

20

# JAMHUURIYADDA DIMOQRAADIGA SOOMAALIYA

WASAARADDA WAXBARASHADA IYO BARBARINTA  
XAFIISKA MANAAHIJTA

## XISAAB

### FASALKA SHANAAD

$A \cup B$   $b = \pi r^2$   $A \cap B$

$\sqrt{2}$   $\phi$   $2^2$

$2 \times 5 = 5 \times 2$

$\{ \dots, -2, -1, 0, 1, 2, \dots \}$

$\{ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 \}$

$A' \cup A'$

$A \cup B = B \cup A$

$69$

$2 + 2 + 2 + 2 + 2 = 10$

$5 + 5 = 10$

FA.

# **XISAAB**

## ***FASALKA SHANAAD***

# **5**

**Xafiiska Manaahijta**

*Wasaaradda Waxbarashada iyo Barbaarinta  
Jamhuuriyadda Dimuqraadiga Soomaaliya*

Buuggan lama daabacan karo lamana guurin karo iyadoo aan  
Wasaaradda Waxbarashada iyo Barbaarinta laga helin oggolaansho

Waxaa lagu daabacay Madbacadda Qaranka  
Xamar, 1975.

## HORDHAC

*Buuggan waxa loogu talagalay ardayda, dugsiyada dhexe, fasalka Shanaad ee habka cusub.*

*Ujeeddada iyo himilada soo saaridda buuggani laga lahaa waxay ahayd in la helo buug kooba manhajka fasalka Shanaad ee habka cusub.*

*Guud ahaan, waxaan mahad weyn u celinayaa Jaallayaashii ka qaybgalay qoritaanka buuggani oo ah :*

- (1) *Bashiir Faarax Kaahiye*
- (2) *Cusmaan Jaamac Daahir*
- (3) *Maxamed Cilmi Bulaale*
- (4) *Saciid Cige Aadan*
- (5) *Cawil Cali Cabdi*
- (6) *Muuse Cabdi Cilmi.*

*Gaar ahaan, waxan mahad u naqayaa Jaalle Muuse Cabdi Cilmi iyo Jaalle Bashiir Faarax Kaahiye oo dhinaca midaynta, isku dubbaridida iyo waafijinta eray-bixinta cusub ee buuggani wax ka qabtay. Waxa kaloo mahad leh dadkii wax ka qabtay xagga sawirrada iyo garaacidida buuggani.*

*Mahad lama illaawaan ah waxa iska leh Madbacadda Qaranka oo suuragelisay soo bixitaanka buuggani.*

MAAMULAHA XAFIISKA MANAAHIJKA  
SULEYMAAN MAXAMUUD AADAN

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## CUTUB I

### JOOOMETARI

#### Bilawga Joometariga

#### A R A A R

Erayga joometary waa eray Giriig ah oo macnihiisu yahay «Cabbiraada Dhulka».

Cilmiga joometarigu waa xisaabta laameheeda waaweyn mid ahaan. Asalkeeduna waa aqoon ku saabsan ama lagu derso qaabka shey waliba uu u uuman yahay, sida uu u yaallo, iyo halka u yaallo. Waxa jirta in shey waloon aragnaaba si gooni ah ama meel gooniya uuu astaysmo. Joometariguna waa astayntaa oo si cilmi ah laysugu duduway.

Gaar ahaanna joometarigu wuxu ka unkamaa baro.

#### Tibixo aan la qeexin

Xisaabyahanadu waxay ogaadeen inay lagama maarmaan tahay in tibixaha xisaabta qaar qeex la'aan lagu qaato. Sidaa haddii la yeeli waayana, waxa dhacaysa in laba tibixood midba ta kale qeexdeeda lagu isticmaalo, oo ay arintiiba ku dhamaato iyadoon labadii tibixood midnaba la qeexin. Metelan, haddaan isniraahno qeexa bar iyo xariiq oo aan niraahno, «xarriiq waa urur baro ah» iyo «bari waa laba **xarriiq** dhextaalkood» waxba maynaan soo kordhin. Markaa, intoo tibixo gaar ah qeex la'aan la qaato, ayaa iyaga la isticmaalaa marka tibixo kale la qeexayo.

Tibixaha qeex la'aanta la qaato waxa ka mid ah «urur», «bar», iyo «xarriiq». Bal hadda, tibixahaa mid walba aan yar sharaxno ama faallaynaba. Hase yeeshee, faallooyinka waa inaan loo qaadan qeexo.

1. **Urur** : Urur waa waxyaabo la isku keenkeenay. Dheeho tusaalooyinkan ururada ah :

$$b) \quad B = \{9, 10, 15\}$$

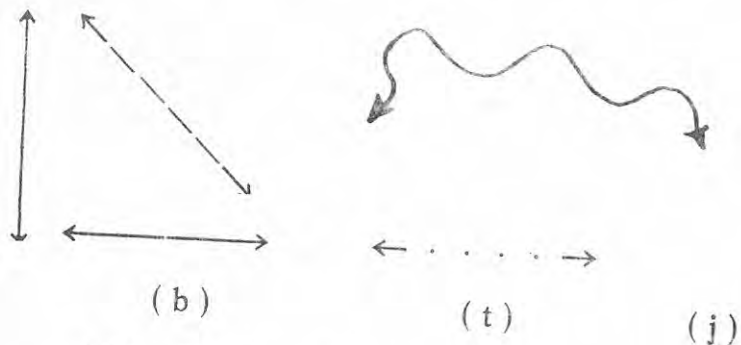
$$i) N = \{ \text{Dadka Soomaaliyeed} \}$$

$$j) K = \{ \text{Soomaalida dayaxa degan} \}$$

Ururka K waa urur madhan. Ku jirayaasha ururka B waa tiroo, hase yeeshe, ku jirayaasha ururka N waa dad. Tibixda «ku jire» qudheeda qeex la'aan baa loo qaataa.

2. Bar : Xagga xisaabta, bari waa fikrad, waxay sheegtaana meel. Bartu dherer, ballar iyo qoto midna ma laha. Sidaa awgeed, lama cabbiri karo barta. Wax waloo yaraan lagu sheegana bartu way ka sii yar tahay. Marka aan muujinayno bar, dhibic, baan dhignaa sida (.) magacawgeeduna waa xaraf lagu ag qoro barta u taagan.

3. **Xarriiq** : Xagga xisaabta, xarriiq waa urur gaar ah oo baro ah. Xarriiq dhererkeeda lama koobi karo, hase yeeshee, ballar iyo qoto midna ma laha. Xarriiqi waa magac guud, laakiin xarriiqyadu waa dhawr jaad (eeg Jaan. 1).



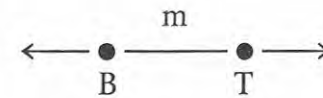
- (b) Xarriiqya toosan
- (t) Xarriiq googo'an
- (j) Xarriiq xoodan

Jaan 1

Xarriiq laba siyoodba waa loo magacaabi karaa. Xarriiqda intoo laba barood oo kala geddisan laga calaamadeeyo, loona bixiyo magacyo sida B iyo T (eeg jaan 2) ayaa xarriiqda loo bixin karaa  $\overleftrightarrow{BT}$ .

Waxaa kale oo la yeeli karaa, in xaraf sida m lagu magacaabo xarriiqda.

Xarriiqda m ama  $\overleftrightarrow{BT}$



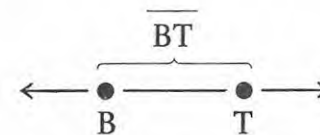
Jaan 2

Intaa aan ku deysano tibixaha qeex la'aanta ah. Dabeeto, inagoo tibixihii aan hore u soo faallaynay isticmaalayna, aan qeexno dhawr tibixood oo aan u baahan doono.

**Qeexo :**

1) **Xariijin** : Waxaad ka soo qaadaa in laba barood oo xarriiq ku yaalla la calaamadeeyey, loona kala bixiyey B iyo T. Labadaa barood iyo dhammaanba baraha ku yaal xarriiqda, ee u dhexeeya B iyo T, waxa loo yaqaan xariijin. Xariijin waa gobol ka mid ah xarriiq. Labada barood ee B iyo T waxa la yiraahdaa baro dhammaad. Xirriijinta labaaadeeda bar dhammaad yihiin B iyo T waxa loo qoraa  $\overline{BT}$ .

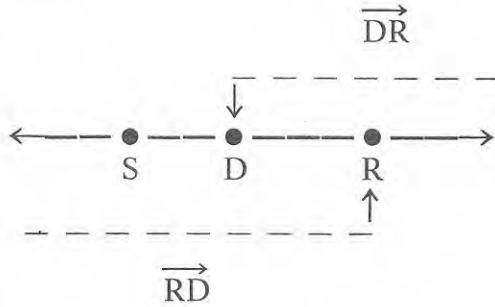
(eeg Jaan. 3)



Jaan. 3

2) **Fallaar**. Fallaar waa urur baro ah, oo ka koobma bar xarriiq ku taalla iyo dhammaanba baraha dhinac ka xiga ee ku yaalla xarriiqdaa.

Marka aan magacaabayno fallaar, waxaan qaadanaa bar bilowgii dhinaca gaarka ah ka xigta. Markaa, haddii bilowgu ahaa D, barta kalana tahay R,  $\overrightarrow{DR}$  waa fallaar. Eeg Jaan. 4.  $\overrightarrow{DR}$  iyo  $\overrightarrow{RD}$  waxay ku kala geddisan yihiin  $\overrightarrow{DR}$  dhinacaa gaarka ah xad kama laha.



Jaan. 4

Hase yeeshee  $\overrightarrow{RD}$  waa fallaar bar bilawgeedu tahay R. kana koobanta R iyo dhammaanba baraha R bidixda ka xiga ee xarriqda ku yaalla. Markaa,  $\overrightarrow{DR}$  iyo  $\overrightarrow{RD}$  isku mid ma aha, ee waxay wadaagaan keliya xarriijinta DR, hal xarriiqna way ku wada yaallaan.

### Layli:

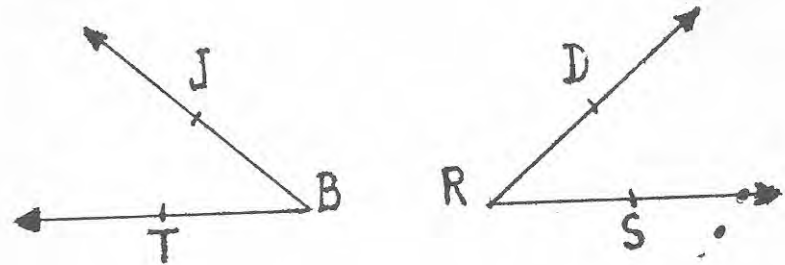
- (1) Haddii B, T, R iyo M ay yihiin baro kala geddisan oo ku wada yaalla xarriiq toosan,
  - a)  $\overrightarrow{BT}$  iyo  $\overrightarrow{TB}$  ma isku midbaa? Waayo?
  - b)  $\overrightarrow{BT}$ ,  $\overrightarrow{RM}$ , iyo  $\overrightarrow{TR}$  xarriiq keliya uun ma wada magacaabayaan? Maxaygeed?
- (2) Ma laga yaabaa laba xariijimood oo laba xarriiq oo kala geddisan ku kala yaalla, inay hal bar wadaagaan? (Jawaabta ku lar jaantus gargaaraaya).
- (3) Ururka baraha ee ay xarriijini ka samaysan tahay ma la koobi karaa?
- (4) Maxay ku kala geddisan yihiin xariiq iyo fallaari?
- (5) Sawir xarriiq, ka magacow laba barood una kala bixi R iyo S.

- b)  $\overrightarrow{RS}$  iyo  $\overrightarrow{SR}$  ma isku midbaa?
  - t) Midkee dheer  $\overrightarrow{RS}$  iyo  $\overrightarrow{SR}$ ?
  - j) Maxay wadaagaan  $\overrightarrow{RS}$  iyo  $\overrightarrow{SR}$ ?
  - x)  $\overrightarrow{RS}$  iyo  $\overrightarrow{RS}$  ma la cabbiri karaa?
  - kh)  $\overrightarrow{RS}$  ma la cabbiri karaa?
- (6) Qeex erayadan: Xariijin iyo fallaar.

### Xaglo

Waxaa laga yaabaa marka aad xagal maqasho inaad xa-suusato xagal lugeed, gacan labaan, laba dariiq oo kulmaya? iwm.

Bal hadda u fiirso jaan. 5.



Jaan. 5

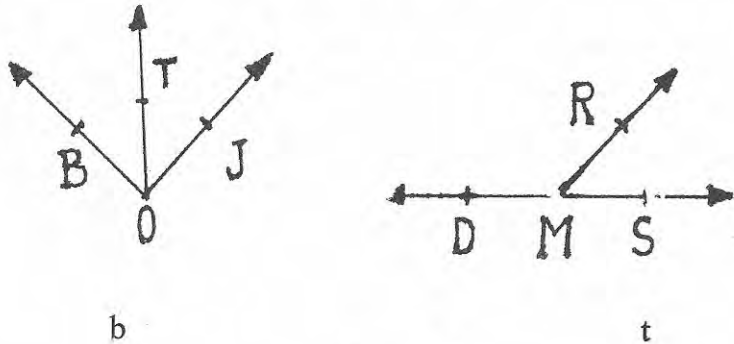
Jaan. 5 waxay muujinaysaa laba xaglood. Labadaa xaglood mid waliba waxay ka kooban tahay laba fallaarood. Xagasha hore waxay ka kooban tahay  $\overrightarrow{BJ}$  iyo  $\overrightarrow{BT}$ . Labadaa fallaarood waxay wadaagaan B. Xagasha labaad fallaaraha ay ka kooban tahay waa kuwee? Bar bilowga ay labadaa fallaarood wadaagaan waa kee?

Haddaba, xagal waxaynu ku qeexi karnaa isutagga laba fallaarood oo hal bar bilow wadaaga. Bar bilowga ay wadaagaan labada fallaarood waxaa loo yaqaan geeska xagasha. B iyo R baa ah geesaha xaglaha jaan. 5 Fallaaraha abuura xagal waxaa loo yaqaan dhinacyada xagasha, waxayna ku kul-

maan geeska xagasha. Bar waloo xagal ku taallaana labada dhinac ee ay xagashu ka samaysan tahay mid ahaan bay ku taal, ama labada dhinacba way ku taal.

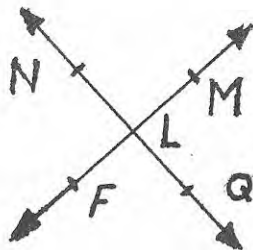
Labada xaglood ee jaan. 5 ta hore waxaa loo qoraa  $\angle TBJ$  ama  $\angle JBT$ ; ka kalana waxaa loo qoraa  $\angle DRS$  ama  $\angle SRD$ . Marka xagal sidaa gaaban loo qoro, matalan  $\angle TBJ$ , xarafka bartanku wuxuu u taagan yahay geeska xagasha. Xarafka hore iyo ka u dambeeyaana waxay kala magacaabaan laba barood oo labada dhinac ee xagasha ku kala yaalla.

**Xaglo deris ah**



**Jaan. 6**

Jaan. 6 b. wuxuu muujinayaa xaglaha deriska ah ee  $\angle BOT$  iyo  $\angle TOJ$ . Laba xaglood oo deris ahi waa laba xaglood oo isgarab yaalla, oo dhinaca ay wadaagaanna uu u dhe-xeeyo. Xaglaha deriska ahi waxay wadaagaan gees iyo dhinac. Jaan. 6 t. xaglahee deris ah?

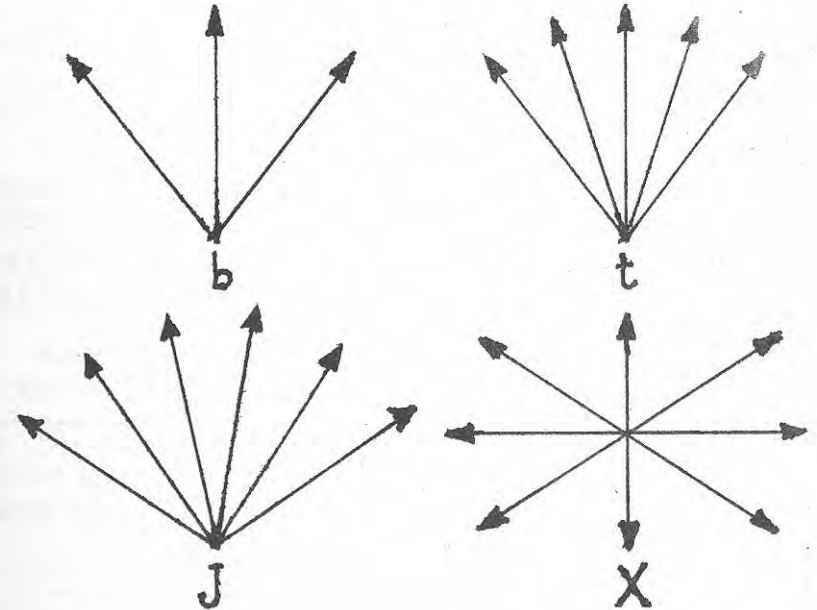


**Jaan. 7**

Jaan. 7 wuxuu muujinayaa xaglaha foodsaarka ah ee  $\angle NLM$  iyo  $\angle FLQ$ . Labadaa xaglood iyana waxay wadaagaan gees. Hase yeeshee, ma jiro dhinac ay wadaaggani. Dhinacyadooda laba xarriiq bay ku kala yaallaan;  $\overrightarrow{LN}$  iyo  $\overrightarrow{LQ}$  xarriiq bay kuwada yaallaan,  $\overrightarrow{LM}$  iyo  $\overrightarrow{LF}$  iyana xarriiq kalay ku wada yaallaan, isla jaan. 7, ma ku aragtaa xaglo kale oo foodsaar ah.

**Layli :**

1. Magacaw waxyaabo u eg xaglo?
2. Imisa xaglood baa lagu muujiyey jaan. 8 b? t? j? x?



**Jaan. 8**



3. Imisa lammaane oo xagla deris ah baa ka muuqda jaan. 8 t.?
4. Lammaane xaglo ah oo deris ahi ma noqon karaan lammaane xaglo ah oo foodsaar ah?
5. Laba xaglood oo foodsaar ahi deris ma isku noqon karaan?

### Cabbiraadda dhererka iyo xaglaha

#### Dhererka :

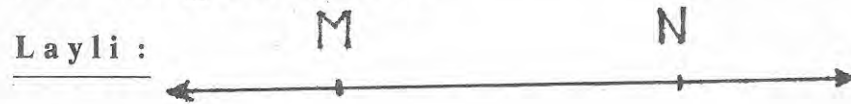
Marka la doonayo in la cabbiro xarriijin dhererkeed, waxa la isticmaalaa halbeeg cabbiraadeed oo u gaar ah dhererka. Sidii aad horeba u soo aragtay, halbeegyadaasi waxa weeye mitirka ama fuurka.

Waxa ka mid ah qalabka lagu cabbiro dhererka mastaradda.



Jaan. 9

Xarriijinta BT haddaad rabto inaad cabbirto, mastarad girgirkeed toos ugu beeg xariijinta. Mastaradda barteeda u taagan eber ku beeg barta B. Barta ku beegan T, ee mastaradda ku taallo, ayaa inoo tilmaamaysa dhererka xarriijinta oo ku cabbiran halbeegyo cabbiraadeed.



1. Cabbir  $\overline{MN}$
2. Jeex xariijimo dhererkoodu yahay
 

b) 2 sm	t) 8 sm	j) 5.5 sm
x) 3.7 sm	kh) 3 hiish	d) $2\frac{1}{8}$ hiis
r) $1\frac{1}{2}$ hiis	s) 22 mm.	sh) 50 mm.

dh) 4.3 sm.

3. b) Imisa sm baa ku jira 1 m?  
 t) » » » » » 4.73 m?  
 j) » mitir » » » 4.5 km.?  
 x) » km » » » 300 m?
4. Weedhahan soo socda sheeg inay run yihiin iyo inay been yihiin?
  - b) Waarkaa ka dheer mitirka.
  - t) Kiiloomitirku ka gaaban maylka.
  - j) Milimitirku ka gaaban hiishka.
  - x) Laba sentimitir ka dheer hiish.
  - kh) Hal mitir ka dheer 39 hiish.

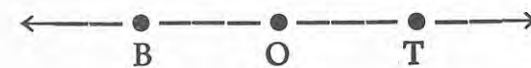
### Cabbiraadda Xaglaha

Cabbiraadda xarriijimuhu waxay u baahdeen in la helo halbeeg cabbiraadeed. Markaasaa, xarriijin gaar ah dhererkeeda loo qaatay halbeeg cabbiraadeed, oo magac loo bixiyey sida «Mitir» iyo «Fuudh».

Tabtaas oo kale, si aynu u helno cabbir xagleed, waxa lagama maarmaan ah inaan xagal ka dhigno halbeegga cabbiraada xaglaha. In kastoon xagashaan doono ka dhigan karno halbeeg cabbiraadeed, waxa haboon midda la isku raacsan yahay inaan inanna isticmaalno.

Xagal waxaan ku qeexnay «isutagga laba fallaarood oo hal bar bilaw wadaaga».

Waxaad sawirtaa xarriiq toosan (eeg jaan. 10), calaamadee bar ku taalla xarriiqdaa, una bixi O, laba barood oo labada dhinac bartaa ka kala xigana calaamadee, una kala bixi B iyo T.



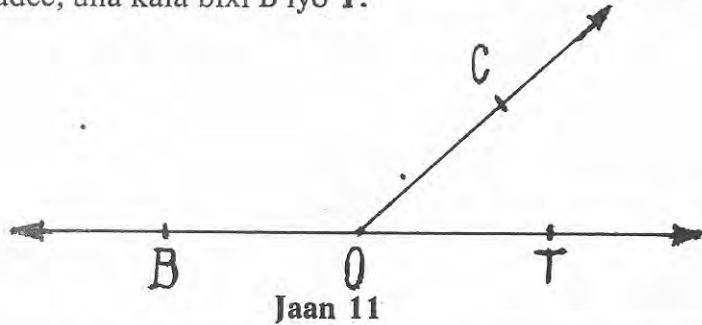
Jaan. 10

Marka,  $\overrightarrow{OB}$  iyo  $\overrightarrow{OT}$  waa laba fallaarood oo ku kulma barta O. Sidaa daraadeed,  $\overrightarrow{BOT}$  waa xagal geeskeedu yahay O.

Waxaynu aragnaa inay xariiqda toosani tahay xagal. Xagasha jaadkaas ah waxa la yiraa xagal toosan.

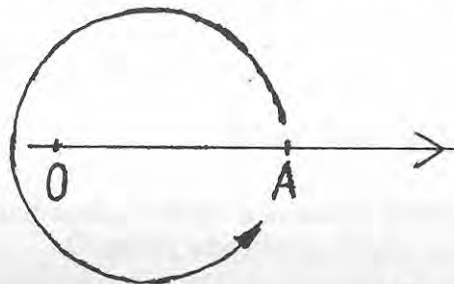
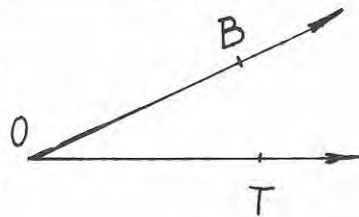
Haddaba, waa maxay xagasha laysku raacsan yahay ee ah beeggalka cabbiraada xagluhu.

Sawir xagal toosan oo geeskeedu yahay O (eeg jaan. 11). Laba barood oo labada dhinac ee xagashaa ku kala yaallana calaamadee, una kala bixi B iyo T.



Xagashaa iyo gudeheeda haddaan u qaybino 180 xaglood oo isku sargo'an xagashii xaglaha 180ka ah ka mid ahba cabbiraadeedu waa 1 digrii iyadaana ah halbeegga cabbiraada. Marka la soo gaabinayo 1 digrii, waxaa loo qoraa  $1^\circ$ . Markaa, xariiqda toosani waa  $180^\circ$ .

Waataynu niri xagali waa isutaga laba fallaarood oo gees wadaaga (eeg jaantuskan). Haddii imminka aynu lid saacad wareeg u wareejino xariijinta OA ilaa aynu gaarno xariijinta OB, waxaad arkaysaa inaynu xagasha AOB samaynay. Haddii aynu sii wareejino OA ilaa aynu ku soo noqono halkaynu ka bilownay, waxaynu samaynay hal waareeg, (eeg jaantuskan)



Haddaba xagasha laysku raacsan yahay waa hal wareeg oo 360 meelood loo qaybiyey, waxaana la yiraa 1 digrii ( $1^\circ$ ).

$$\text{Kolka } 1^\circ = \frac{1}{360} \times \text{hal wareeg.}$$

Xagal gaar ah cabbiraadeedu waxa weeye inta xaglood, ee mid walba cabbiraadeedu tahay  $1^\circ$ , ee lagu dhex samayn karo xagashaa iyo gudeheeda.

Cabbiraada xagluhu had iyo jeer ma aha tirooyin idil oo digriiyo ah; way yeelan karaan cabbiraadyo  $30 \frac{1}{2}$  digrii ama  $65 \frac{1}{4}$  digrii oo kale ah.

Hase yeeshee, waa la iska ilaaliyaa in jajabyo digriiyo ah la isticmaalo. Halka digrii oo lixdan xaglood loo qaybiyey waxaa la yiraah hal minit. Halkaa minit waxaa loo qoraa  $1'$ . Markaa, cabbiraada ah  $30 \frac{2}{10}$  waxa haboon in loo qoro 30 digrii iyo 30 minit ( $30^\circ 30'$ ), midda ah  $65 \frac{4}{3}$  digriina waxaa loo qoraa 65 digrii iyo 45 minit ( $65^\circ 45'$ ).

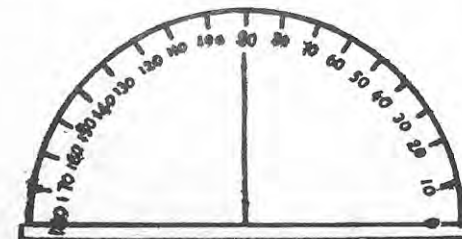
Xasuusnow in

$$\begin{aligned} 1 \text{ digrii } (1^\circ) &= 60 \text{ minit } (60') \\ 1 \text{ minit } (1') &= 60 \text{ sekan } (60'') \end{aligned}$$

### Habka loo Cabbiro Xaglaha.

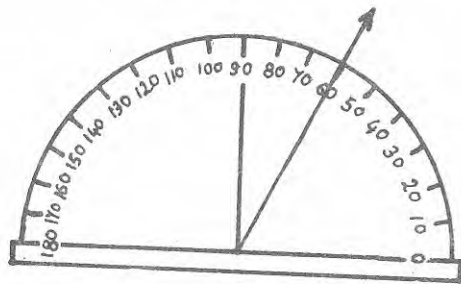
Xaglaha qalabka lagu cabbiro waxaa ka mid ah xagal beegga. Alaabadaasi waxay sawaabisaa xagal toosan oo loo qayshay 180 xaglood oo isku sargo'an. Markaa, waxa lagu cabbiri karaa xaglo cabbiraadoodu u dhexayso eber iyo 180 digrii.

Xagal beeggu wuxu u egyahay musawirka ku muujisan jaan. 12.



jaan. 12

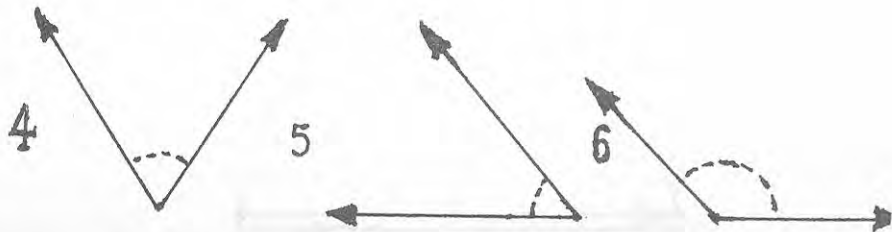
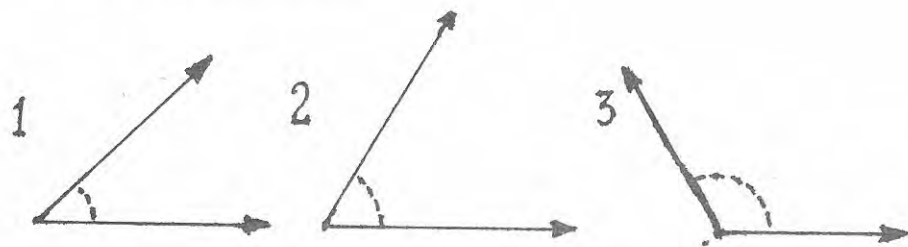
si aad u hesho cabbiraad xagleed oo digriiyo ah, xagal beeg dul saar xagasha aad cabbirayso. Geeska xagashu ha ku beegnaado barbartanka xagal beegga. Dhinacyada xagasha midkoodna ku beeg girgirka hoose ee xagal beegga. Deeto, akhri tirada ku taalla xagal beegga qaarkiisa sare ee ka sarraysa dhinaca labaad ee xagasha. Metalan, jaan. 13 waxay muujinaysaa xagal cabbiraadeedu tahay  $60^\circ$ .



Jaan. 13

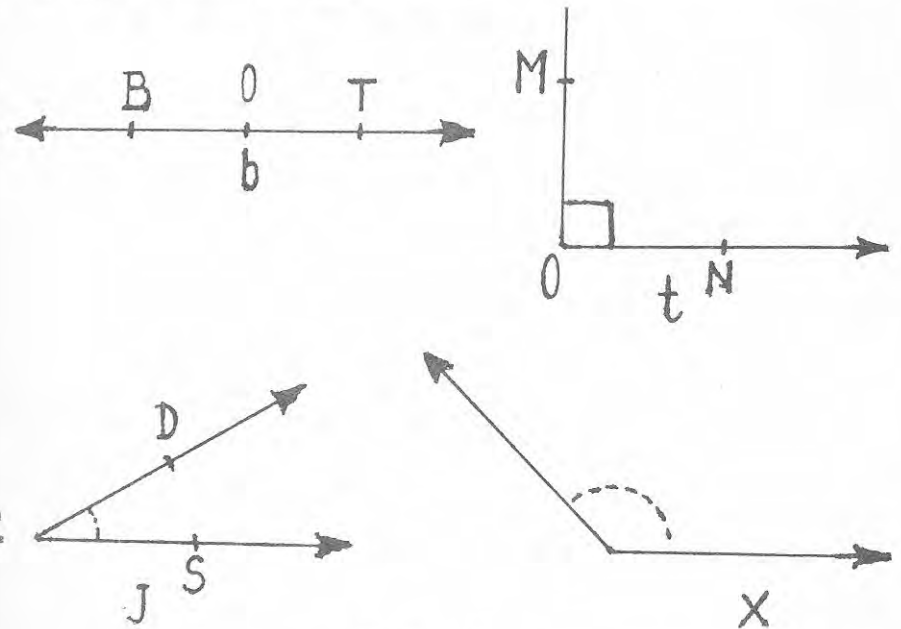
Layli :

Cabbir xaglahan



Xaglaha waxaa loo kala sooci karaa sida ay cabbiraadoodu u kala geddisan tahay. Xagasha cabbiraadeedu tahay  $90^\circ$  waxaa loo yaqaan **xagal qumman**. Xaglaha cabbirkoodu ka yar yahay  $90^\circ$  na waxaa loo yaqaan **xaglo fiiqan**, kuwa cabbirkoodu ka weyn yahay  $90^\circ$  na waxaa la yiraa **xaglo furan**.

Jaan. 14 waxay muujinaysaa xagal **toosan**, xagal **qumman**, xagal **laaban**, iyo xagal **furan**.

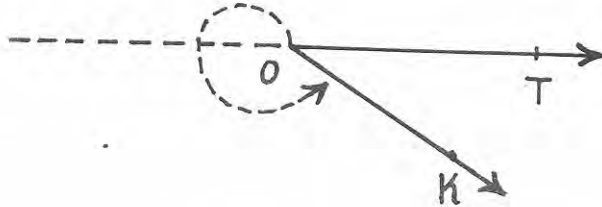


Jaan. 14

Xagasha BOT waa xagal toosan,  $\angle MON$  waa xagal qumman,  $\angle DRS$  waa xagal fiiqan,  $\angle LMN$  na waa xagal furan.

Weli, xagga cabbiraada xaglaha, waxaan ku ekayn uun xaglaha u dhexeeya O iyo 180 digrii. Xaglaha cabbirkoodu ka weyn yahay 180 digrii, kana yar yahay 360 digrii waxaa la yiraa **xaglo daacsan**.

Jaan. 15 baa muujinaysa xagal daacsan  $\angle$  KOT waa xagal daacsan.



Jaan. 15

Layli :

1. Xaglihii layligii hore, kuwee ah xagla qumman, xaglo fiiqan, ama xaglo furan.
2. Sawir laba xaglood oo fiiqan.
3. Sawir xagal furan.
4. Sawir xagal daacsan.

**Saldhigga tabta dhismaha**

Samaynta dhismayowga joometarigu waxaa weeye in la sawiro urur baro ah iyadoo la isticmaalayo qalab gaar ah. (xusuusnaw in xarriiqyada, xarriijimaha, iwm, ay yihiin ururro baro ah).

Qalabka dhismahaa lagama maarmaanka u ahi waxa weeye qalin (laabis), mastarad iyo goobeeye.

Dhawr dhis oo saldhig u ah farsamada dhismaha joome-tariga aan ka yara hadalno, iskuna dayno inaan samayno.

**1 — Xarriijin Guurinteed**

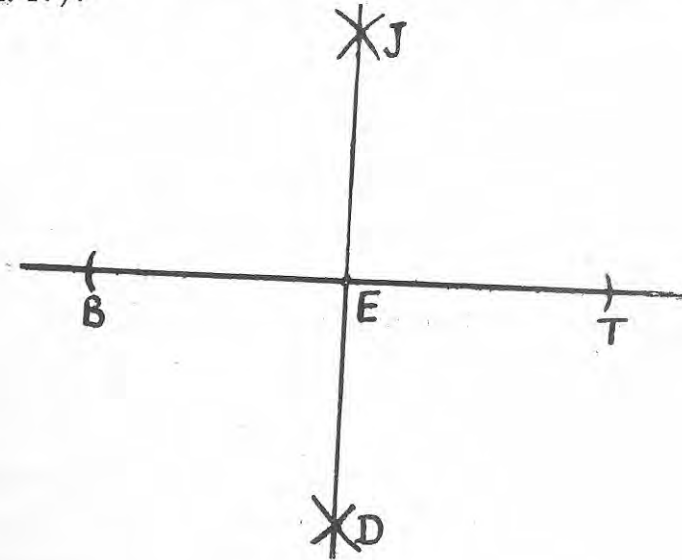
Ka dhig inaynu rabno in xarriijin la ina siiyey aynu guuri-no. Xarriiqda CR ayaynu ku sawiri xarriijin ku sargo'an xarii-jintaa, oo bar bilawgeedu tahay C (eeg Jaan. 16)

Jaan. 16

Si aad dhismahaa u samayso, adigoo goobeeye, laabis iyo mastarad isticmaalaya, sawir qaanso maraysa T, iyadoo ay xud-duntu tahay B. Adigoo gacanka beddelin, sawir qaanso CR ku jaraysa D, oo xuddunteeduna tahay C. Markaa  $\overline{CD}$  baa ah xarriijintaan rabney.

**2 — Klalabdhid Xarriijimeed**

Imminka waxaynu rabnaa inaynu kalabadhno xarriijinta BT (Jaan. 17).



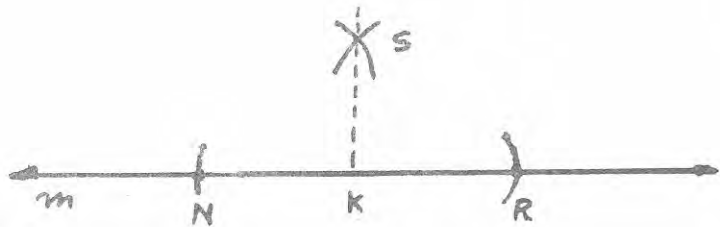
Jaan. 17



Iyadoo ay xudduntu tahay B, oo aad gacan ahaan u qaaday fogaan kaweyn xarriijinta badhkeed, sawir laba qaanso oo labada dhinac ka kala mara xarriijinta BT. Adigoo gacankii hore uun isticmaalaya, oo ay xudduntu tahay T, sawir laba qaanso oo kale oo labada dhinac ka kala mara xarriijinta BT. Qaansooyinkaasi waxay ku kulmaan labada dhibcood ee J iyo D. Xarriijinta xariirisa J iyo D barta ay kula kulanto BT, ee aan ku magacawney E, ayaa ah xarriijinta BT badhtankeeda. Xarriijinta DJ waxa la yiraahdaa qotome badhaha xarriijinta BT. Xarriijinta iyo qotome badheheedu waxay isla sameeyaan xaglo quman.

### 3. Dhisidda qotome maraaya bar xariiq ku taalla

Waxaad ka soo qaaddaa inay xariiqda tahay m (jaan. 18) barta u qotomuhu marayaana tahay K.

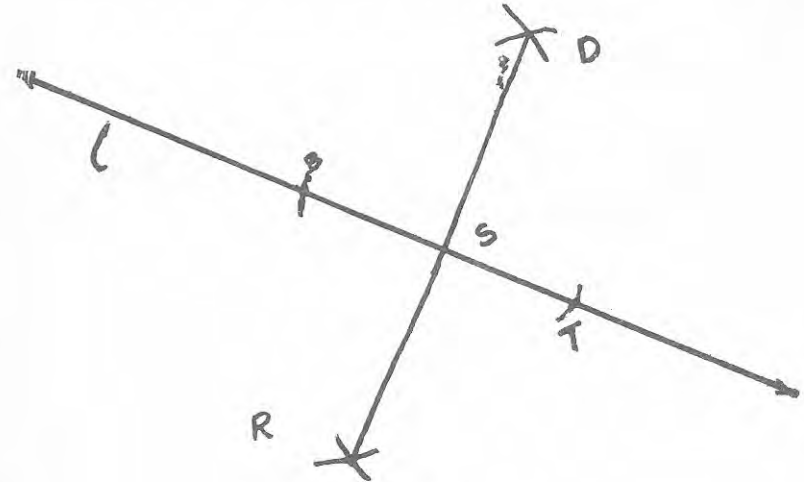


Jaan. 18

Iyadoo xudduntu tahay K, sawir qaanso kula kulanta xariiqda m labada barood ee N iyo R. Gacan ahaan u qaado fogaan woxoogey ka dheer NK ama KR. Adigoo gacankaa isticmaalaya, marna xudduntu tahay N marna R, sawir laba qaanso, barta ay ku kulmaanna u bixi S. Markaa SK baa ah qotomihii aan rabney.

### 4. Dhisidda qotome maraaya bar xariiq dibadda ka ah

Waxaad ka soo qaaddaa inay xariiqdu tahay l, dhibicduna tahay D. Iyadoo xudduntu tahay D, sawir qaanso kula kulanta xariiqda l labada dhibcood ee B iyo T. Iyadoo xuddunuhu yihiin B iyo T, gacannaduna isle'eg yihiin, sawir laba qaanso oo ku kulma barta R (eeg Jaan. 19).

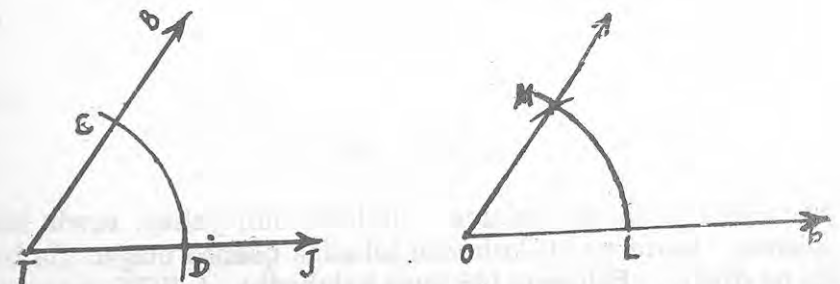


Jaan. 19

Jeex xarriijinta DR. Markaa DS baa ah qotomihii la rabey.

### 5. Xagal Guurinteed

Masaladu waxay tahay in la sawiro xagal cabbir le'eg xagal kale oo la ina siiyey. Waxaad ka soo qaaddaa xagasha la ina siiyey inay tahay  $\angle$  BTJ sida ay muujinayso Jaan. 20.

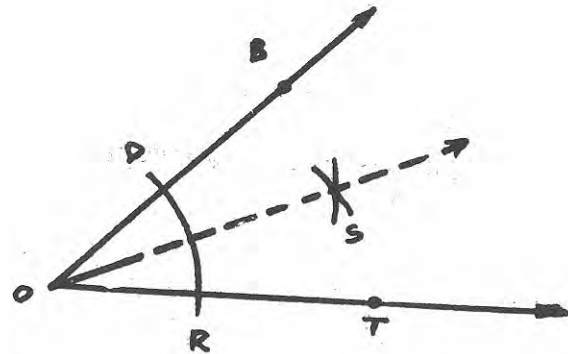


Jaan. 20

Jeex xariiq bar bilawgeedu yahay O. Iyadoo xudduntu tahay T, sawir qaanso labada dhinac ee  $\angle BTJ$  kula kulanta labada barood ee D iyo G. Iyadoo barta O ay xuddunta tahay, gacankuna kii hore yahay, sawir qaanso OA ku jarta barta L. L oo xuddunta ah, gacankuna yahay fogaanta u dhaxaysa G iyo D, sawir qaanso tii hore ku gooya M. Isku xir O iyo M. OM ayaa ah dhinacii labaad ee xagasha aan rabney. Mar-kaa  $\angle MOA$  baa ah xagashii aan rabney.

### 6. Kalabadhid xagleed

Waxaad ka soo qaaddaa in xagasha la kala badhayaa ay tahay  $\angle BOT$ . Adigoo O u isticmaalaya xuddun ahaan, sawir qaanso labada dhinac ee xagasha ku jarta D iyo R. D iyo R oo

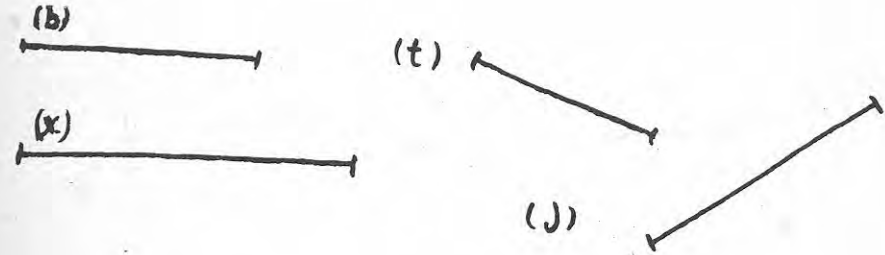


Jaan. 21

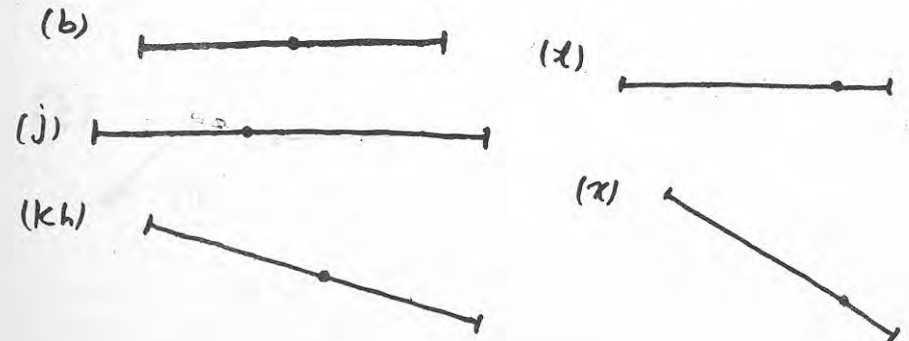
xauddunaha ah, gacankuna kii hore uun yahay, sawir laba qaanso. Barta ay ku kulmaan labada qaanso magac ula bax (S ba dheh). Fallaarta OS ayaa kalabadha  $\angle BOT$ . waxaana a yiraahdaa Xagal Badhaha  $\angle BOT$ .

### L a y l i :

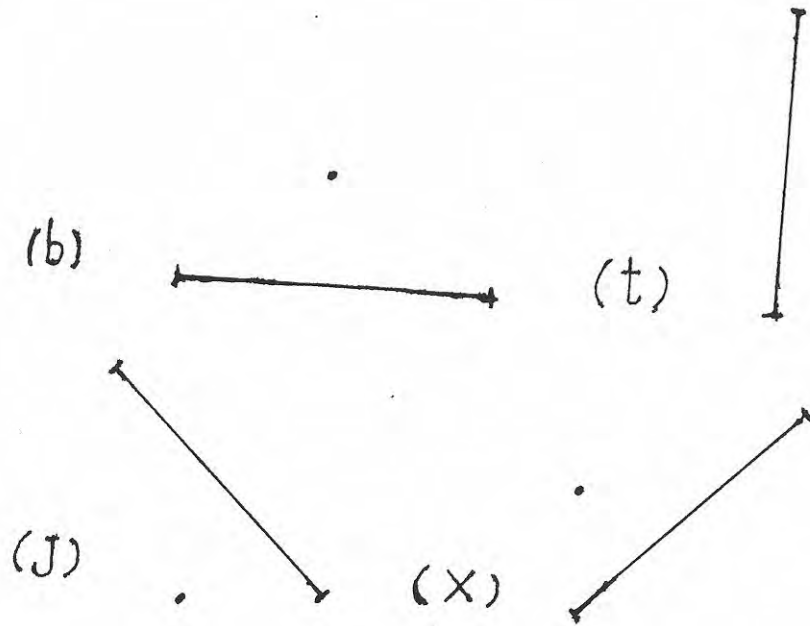
1. Guuri xariijimahan



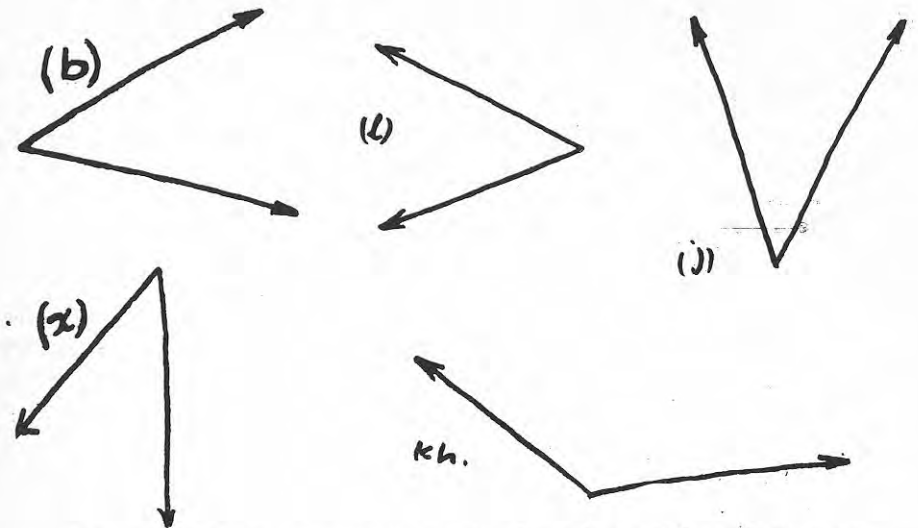
2. Xarriijimaha kor ku sawiran mid walba kalabadh.
3. Qotomayaasha xarriijimahan ee baraha maraya sawir.



4. Qotomayaasha xarriiqyadan, ee baraha dibadda ka ah ku yaalla, ee muujisan, sawir.



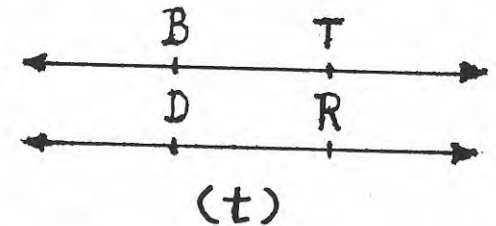
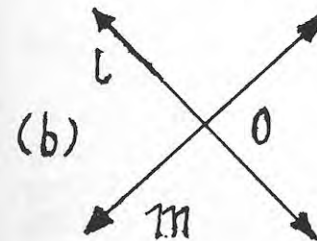
5. Guuri xaglahan



6. Sawir xagal cabbiraaddeedu tahay  $45^\circ$ , adigoon xagal beeg isticmaalin.

**Xarriiqyada barbaraha ah iyo astaamahooda**

Waxaa laga yaabaa inay laba xariiq kulmaan, sida xariiqda m iyo xariiqda L ee ku kulma barta O (eeg jaan. 22 b.). Waxaa kale oo laga yaabaa inay laba xariiq kulmi waayaan, sida  $\overleftrightarrow{BT}$  iyo  $\overleftrightarrow{DR}$  (eeg jaan. 22 t.).



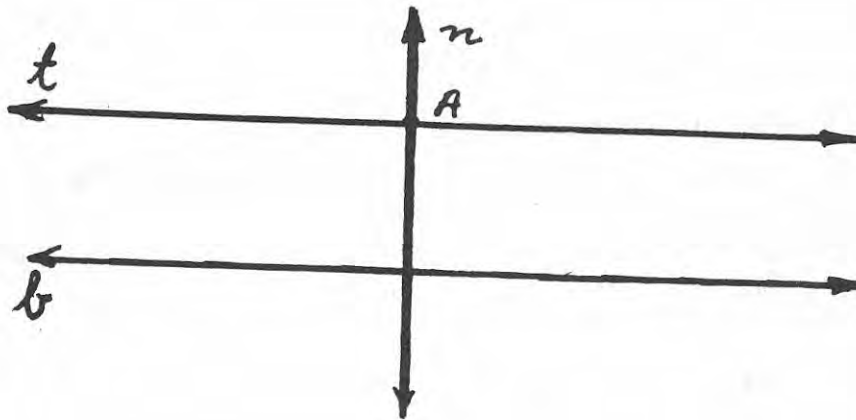
Laba xariiq oo toosan oo aan meelnaba ku kulmayn waxaa loo yaqaan **xarriiqyo barbaro ah**. Markaa, laba xarriiq oo toosani hadday barbaro yihiin, bar ay wadaagaani ma jirto.

Midda kale, fogaanta laba xariiq oo barbaro ah qoton ahaan ugu dhexaysaa, meel waloo laga qaadaba, waa miduun.

Xariiqda toosan ee laba xariiq oo barbaro ah labadaba marta waxaa loo yaqaan **wadaajiye**.

### Dhismaha xarriiqyo barbaro ah

Waxaad ka soo qaaddaa in la ina siiyey xariiqda b, oo la ina warsaday xariiqdaa xariiq ay barbaro yihiin inaan sawirno. Dooro bar xariiqda dibadeeda ah (kaba dhigo A). (Eeg Jaan. 23).

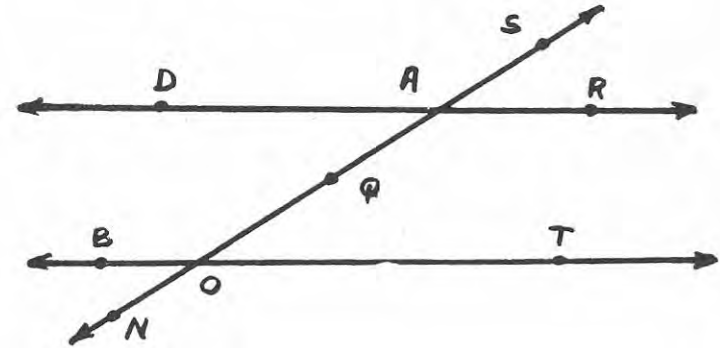


Jaan. 23

Waxaad sawirtaa xariiq ku qotonta xariiqda b oo maraysa barta A. Xarriiqdaa magac ula bax (kaba dhig n). Waxaad sawirtaa xariiq ku qotonta xariiqda n oo maraysa barta A. Uba bixi xariiqda t. Markaa xariiqda b iyo xariiqda t waa barbaro.

### J i t a a b o :

Adigoo raacaya hilinkii aynu soo sheegnay, waxaad sawirtaa laba xariiq oo barbaro ah (eeg Jaan. 24).



Jaan. 24

Sawir wadaajiyaha  $\overleftrightarrow{NS}$  ee labada xarriiq kula kala kulma A iyo O.

Bal hadda cabbir  $\angle SAR$  iyo  $\angle QOT$ . Ma is cabbir le'egyihin?

Labada xaglood ee  $\angle SAR$  iyo  $\angle QOT$  waxaa loo yaqaan lammaane **xagla ah oo gudboon**. Waxaa kale oo xagla gudboon ah  $\angle QAD$  iyo  $\angle NOB$ . Bal hadda ku cabbir xagal beeg. Ma cabbir le'eg yihiin?

Waxa dhab ah lammaanaha xaglaaha ah ee gudbooni inay is cabbir le'eg yihiin.

$\angle SAB$  iyo  $\angle QOB$ , iyo  $\angle QAR$  iyo  $\angle NOT$  iyana waa lammaanayaal xagla ah oo gudboon. Hubso inay is cabbir le'eg yihiin. **Laba xaglood hadday yihiin lammaane xagla ah oo gudboon, way is cabbir le'eg yihiin.**



$\angle SAR$  iyo  $\angle QAD$  waa **xaglo foodsaar ah**. Ma is cabbir le'egyihin? Jaan. 24 ma kaaga muuqdaan xaglo kale oo foodsaar ahi? Iyana ma is cabbir le'eg yihiin?

**Laba xaglood hadday foodsaar yihiin way is cabbir le'eg yihiin**

Labada xaglood, ee  $\angle BOQ$  iyo  $\angle QAR$ , waa **xaglo gudeed talantaali ah**; wadaajiyaha ayay labada dhinac kaga kala yaallaan, labada xariiq ee barbarha ahna way u dhexeeyaan.  $\angle BOQ$  iyo  $\angle QAR$  ma is cabbir le'eg yihiin? Lammaane kale oo xaglo gudeed talantaali ahi ma ka muuqdaa Jaan. 24? Iyana ma is cabbir le'eg yihiin?

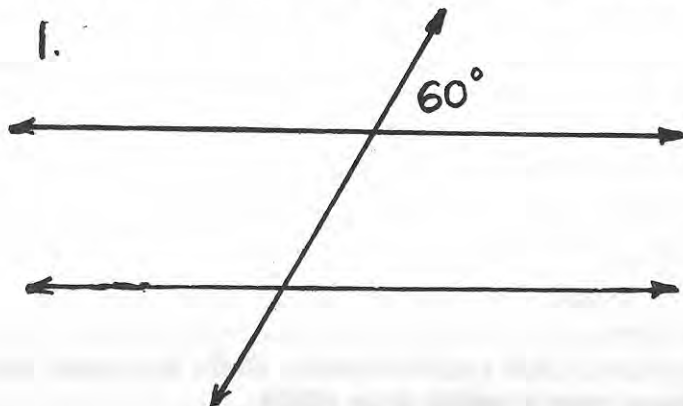
**Laba xaglood hadday xaglo gudeed talantaali ah yihiin way is cabbir le'eg yihiin.**

Labada xaglood ee  $\angle SAD$  iyo  $\angle NOT$  waxa la yiraahdaa **xaglo dibadeed talantaali ah**. Cabbir labada xagloodba. Ma is cabbir le'eg yihiin? Lammaane kale oo xagla dibadeed talantaali ah ma laga heleyaa Jaan. 24? Waa kuwee? Iyana ma is cabbir le'eg yihiin?

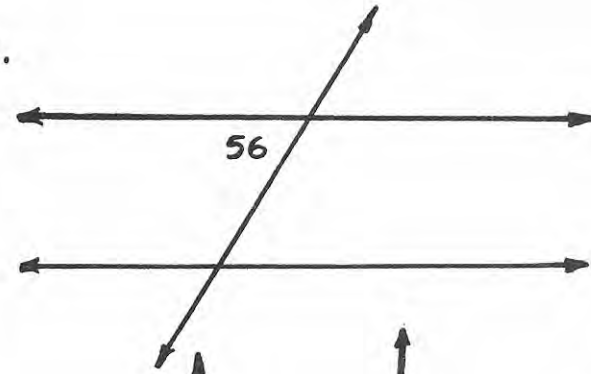
**Laba xaglood hadday lammaane xagla dibadeed talantaali ah yihiin way is cabbir le'eg yihiin.**

### L a y l i :

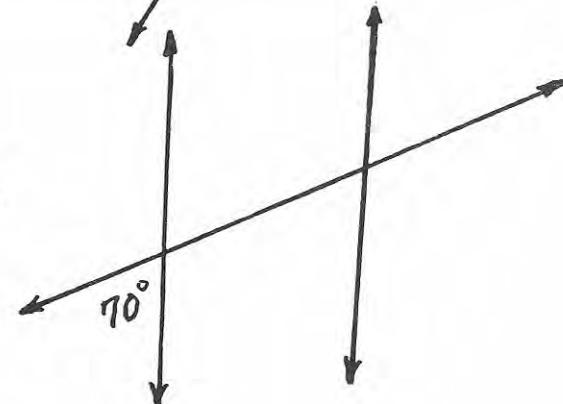
Xaglana aan cabbirkooda lagu siin, raadi cabbirkooda



2.



3.



### Qiyaas Sawir.

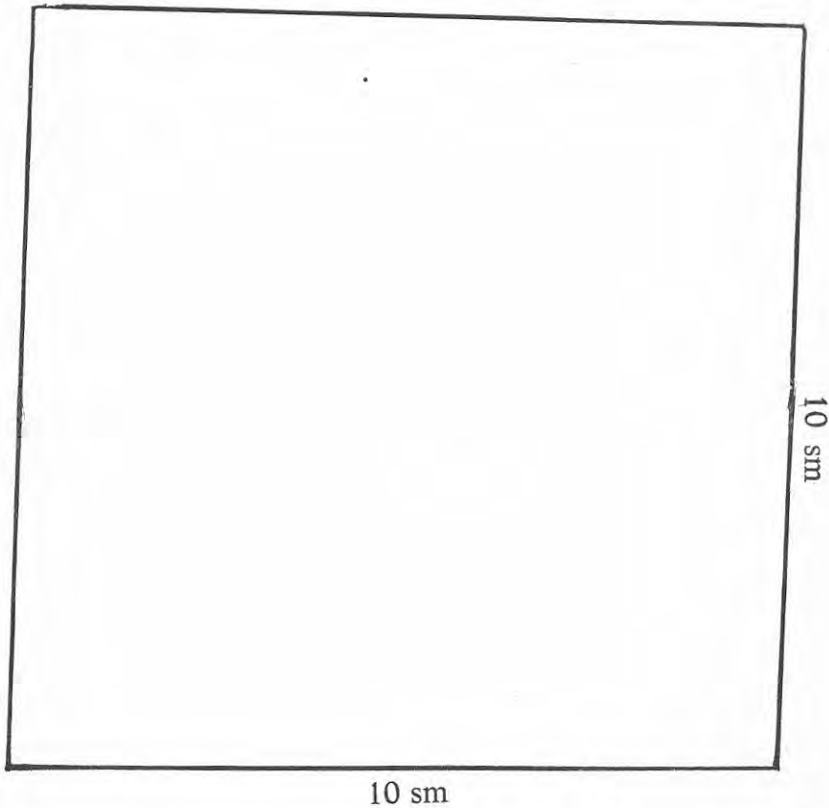
Mararka qaarkood waxa dhaca in loo baahdo in meel lagu sawiro waraaq. Haddii meesha qiyaasteedu ay yar tahay, dhibaato caynkaas ahi jirimayso. Badanaase waxa dhaca in qiyaasta meeshu ay ka weyn tahay waraaqda. Marka haddaba ay noqoto lagama maarmaan in sawir lagu muujiyo meesha caynkaas ah waxa loo baahan yahay in la qaato qiyaas yar oo u taagan meesha. Mararka qaarkoodna waxa loo baahan yahay in qiyaasta meel yar la weyneeyo si hawl yaraan loo arki karo.

Qiyaasta, haddaba, meel yaraanteedda ama weynaanteedda ku xiran waxa la yiraahaa **Qiyaas Sawir**. Badanaa 1 sentiimitir (ama 1 hiish) ayaa laga dhigtaa inay u taagan tahay cabiraad weyn kolka la doonayo in meel cabiraadeeda la yareeyo.

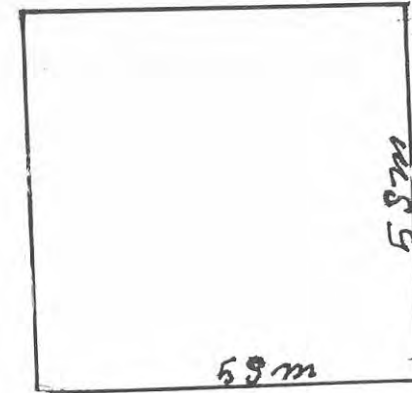
**Tusaale:** Labajibbaar dhinac waliba yahay 10 sm ayaa la doonayaa in qiyaas sawir ah  $2 \text{ sm} = 1 \text{ sm}$  loo sameeyo.

$2 \text{ sm} = 1 \text{ sm}$  waxay tahay laba sentimitir oo sawirka dhabta ah waxaa u taagan hal sentimitir oo sawirka xaashida ah.

Haddii cabbiraadda hore la raaco, labajibbaarku intan ayuu le'ekaanayaa:

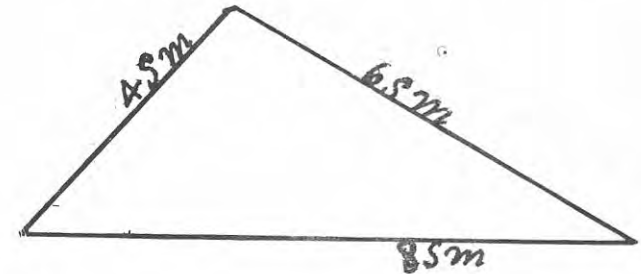


Haddii qiyaastan dambe oo ah  $2 \text{ sm} = 1 \text{ sm}$  la raaco  
 $10 \text{ sm} = \frac{10}{2} = 5 \text{ sm}$ .: Laba jibbaarkiina wuxuu le'ekaanayaa  
 intan:



Tusuule 2. Adoo qaadanaya qiyaas sawir ah  $1 \text{ sm} = 2 \text{ sm}$ , waxaad sawirtaa saddexagal dhinacyadiisu yihiin 2 sm, 3 sm iyo 4 sm.

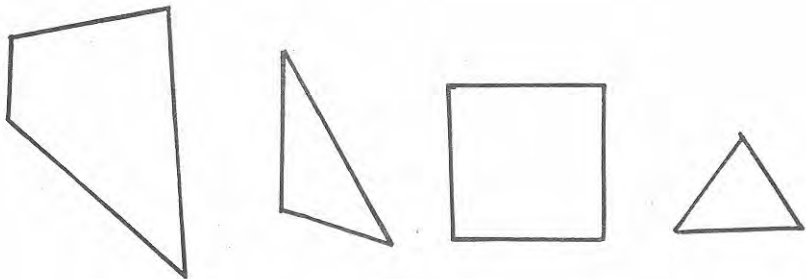
Furfurid : Qiyaastan markaad raado  $2 \text{ sm} = 4 \text{ sm}$ ,  $3 \text{ sm} = 6 \text{ sm}$ ,  $4 \text{ sm} = 8 \text{ sm}$ . Kolkaa:



L a y l i :

1. Fagaare lagu cayaaro ayaa dhinacyadiisu yihiin 20 fuur iyo 30 fuur. Sawir fagaaraha adoo qaadanaya qiyaas ah  $1'' = \text{fuur}$ .
2. Saddexagal ayaa dhinacyadiisu yihiin 16'', 18'' iyo 20''. Qaado qiyaas ah,  $1'' = 4''$ , dabadeedna sawir saddexagalka.
3. Aqal ayaa hoostiisu tahay labajibbaar dhinaciisu yahay 41 sm. Isticmaal qiyaas ah  $1 \text{ sm} = 5 \text{ sm}$ , dabadeedna sawir aqalka hoostiisa.

4. Saddexagal ayaa dhinacyadiisu yihiin  $2\frac{1}{2}$  sm, 3 sm iyo 4 sm. Weynee saddexagal intaad qaadato qiyaas ah  $1\text{ sm} = 2\text{ sm}$ .
5. Goobo ayaa gacankeedu yahay 3 sm. Goobo taa labanlaabkeeda ah sawir. Waa intee dhexroorka cusiubi?
6. Sawirradan waxaad ka dhigtaa qaar ah (a) saddexlaabkood (b) labanlaabkood.



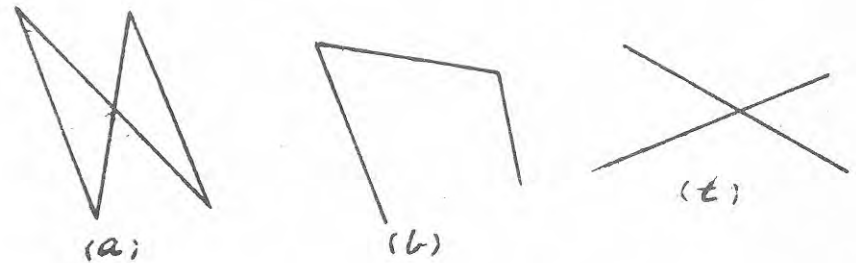
## C U T U B II

### Geesoole

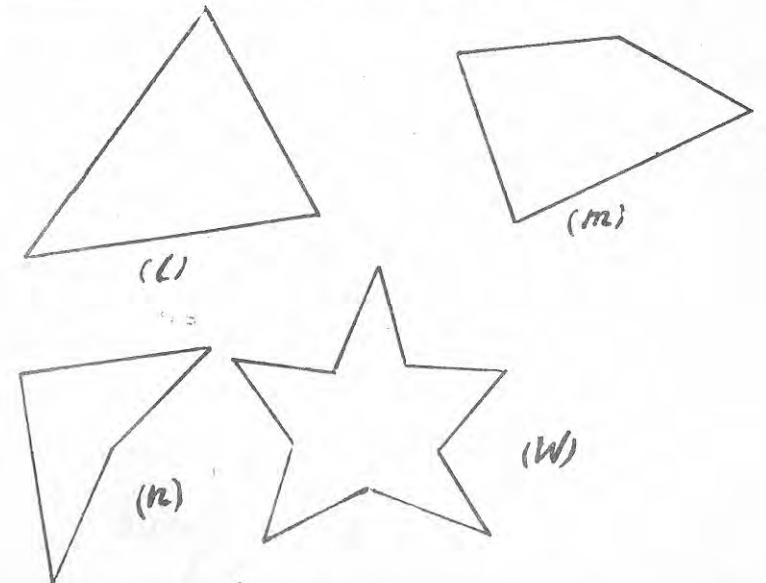
Qeex :

Geesoole waa shaxan oodan, oo ka samaysan xariijimo midiba mid ku daba taxan tahay, isla markaasna laba xariijimoodna iskama dul gudbi karaan.

(1) Shaxannadani ma aha geesooleyaal. Waayo?



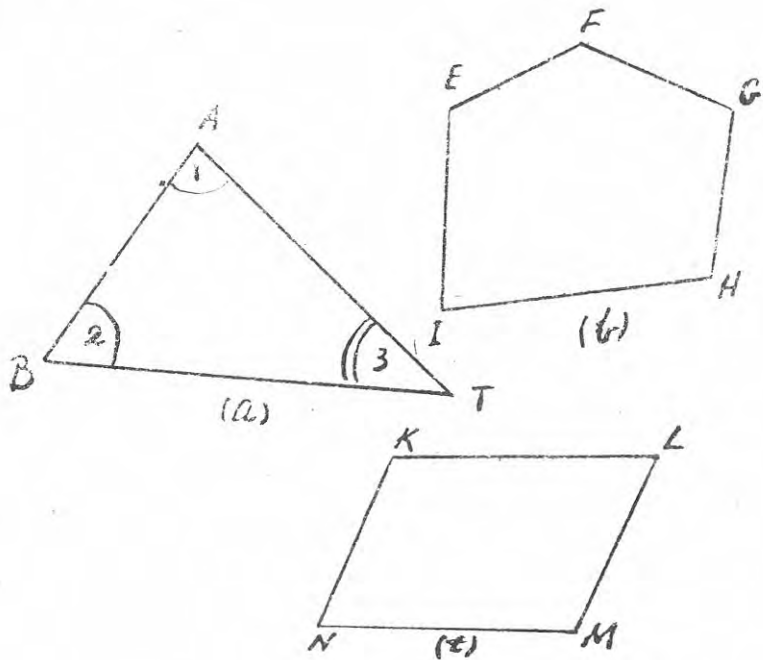
(2) Kuwanise waa geesooleyaal. Waayo?



Geesoole kastaa wuxuu yeelan karaa ugu yaraan saddex

gees; waxaana loogu magac daraa hadba inta gees uu leeyahay. Haddaba, sheeg magacyada geesoolayaasha shaxanka labaad ee kor lagu muujiyey.

Gees walba oo geesoole leeyahay waxaa loo bixiyaa magac lagu sugo.



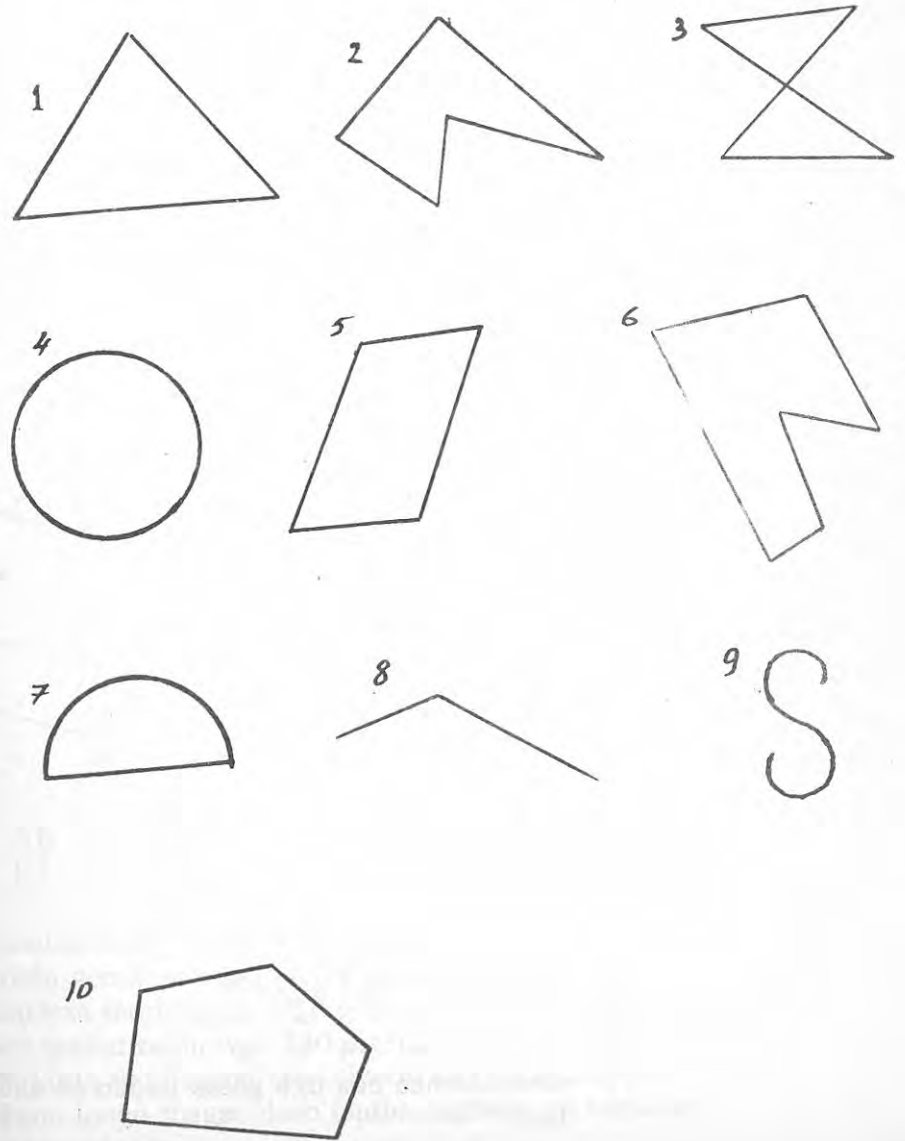
Shaxan (a) marka la magacaabay waxaa loo akhriyaa saddexagal ABT. Shaxan (b) waa shan geesle EFGHI. Shaxan (t) waa afar geesle KLMN. Xaglaha shaxan (a) na waxaa loo qoraa:

- 1)  $\sphericalangle$  A ama  $\sphericalangle$  BAC
- 2)  $\sphericalangle$  B »  $\sphericalangle$  ABC
- 3)  $\sphericalangle$  C »  $\sphericalangle$  ACB

- 1) Magacaaw xaglaha shaxan (b)
- » » » (t)

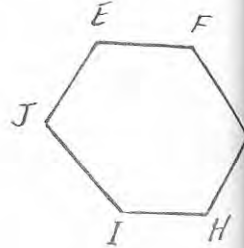
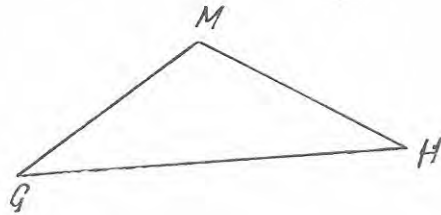
### L a y l i :

- 1) Shaxannadan soo socda kuwee baan ahayn geesoolayaal? Waayo?

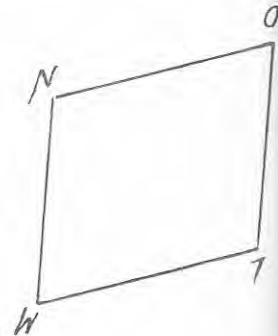
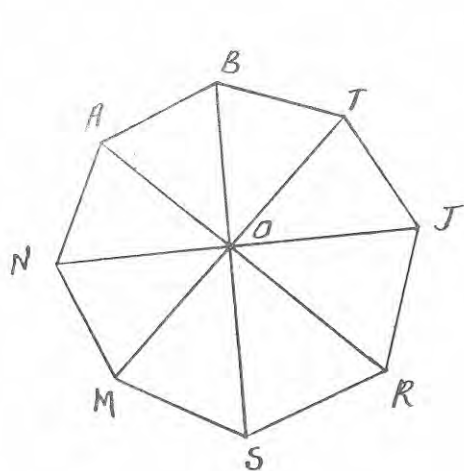




- 2) Magacaw xagla gudeedka ay shaxannadani leeyihiin.



3)

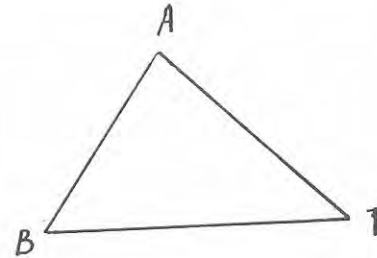


- 4) Sawir geesoole 7 gees leh  
 5) » » 8 » »  
 6) » » 4 » »  
 7) Geesoolehee baa ugu geeso badan ee aad sawiri kartaa?

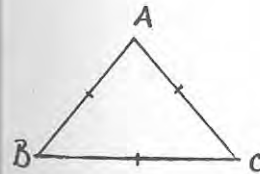
### Saddexagal

Qeex :

Saddexagal waa shaxan geesoole ah, oo saddex gees leh.

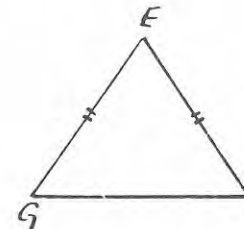


Saddexagal waxaa kaluu leeyahay saddex dhinac iyo saddex xaglood. Dhinacyada ama xaglaha saddexagal way isle'ekaan karaan, ama labuun baa isku mid ahaan kara; ama midkoodna mid ma le'eka.



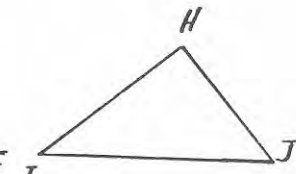
Shaxan b

Shaxan b :  $AB = BC = AC$



Shaxan t

Shaxan t :  $EG = EF$



Shaxan j

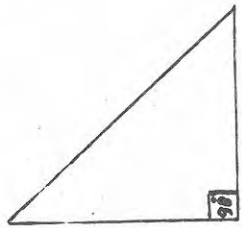
Shaxan j :  $HI = IJ = HJ$

Astada saddexagal waxaa loo qoraa  $\Delta$  iyadoo lagu horqoro magacyada geesaha, sida  $\Delta ABT$ ,  $\Delta WXY$ , iwm. Waxaana loo akhriyaa saddexagal  $ABT$ . Xaglaha saddexagal marka laysku daro wadartoodu waa 180 digrii.

Magac bixinta saddexagal laba siyood bay ku timaadaa.

- 1) Isagoo loogu magac daro hadba xaglaha uu leeyahay cabbiraadooda.

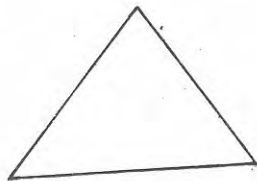
Qeexo: Saddexagal qumani waa saddexagal leh xagal quman. Saddexagal daacsani waa saddexagal leh xagal daacsan. Saddexagal fiiqani waa saddexagal leh saddex xaglood oo fiiqan. Saddexagal isle'eke waa saddexagal ay is le'eg yihiin saddexdiisa xaglood.



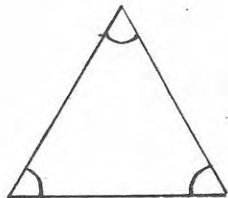
Saddexagal qumman



Saddexagal daacsan



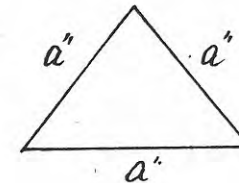
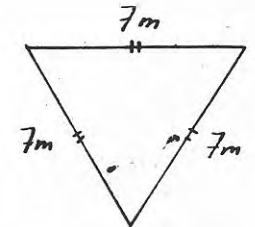
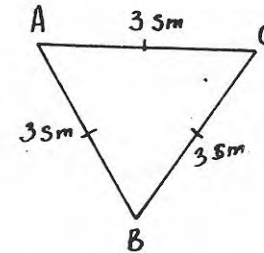
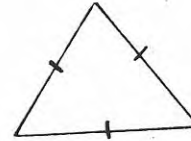
Saddexagal fiiqan



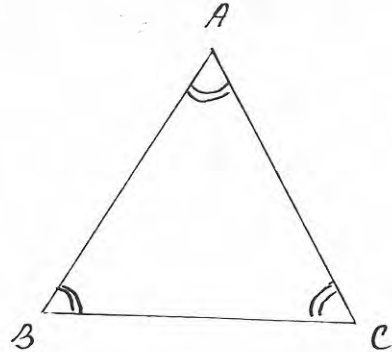
Saddexagal isle'eke

2) Ta labaadi waxay tahay iyadoo loogu magac daro dhinacyada uu leeyahay.

a) Saddexagal simani waa saddexagal saddex dhinac oo isku sar go'an leh. Sida shaxannadan.



Wadarta cabbiraadda xaglaha saddexagal waa  $180^\circ$  digrii.

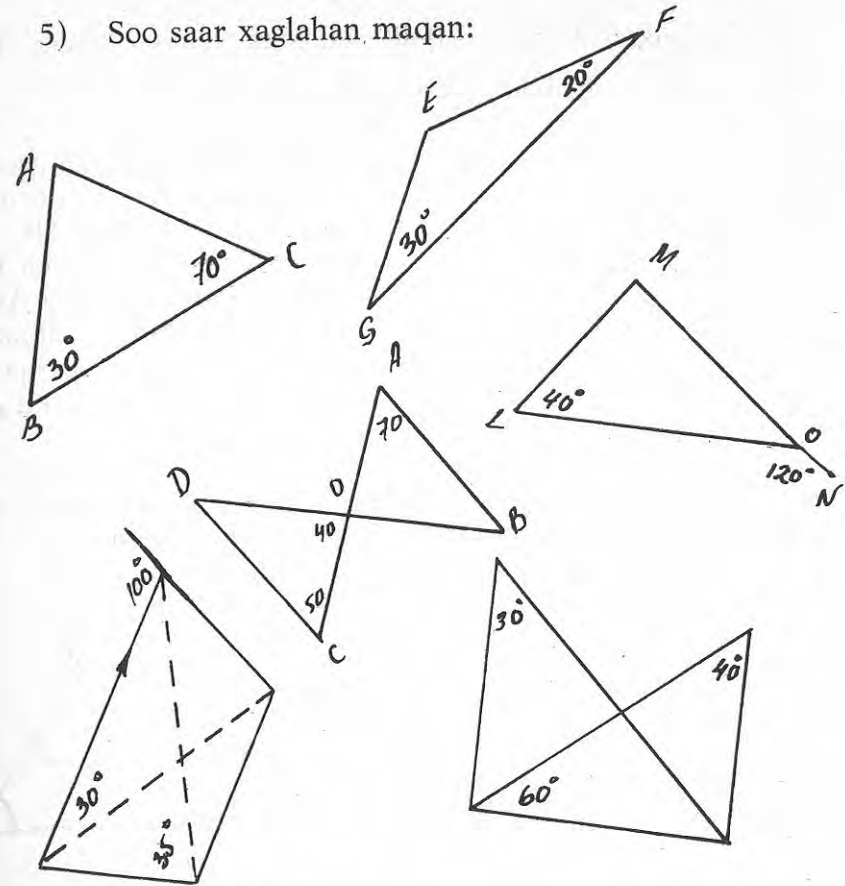


$\sphericalangle A + \sphericalangle B + \sphericalangle C = 180^\circ$   
 $\sphericalangle A + \sphericalangle A + \sphericalangle A = 3 \sphericalangle A = 180^\circ$   
 $\therefore \sphericalangle A = 60^\circ$   
 Kolkaa, xaglaha saddexagal siman middiba waa  $60^\circ$

**L a y l i :**

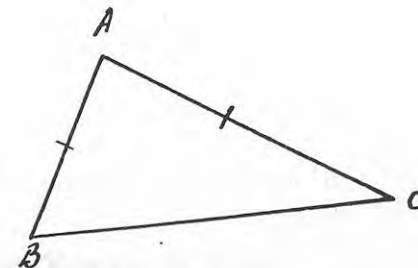
- 1) Adigoo goobeeye iyo mastarad isticmaalaya (a) samee xagal  $60^\circ$  (b) samee saddexagal (c) xagal beeg ku qiyaas xaglaha shaxan kaas.
- 2) Xagalbeeg iyo mastarad qur ah (a) ku samee saddexagal is le'eke (b) qiyaas dhinacyada. Maxaad aragtay?
- 3) Haddii dhinac saddexagal la fidiyo, xagasha halkaa ka soo baxda waxaa la yiraahdaa xagal dibadeedda saddexagalka. Haddaba, xagal dibadeedda saddexagal simani waa intee?
- 4) Haddii dhinac saddexagal simani uu yahay X sm, waa intee cabbiraadda dhinacyada kale.

5) Soo saar xaglahan maqan:

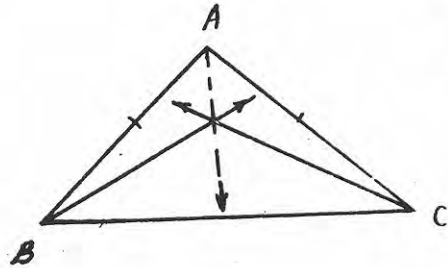


**b) Saddexagal labaale**

Qeex: Saddexagal labaale waa saddexagal laba dhinac oo is-leeg leh, dhinaca saddexaad waxaa la yiraahdaa salka saddexagalka.



Shaxankan dhinaca AB wuxuu le'eg yahay dhinaca AC, ( $\overline{AB} = \overline{AC}$ ). Kolka, saddexagalku waa labaale.



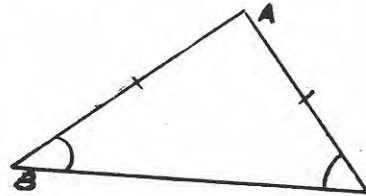
Shaxankan, marka geeska C la soo duubo wuxuu taaban karaa dhinaca AB. Sidaa si le'eg buu geeska B u taaban karaa dhinaca AC.

Sidaa aawadeed dhinaca AB waa ku lid xagasha C; dhinaca AC waa ku lid  $\sphericalangle B$ .

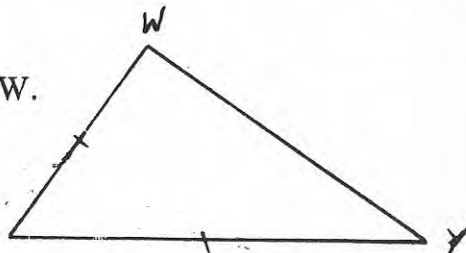
Haddaba, xaglaha ka soo horjeeda dhinacyada isleeg, waa la yiraahdaa xaglaha salka, wayna isle'eg yihiin.

$\therefore$  Haddii  $\overline{AB} = \overline{AC} \implies \sphericalangle B = \sphericalangle C$   
 Haddii  $\sphericalangle B = \sphericalangle C \implies \overline{AB} = \overline{AC}$

Tusaale: Haddii  $\triangle WXY$  ay  $\overline{WX} = \overline{XY}$ , oo  $\sphericalangle WXY = 70^\circ$  waa imisa



- 1)  $\sphericalangle XWY$     2)  $\sphericalangle XYW$ .



**Furfurid:**

- 1) Sawir marka hore saddexagal, kuna dhig magacyada geesihiisa.
- 2) Summad isku mid ah ku dhig dhinacyada isleeg.

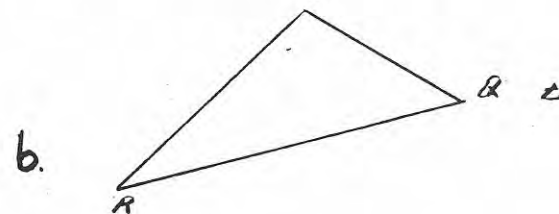
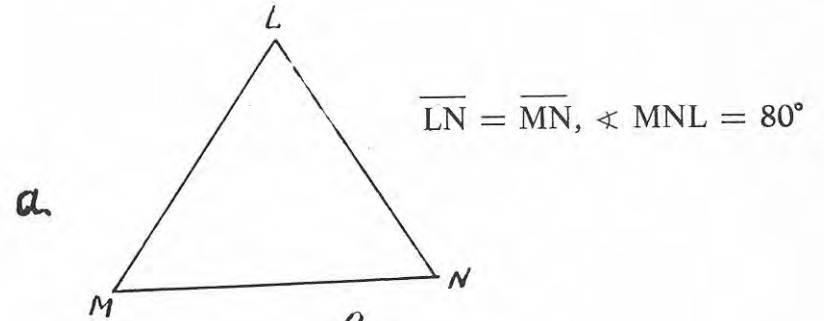
$\therefore \sphericalangle W = \sphericalangle Y, \sphericalangle W + \sphericalangle Y = 180^\circ - 70^\circ = 110^\circ$

Markaa mid waliba waa badhka  $110^\circ$  mar haddii ay isle'eg yihiin  $\sphericalangle W$  iyo  $\sphericalangle Y$ .

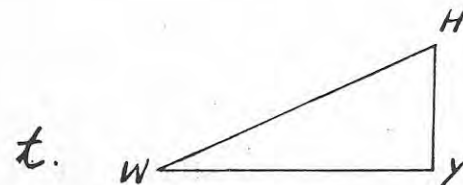
$\therefore \sphericalangle W = \sphericalangle Y = 55^\circ$

L a y l i :

Soo saar cabbiraadda xaglaha maqan, ee shaxanndan.

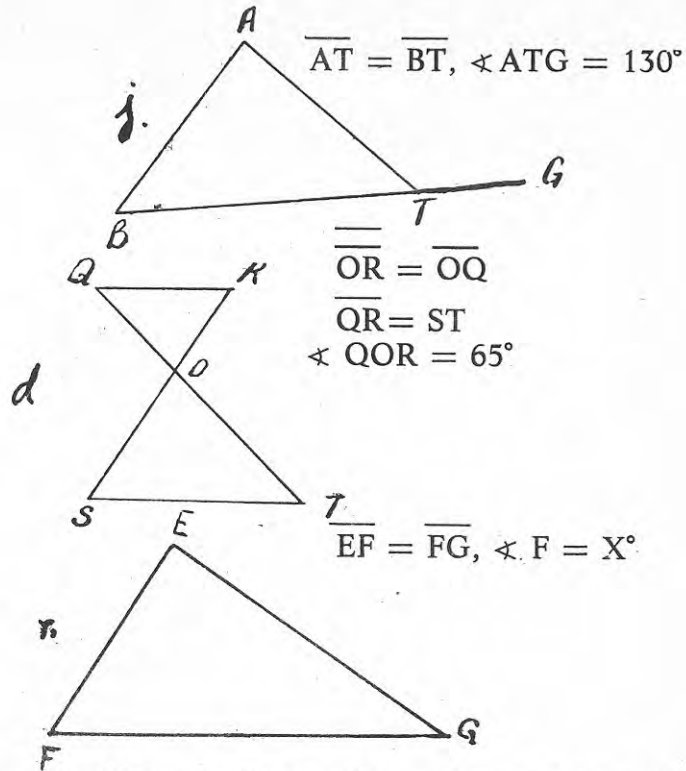


$\overline{OR} = \overline{OQ}, \sphericalangle R = 70^\circ$



$\overline{HW} = \overline{WY}, \sphericalangle HWY = 20^\circ$





2) Sawir  $\triangle EFG$ , oo dhinaca  $EF = FG$ ,  $\sphericalangle F = 76^\circ$   
 Dhinaca  $EG$  u fidi ilaa  $B$ . Haddii xaglo badhayaasha  
 $\sphericalangle E$  iyo  $\sphericalangle FGB$  ay ku kulmaan  $H$ , soo saar xaglaha  
 hoos ku qoran.

1.  $\sphericalangle FEH$       2.  $\sphericalangle HEG$       3.  $\sphericalangle HGB$
4.  $\sphericalangle EHG$       5.  $\sphericalangle FGE$ .

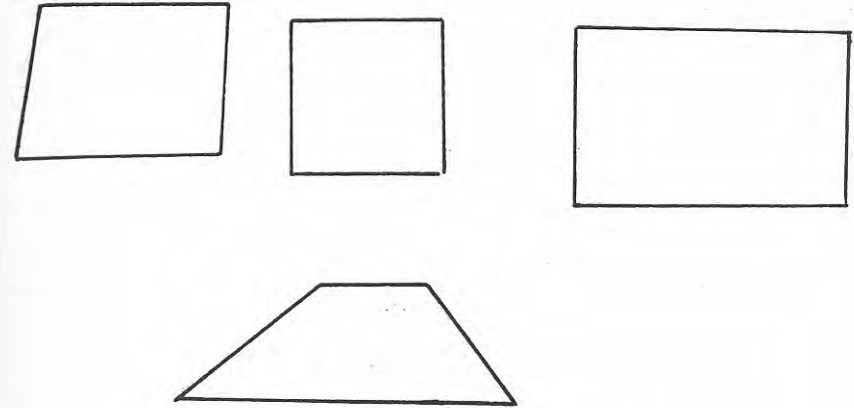
3) Sawir  $\triangle BFK$ , oo dhinaca  $\overline{BF} = \overline{FK}$ .  $\overline{FK}$  u fidi ilaa  
 $N$ . Haddii  $\sphericalangle BKN = 80^\circ$  waa intee (i)  $\sphericalangle BFK$   
 (ii)  $\sphericalangle KFB$  (iii)  $\sphericalangle FBK$ .

4) Sawir  $\triangle MNL$  oo  $\sphericalangle MLN = 100^\circ$ ,  $\overline{LM} = \overline{LN}$ . Da-  
 badeedna raadi (i)  $\sphericalangle LMN$  (ii)  $\sphericalangle MNL$ .

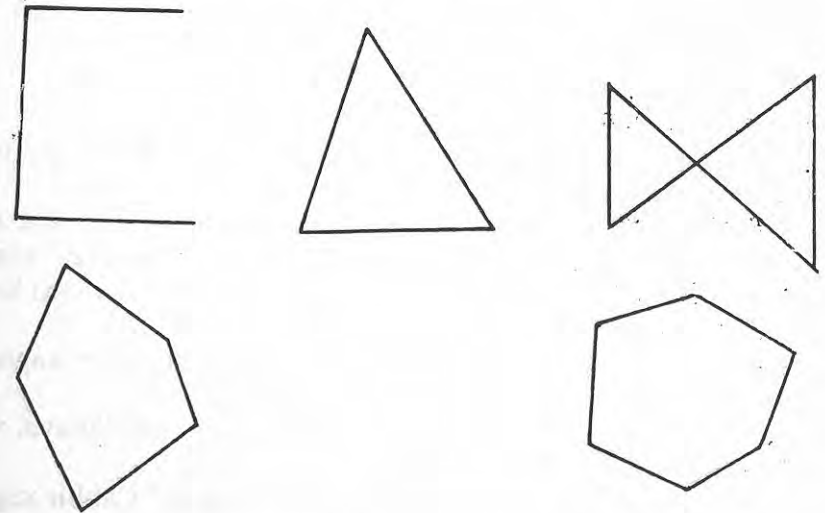
5) Sawir  $\triangle BTJ$  oo  $\overline{BT} = \overline{TJ}$ ,  $\sphericalangle BTJ = 40^\circ$ , markaana  
 raadi (i)  $\sphericalangle TBJ$  (ii)  $\sphericalangle BJT$ .

### Afar geesle

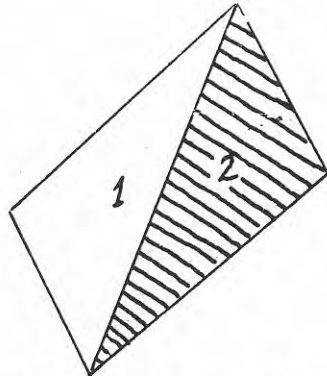
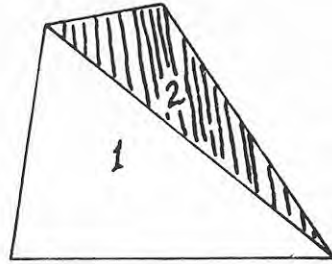
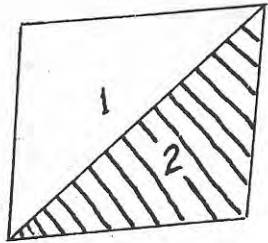
Qeex : Afar gees waa geesoole afar dhinac leh.  
 Shaxannadani waa afar geesleyaal.



Kuwanise ma aha afar geeslayaal.



Ogsoonow, afar geesle kasta waxaa loo qaybin karaa laba  
 saddexagal haddii laba gees oo iska soo horjeeda laysku xiro.  
 Waxaynu, marka, arkaynaa in wadarta xaglaha afar geesluhu  
 ay tahay  $360^\circ$ .



Bal hadda imminka aan eegno afar geeslayaal gaar ah.

### 1. Barbaroole.

Qeex: Barbaroole waa afar geesle labadii dhinac ee iska soo horjeedaaba ay yihiin barbaro.

**TIJAABO 1** LM ha ahaato xariijin 3 sm ah. M waxaad ka jeexdaa xariijin MN oo ah 5m. L waxaad ka jeexdaa xariiq barbaro la ah MN. N na waxaad ka jeexdaa xariiq barbaro la ah LM, kulana kulmaysa xariiqdii hore W.

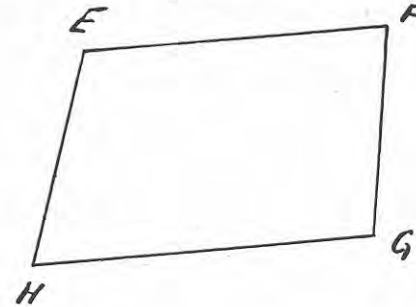
Qiyaas NW iyo LW. Maxaad aragtaa? Cabbir xaglaha LMN, MNW, NWL, WLM. Maxaad aragtaa?

**TIJAABO 2:** Qiyaastaad doontid adoo qaadanaya, waxaad samaysaa barabroole ABTJ.

Qiyaas AB, TJ, AJ, iyo BT. Maxaad aragtay? Cabbir xaglaha ABT, AJT, BAJ iyo BTJ. Maxaad aragtay?

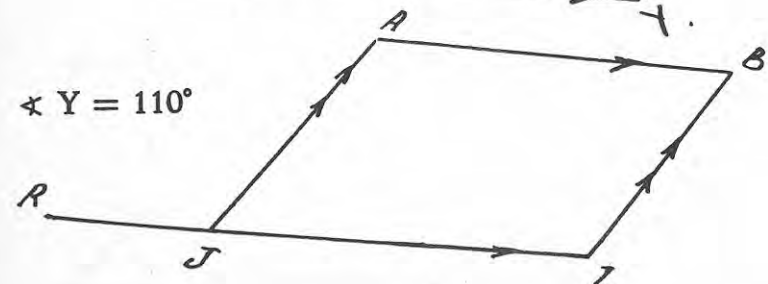
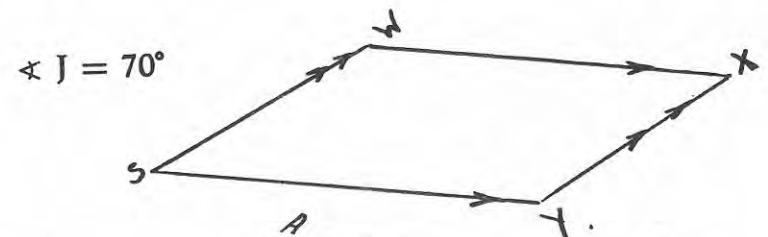
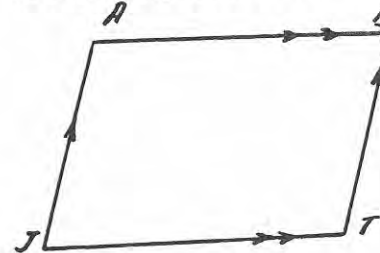
Tijaabooyinkaasi, waxay ku tusayaan in barbaroolaha labadii dhinac ee iska soo horjeedaaba ay is le'eg yihiin; labadii xaglood ee iska soo horjeedaana ay is le'eg yihiin. Kolkaa, had-dii EFHG uu yahay barbaroole.

- 1)  $\overline{EF} = \overline{HG}, \overline{EH} = \overline{FG}$
- 2)  $\sphericalangle F = \sphericalangle H, \sphericalangle E = \sphericalangle G.$



### Layli:

- 1) Barbaroolayaashan soo saar xaglaha maqan.

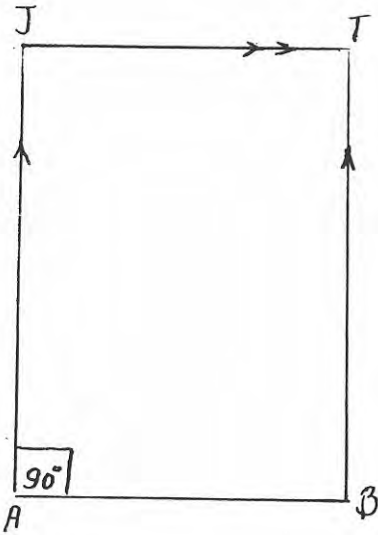


$\sphericalangle AJR = 140^\circ$

2) Laydi

Qeex : Laydigu waa barbaroole xagal waliba qumman tahay. Laydiga labada dhinac ee iska soo horjeedaa waa is le'eg yihiin, waayo waa barbaroole. Hase yeeshee, labada dhinac ee isku xigaa isma le'eka.

Shaxankan hoos ku yaallaa waa laydi waayo waa barbaroole ay  $\sphericalangle A = \sphericalangle B = \sphericalangle T = \sphericalangle J = 90^\circ$ .

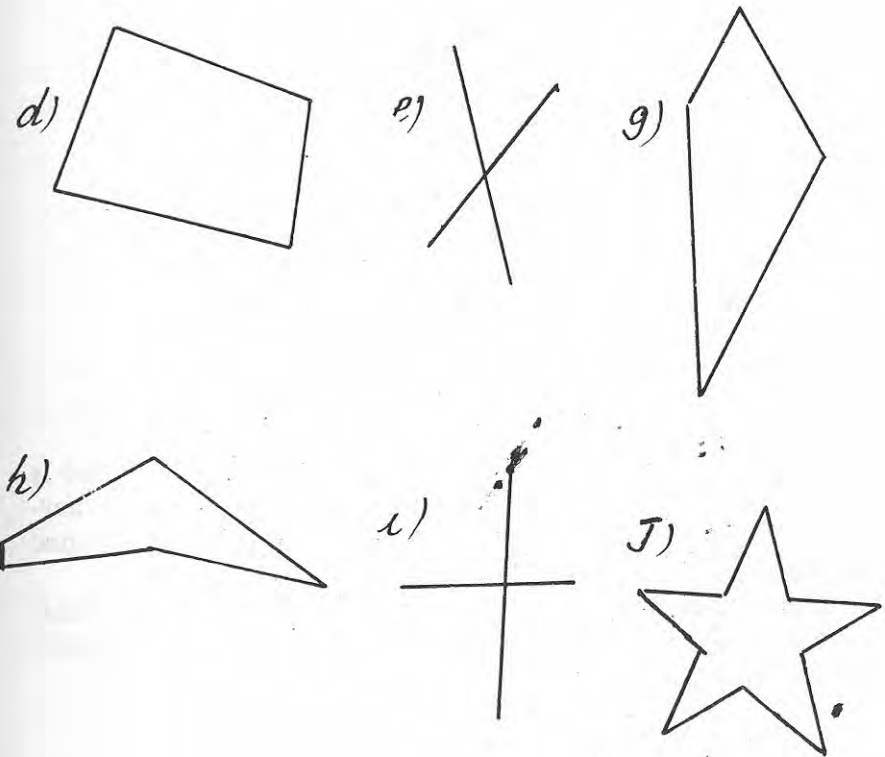
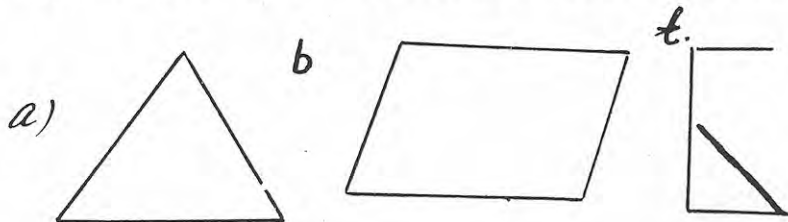


Tusaale: **Waxyaabo laydiyan:**

- 1) Xaashadaha buugagga;
- 2) Qolkaad ku jirto gidaarkiisa;
- 3) Miiskaaga dushiisa;
- 4) Maxay kale baa u ekaan kara laydi?

**L a y l i :**

(1) Afar geeslayaashan kuweebaa shaxan oodan ah.



(2) Shaxanku ma yahay laydi? Waayo?

- Haddii (1)  $\overline{AB} \parallel \overline{DC}$   
 (2)  $\overline{AD} = \overline{BC}$   
 (3)  $\sphericalangle A = \sphericalangle B = \sphericalangle D = \sphericalangle C$   
 (4)  $\overline{AB} = \overline{BC}$ .

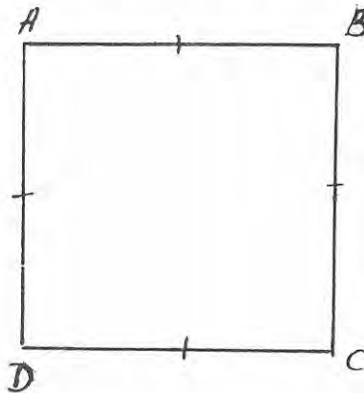
(3) Shaxankanu ma yahay laydi. Waayo?

- Haddii (1)  $\overline{LM} \parallel \overline{ON}$   
 (2)  $\overline{LO} \parallel \overline{MN}$   
 (3)  $\overline{LM} = \overline{ON}$   
 (4)  $\overline{MN} = \overline{LO}$   
 (5)  $\sphericalangle L = \sphericalangle N$   
 (6)  $\sphericalangle M = \sphericalangle O$   
 oo  $\sphericalangle L = 90^\circ$ .

### Labajibbaarane :

**Qeex :** Labajibbaarane waa afargeesle afartiisa dhinac is le'eg yihiin. Mar haddii laydigu uu yahay barbaroole, waxaynu oran karnaa, labajibbaarane waa barbaroole labada dhinac ee isku xigaa ay is le'eg yihiin xagluhuna ay yihiin  $90^\circ$ .

Ogsoonow labajibbaaranuhu wuu la wadaagaa tilmaamaha uu leeyahay laydigu? Waxase u sii dheer intaas in labajibbaaranuhu leeyahay afar dhinac oo isku sar go'an.



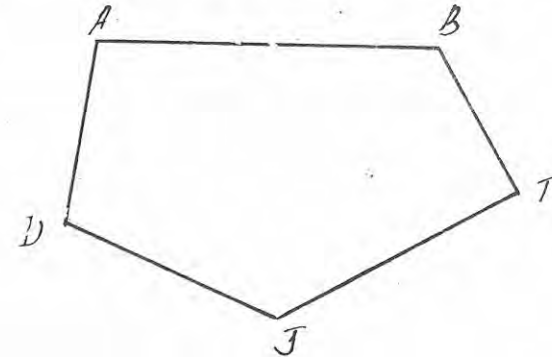
### L a y l i :

- 1) Cali baa intuu qorax-ka-soo-baxa u jeestay 2 talaabo hore u socday. Mar labaad intuu  $\sphericalangle 90^\circ$  is jimbacay buu 2 talaabo hore u socday. Sidaa si le'eg buu 2 talaabo midba uu u socday qorax-u-dhaca iyo koofur. Bal sawir Jidkii Cali. Shaxanka ka soo baxay waa kuma?
- 2) Samee labajibbaarane dhinaciisu yahay 3 sm.
- 3) Buuggaaga xaashad ka gooso. Intee labajibbaarane oo midkii dhinaciisu yahay 2 sm baad ka goyn kartaa xaashaddaa?

### Shan geesle

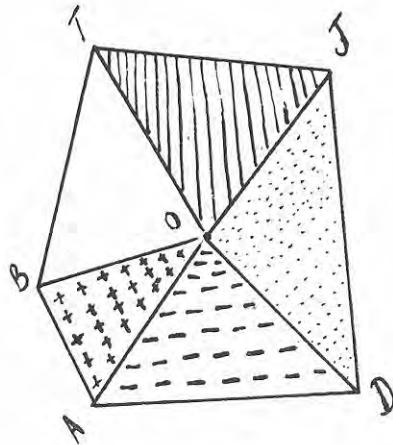
Intii hore oo dhan, waxaynu ka hadlayney saddexagal iyo afar geesle; immikase bal aynu guud ahaan daba galno geesooleyaasha. Hore waxaynu u niri, geesoole waa shaxan oodan oo ka samaysan xariijimo midba mid ku daba taxan tahay. Geesoole waxaa la yiraahdaa geesoole hufan haddii xaglihiisu is le'eg yihiin, dhinacyadiisuna is le'eg yihiin.

**Qeex :** Shan geesle waa geesoole shan dhinac leh. Haddii shantiisa dhinac is le'eg yihiin, waxa la yiraahdaa shan geesle hufan, xaglihiisuna way is le'eg yihiin.





Shaxankan hoos ku yaallaa waa shan geesle gudihisa ay ku jiraan shan saddexagal.



1.  $\triangle$  ABO
2.  $\triangle$  BOT
3.  $\triangle$  TOJ
4.  $\triangle$  JOD
5.  $\triangle$  AOD

Waxaynu ogsoonahay in saddexagal xaglihiisa marka laysu geeyo ay yihiin  $180^\circ$ . Haddaba, shanta saddexagal ee shan geesluhu ka samaysan yahay xaglahooda marka laysu geeyo waa

$$5 \times \triangle = 5 \times 180^\circ = 900^\circ$$

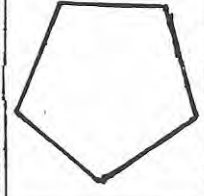
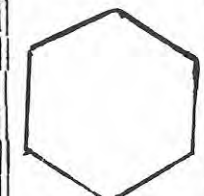
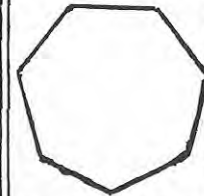
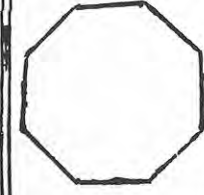
Hase yeeshee, xaglaha barta O ku samaysani waa  $360^\circ$  (waayo?).

Sidaa aawadeed xagla gudeedka cabbirkoodu waa  $5 \times 180^\circ - 360^\circ = 540^\circ$ .

Waxaynu marka oran karnaa wadarta xagla gudeedka shan geesle waa  $540^\circ$ .

**Kolka**, cabbiraada xagal kastuu shan geesle hufani leeyahay waa  $\frac{540^\circ}{5} = 108^\circ$ .

Aad u deris tusahan:

Geesoole	# geesaha	W $\triangle$ ee $\triangle$	W $\triangle$ ee unugeed	Wadarta xaglaha gudaha
	5	$5 \times 180$	360	$900 - 360 = 540^\circ$
	6	$6 \times 180$	360	$1080 - 360 = 720^\circ$
	7	$7 \times 180$	360	$1260 - 360 = 900^\circ$
	8	$8 \times 180$	360	$1440 - 360 = 1080^\circ$
	.	.	.	.
	.	.	.	.
	.	.	.	.
	.	.	.	.
	n	$n \times 180^\circ$	$360^\circ$	$180n - 360^\circ$

W = Wadar

# = Tiro

Haddaba, wadarta xaglaha ee uu leeyahay geesooluhu waa

$$180n - 360^\circ = 180(n - 2) \text{ digrii}$$

**Tusaale:**

Waa imisa cabbiraadda xagal gudeed kasta ee lix geesle hufani?

**Furfurid:**

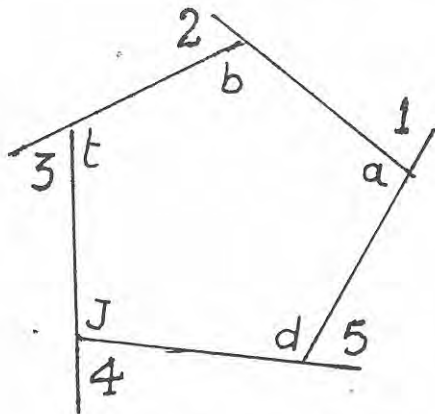
Wadarta xagla gudeeddadu waa  $180(n - 2)$ . Haddaba,

xagal gudeed kasta oo lix geesle hufani =  $\frac{180(6 - 2)}{6} = 120^\circ$ .

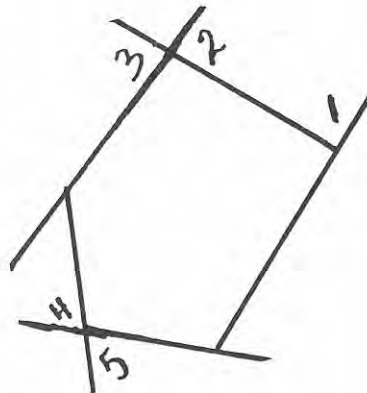
Haddii dhinac geesoole la fidiyo, xagasha halkaa ku samaysanta waxaa la yiraahdaa xagal dibadeedda geesoolaha. Geesoole n dhinac lihi, markaa, wuxuu yeelanayaa n xagal dibadeed.

Haddaba, haddii dhinacyada geesoole xag loo wada fidiyo, wadarta xagla dibadeedku waa  $360^\circ$  Ama,

**Wadarta xagla dibadeedku = 360 digrii**



Shan geesolahan dhinacyadiisa xag baa loo wada fidiyey



Shan geesoolahan dhinacyadiisa xag looma wada fidin

Haddii shan geeslaha shaxanka hore aynu qaadano waxaynu arkaynaa in

$\sphericalangle 1 + \sphericalangle a = 180^\circ$ , waayo?

$\sphericalangle 2 + \sphericalangle b = 180^\circ$

$\sphericalangle 3 + \sphericalangle c = 180^\circ$

$\sphericalangle 4 + \sphericalangle d = 180^\circ$

$\sphericalangle 5 + \sphericalangle e = 180^\circ$

$\therefore \sphericalangle 1 + \sphericalangle 2 + \sphericalangle 3 + \sphericalangle 4 + \sphericalangle 5 + \sphericalangle a +$

$\sphericalangle b + \sphericalangle c + \sphericalangle d + \sphericalangle e = 900^\circ$

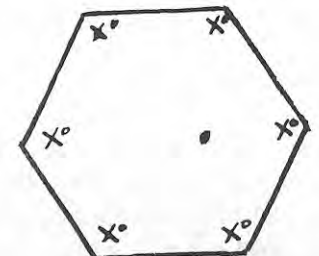
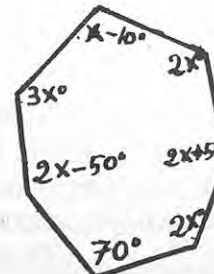
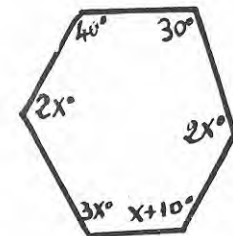
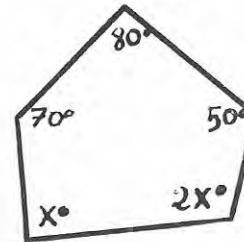
Ha yeeshee  $\sphericalangle a + \sphericalangle b + \sphericalangle c + \sphericalangle d + \sphericalangle e = 540^\circ$ , waayo?

$\therefore \sphericalangle 1 + \sphericalangle 2 + \sphericalangle 3 + \sphericalangle 4 + \sphericalangle 5 = 900^\circ - 540^\circ = 360^\circ$

Geesoolayaasha kalena waa la mid.

**Layli:**

- 1) Waa imisa cabbiraadda xagal gudeed kasta ee 7 geesle hufani?
- 2) Waa imisa wadarta xagal gudeeddada (a) 10 geesle (b) 8 geesle (c) 9 geesle (d) 20 geesle (e) m geesle.
- 3) Wadarta xagla gudeeddada shan geesle hufani waa  $540^\circ$ . Waa imisa cabbiraadda xagashii?
- 4) Haddii 6 geesle xagal dibadeed kastaa ay tahay  $70^\circ$ , waa imisa xagal gudeed kastaa?
- 5) Soo saar xaglaha maqan ee shaxannadan.

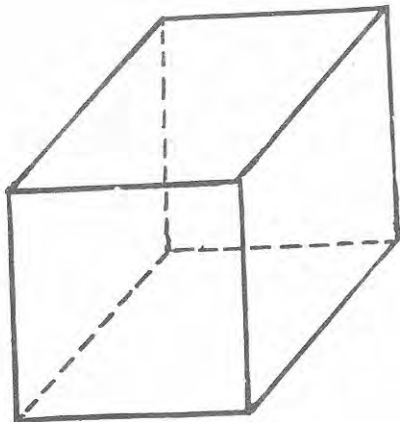


### C U T U B III

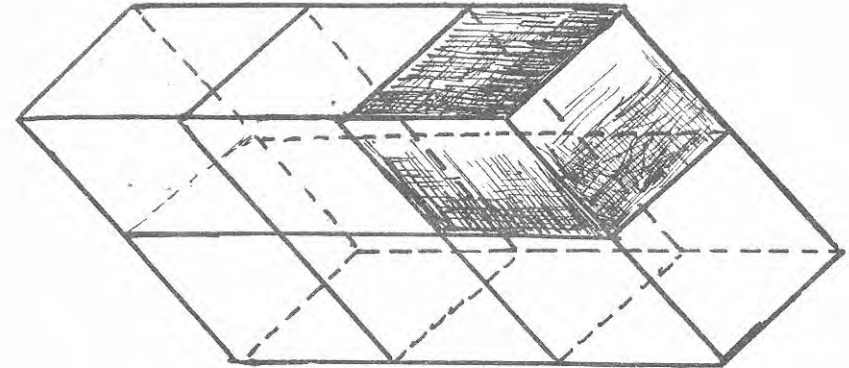
#### M u g

Adkeyaashu dhammaan waxay degaan meel. Markaynu cabbirno meeshuu adke degey, waxaynu isla markaas cabbiraynaa muggiisa, ama qaadkiisa. Halbeegga muggu waxa weeyaan xubin saddexjibbaaran, fuudh saddexjibbaaran,, senti-mitir saddexjibbaaran iwm.

Dhererka, ballaca iyo joogga xubin saddexjibbaarane way isle'eg yihiin; midkastina waa xubin koowaad. Sida shaxan-kani ku tusaayo.



Adke muggiisu wuxuu yahay inta xubin saddexjibbaaran ee uu gudahiisa ku qaadi karo. Sidaa aawadeed Shaxanka soo socda afar gees adke ah muggiisu waxa weeyaan 6 xubnood oo saddexjibbaaran. Mugga marka la gaabinayo, waxaa loo qoraa «V».



Mugga afar gees adke ah = dherer × ballac × joog.

#### T u s a a l e :

Sar baa dhererkeedu yahay 40 m, ballaceeduna 25 m, joogeeduna 7 m. Waa imisa mugga sartaasi?

#### F u r f u r i d :

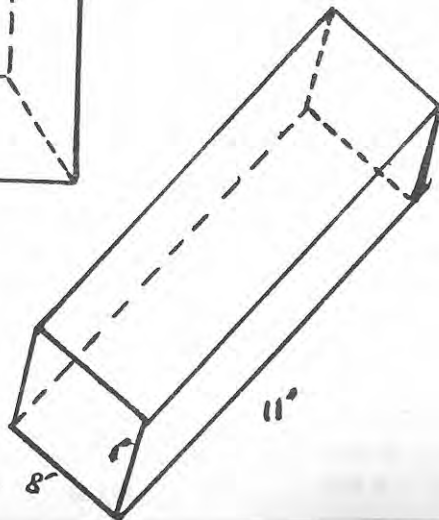
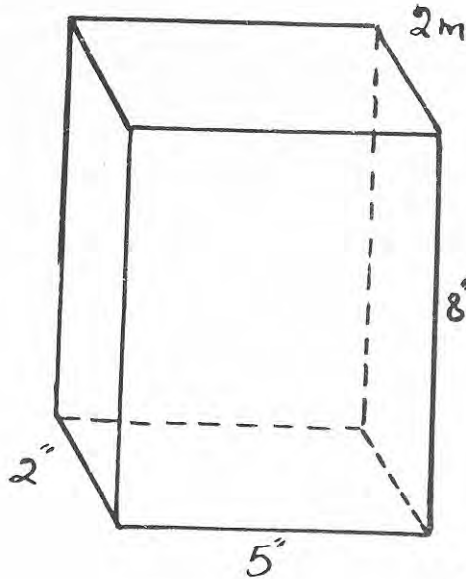
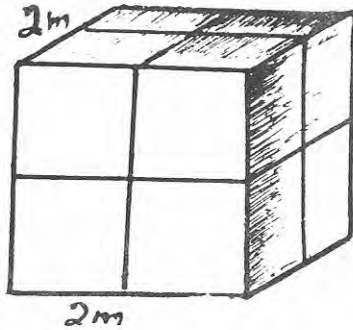
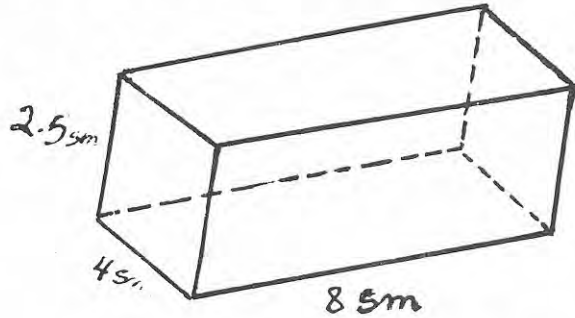
$$\begin{aligned} \text{Mugga sarta} &= \text{dherer} \times \text{ballac} \times \text{joog} \\ \therefore V &= 40\text{m} \times 25\text{m} \times 7\text{m} \\ &= 7000\text{m}^3 \end{aligned}$$

#### L a y l i :

1) Baadi doon mugga afar geesle adke ah haddii cabbiraaddiisu tahay sida hoos ku qoran:

a)	12 sm	7 sm	3 sm
b)	6.8 hiis	5 hiis	1.05 hiis
t)	2.4 mitir	1.2 mitir	2.005 mitir
s)	2.4 fuur	1.2 fr	2.005 fr
g)	a sm	b sm	t sm

2) Soo saar mugga shaxannadan.



- 3) Berked, bedka salkeedu yahay 144 hiish lj baa biyo lagu shubay ilaa 6 hiish u joogga berkeddu buuxsamyey. Soo saar mugga biyaha ee ku jira berkedda.
- 4) Intee fuur saddexjibbaar oo hawa ah baa ku jirta qol dhererkiisu yahay 36 fr ballaciisuna 24 fr jooggiisuna 12 fr?
- 5) Cali baa hog qoday dhererkiisa iyo ballaciisuna iyo jooggiisu ay kala yihiin 6 fr 5 fr, hiish. Intee hiish saddexjibaaran oo ciid ah baa hogga laga qoday?

### Mug Dhululubo

Dhululubo waa weel san-saan dhuumeed leh; sida shaxan kani uu ku tusaayo.

Mugga dhululubo = Bedka  $\times$  salkiisa  $\times$  joog

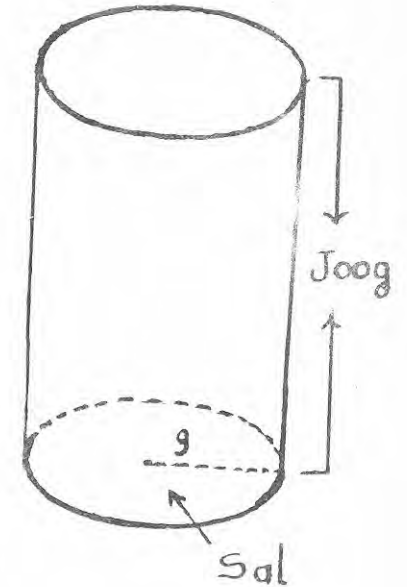
$$\therefore V = \pi r^2 \times h$$

$$= \pi r^2 h$$

Sida muuqata haddii V iyo

h la og yahay, kolka  $r = \sqrt{\frac{V}{\pi h}}$

Markaa  $h = \frac{V}{\pi r^2}$



### Tusaale :

Dhululubo ayaa bedka salkeedu yahay 12.56 hiis lj, jooggeduna waa 8 hiis. Waa intee muggedu?

### Furfurid :

Mugga dhululubo =  $\pi r^2 h$ .

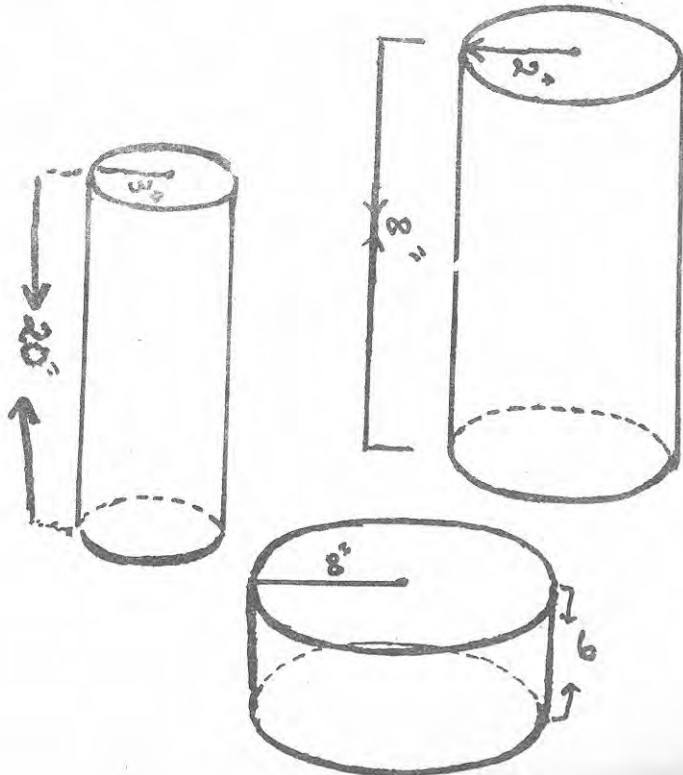


Waxaanu ognahay  $\pi r^2 = 12.56$  hiish 1j.

Markaas mugga dhululubo =  $12.56 \times 8'' = 100.48$  hiish Sj.

L a y l i :

- 1) Dhululubo ayaa gacanka salkeedu yahay 3 hiish, joogeeduna waa 7 hiish. Baadi doon muggaada?
- 2) Haddii dhexroorka salka dhululubo uu yahay 10 sm, joogeeduna uu yahay 15 sm, waa imisa muggaada?
- 3) Waa imisa mugga dhululubo haddii dhexroorka uu yahay 4 hiish, joogeeduna yahay 6 hiish?
- 4) Soo saar mugga dhululubooyinka:



- 5) Dhululubo ayaa muggaada yahay 396 sm, gacankaada waa 3 sm. Waa intee joogeeda?
- 6) Raadi dhererka dhululubo muggaada yahay 284 m<sup>2</sup>, gacankaada yahay 2m.
- 7) Haddii dhululubo dhererkeedu yahay 14 sm, muggaada yahay 704 sm<sup>3</sup>, waa intee gacankaada?
- 8) Dhululubo ayaa muggaada yahay 9.6 sm<sup>3</sup> dhererka dhululubada waa 1.4 sm. Raadi dhexroorka dhululubada?
- 9) Laba dhululubo oo kala weyn ayaa lays dhex geliyey. Ta roon dhererkeedu waa 14 fuur gacankaada waa 3.5 fuur. Ta yar dhererkeedu waa 14 fuur, gacankaada waa 1.75 fuur. Intee baa muggaada isdheer yahay?
- 10) Laba dhululubo ayaa labadaba dhererkeedu yahay 28 sm. Ta weyn gacankaada waa 3 sm. Labada dhululubo marka lays dhex geliyo mugga dhexdooda waa 440sm<sup>3</sup>. Raadi gacanka dhululubada yar.

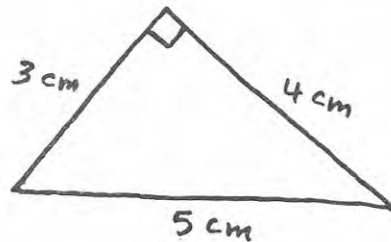
## C U T U B IV

### Aragtiinka Baytagoras

Ka soo qaad in aad haysato saddexagal xagal qumman. Marka la qiyaaso dhinacyada saddexagalkaa waxaa la arkayaa wax u gaar ah saddexagal xagal qumman. Waxaa jira wax ka dhexeeya dhinacyada saddexagalka. Taa waxaa ogaaday xisaabyahan Giriig ah oo la yiraahdo Baytagoras.

Ka dhig inaynu haysano saddexagalka LMN oo  $LM = 3$  sm,  $LN = 4$  sm,  $MN = 5$  sm,  $\angle MLN = 90^\circ$ .

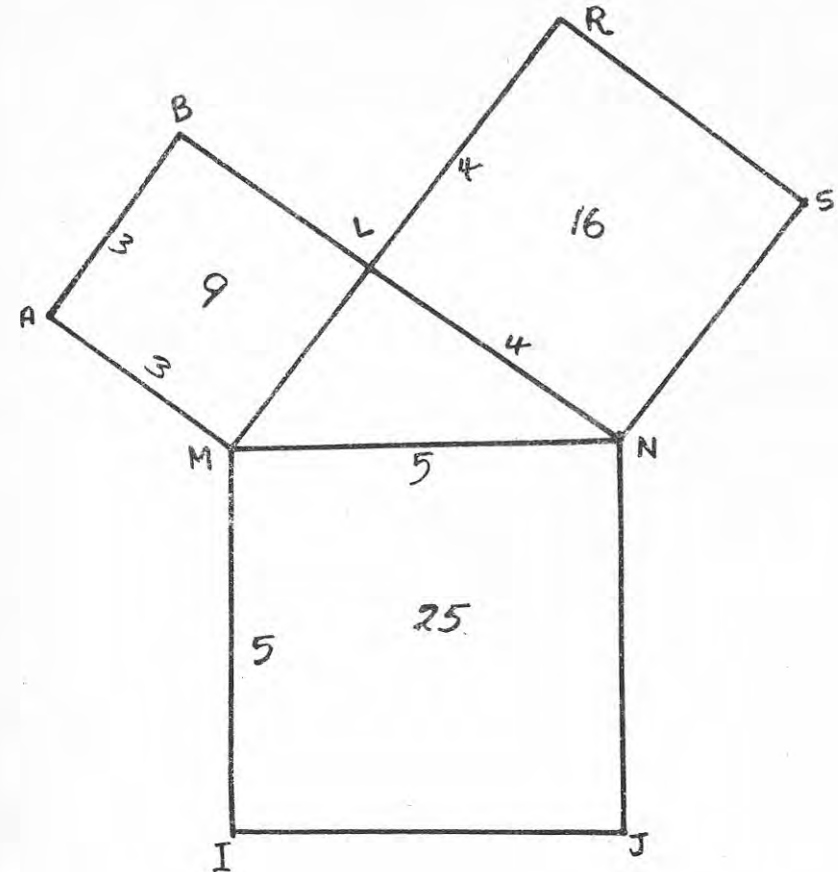
(Eeg jaantuskan).



Haddii imminka aynu dhinac walba labajibbaarno, waxaynu heleynaa  $3^2 = 9$ ,  $4^2 = 16$ ,  $5^2 = 25$ .

Waxaad arkaysaa in  $3^2 + 4^2 = 9 + 16 = 25$ .  
Kolkaa,  $3^2 + 4^2 = 5^2$ .

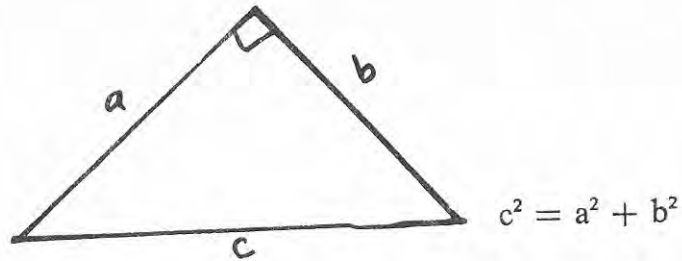
Runtii, haddii aad dhinac walba ku samayso laba jibbaarane, waxaad arkaysaa labajibbaaranaha shakaalku inuu le'eg yahay labada labajibbaarane ee lugaha oo laysu geeyey.



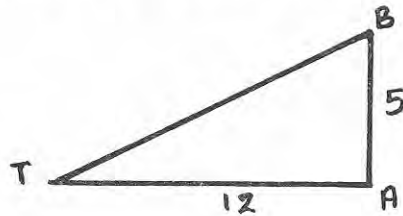
Waxaad arkaysaa markaad labajibbaarane walba bedkiisa soo saartid in labajibbaaranaha MNJI uu le'eg yahay labada labajibbaarane LNSR iyo ABLM oo laysu geeyey.

### Aragtiinka Baytagoras

Saddexagal xagal qumaan kasta labajibbaarka shakaalku wuxuu le'eg yahay labada lugood labajibbaarradooda oo laysku daray.



**Tusaale:** ABT waa saddexagal xagal qumman ku leh A. Haddii AB = 5 sm, AT = 12 sm, waa intee BT?



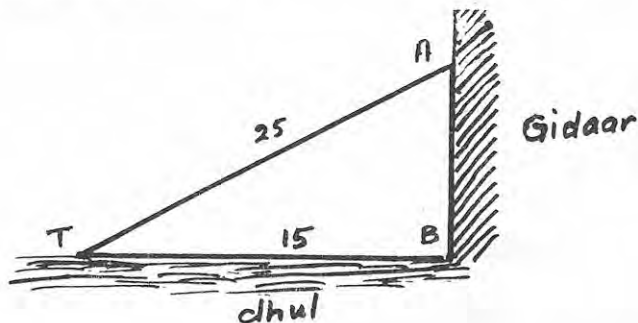
Aragtiinka Baytagoras wuxu inoo sheegayaa in

$$(BT)^2 = (AB)^2 + (AT)^2$$

$$\therefore (BT)^2 = 5^2 + 12^2 = 25 + 144 = 169$$

$$\therefore BT = \sqrt{169} = 13 \text{ sm.}$$

**Tusaale:** Sallaan ayaa lagu tiiriyey gidaar. Sallaanku waa 25 fuur, dabada dhulka taallaana waxay gidaarka u jirtaa 15 fuur. Madaxa sallaanku intuu dhulka ka sarreeyaa?



Waynu aragnaa in gidaarka iyo dhulku isku qotomaan. Haddii aynu isticmaalno aragtiinka Baytagoras waxaynu heley-naa:

$$25^2 = 15^2 + (AB)^2$$

$$\therefore AB^2 = 25^2 - 15^2 = 625 - 225 = 400$$

$$\therefore AB = \sqrt{400} = 20 \text{ fuur.}$$

### L a y l i :

Layalisyada 1 — 10 waxaad raadisa dhinaca saddexaad ee saddexagalka xagal qumman haddii shakaal u yahay c, dhi-nacyada kalana ay kala yihiin a iyo b.

1.  $a = 3, b = 4$
2.  $a = 5, b = 12$
3.  $b = 4, c = 23$
4.  $a = 5, c = 23$
5.  $a = 10, c = 20$
6.  $a = 4, b = 24$
7.  $b = 5, c = 7$
8.  $b = 5, c = 61$
9.  $a = 15, b = 20$
10.  $b = 17, c = 45$
11. Labajibbaarane LMNW ayaa lug waliba tahay 15 sm. Waa intee shakaalka MW?
12. AGCD waa afar geesle xagla qumman.  $AB = 17$  sm,  $BD = 8$  sm. Waa intee shakaalka BD?
13. Labajibbaarane LMNW ayaa shakaalka MW = 25 sm, waa intee dhinaca labajibbaaranuhu?
14. ABCD waa afar geesle xaglo qumman.  $AB = 12$  sm shakaalka  $AC = 13$  sm. Raadi AD.
15. Sallaan 50 fuur ah ayaa ku tiirsan dhakada gidaar jooggiisu yahay 40 fuur. Gunta sallaanku imisa ayay u jirtaa gidaarka?
16. Sallaan ayaa guntiisu u jirtaa 3 mitir gidaar jooggiisu yahay 7 mitir. Waa intee dhererka sallaanku?
17. ABC waa saddexagal xagal qumman ku leh A oo  $AB = AC = 9$  sm. Raadi shakaalka saddexagalka?

## C U T U B V

### URURRO

Inta badan markaynu tilmaamayno waxyaalo kooxa ah, waxaynu isticmaalnaa erayada; xirmo cadaa ah, xayn ariya, raxan libaaxya ah, guuto ciidama ah iwm. Haddaba xisaabtu waxay isticmaashaa erayga «Urur» oo kaliya.

Imminka xisaab ahaan erayadii hore oo dhan waxaynu ku baddeleyna erayga «urur»: Urur cadaa ah, urur ariya, urur libaaxya ah, urur ciidama ah.

Waxaa loo baahanyahay in la ogaado waxyaalaha aynu soo sheegnay oo dhami waxay ka kooban yihiin in ay isku mid yihiin; laakiin way kala geddistaan karaan. Ujeeddada oo ah in la heli karo urur ka kooban baabuur, dameer, buug iyo dhagax.

### Kutirsane

Urur kastiba wuxuu ka kooban yahay xubno; xubnaha waxa la yiraahdaa kutirsane; xubintiina kutirsane.

Haddii lagu weydiiyo kutirsaneyaasha maalmaha ku jira toddobaadkii, waxaad qoraysaa Sabti, Axad, Isniin, Salaasa, Arbaco, Khamiis iyo Jimce. Markaa waxaynu oran karnaa Jimce waa ku tirsane ururkaa, laakiin Juun ma aha kutirsane ururkaa. Hiiraan waa kutirsane ka mid ah gobollada J. D. S., Soomaaliya waa kutirsane ka mid ah ururka dawlada Carabta.

Tirada kutirsaneyaasha ururadu wax go'an ma aha; mid waliba intuu doonuu yeelan karaa.

### Layli :

Qor ku tirsaneyaasha ururada hoos ku yaal.

- 1) Barayaasha dugsiga xisaabta ka dhiga.
- 2) Bilaha sannadka.
- 3) Degmooyinka gobolka Togdheer.
- 4) Gobollada J. D. S.

- 5) Waddannada Afrikada Bari.
- 6) Tirooyinka dhabanka ah ee ka yar laba iyo toban.
- 7) Abyoonayaasha taban ee 18 ka weyn.
- 8) Dhufsaneyaasha afar ee ka weyn labaatana kana yar boqol.
- 9) Tirooyinka kisi ah ee saddex u qaybsama ee ka yar konton.
- 10) Tirooyinka mutuxan ee u dhexeeya toban iyo sagaashan.
- 11) Abyoonayaasha qaybiya labaatana.
- 12) Tirooyinka mutuxan ee wadartoodu ay tahay afar iyo toban.

Sidee u tilmaami lahayd ururada soo socda:

$$13) \{5, 10, 15, 20, 25, 30\}$$

$$14) \{\dots, -2, -1, 0, 1, 2, \dots\}$$

$$15) \{1, 8, 27, 64, 125\}$$

### Siyaabaha loo tilmaamo ururada

Waxa jira laba hab oo loo tilmaamo ururada. Laakiin waxa jirta in hab kastaaba oggolyahay in magac loo bixiyo ururka.

#### 1. Habka tixidda

Sida caadiga ah ururadu waxay ka kooban yihiin kutirsaneyaal, markaa habkani waa habka lagu taxo kutirsaneyaasha ururada.

Haddaba sideebaa loo kala soocaa kutirsaneyaasha ururada?

Kutirsaneyaasha waxa kala sooca hakadyo, haddaan hakadyadaasi jirin ururka macnihiisu way isbeddelayaa.



## SIXID

Bogga	Qaladka	Saxidda
100	Cutub II	Cutub VI
139	Cutub IV	Cutub VIII
159	Cutub VI	Cutub X

Raac tasmada buugga

**Tusaale :**

$$A = \{1, 2, 3\}$$

$$B = \{1, a, x\}$$

Haddaad u fiirsatid ururada A iyo B; waxaad aragtaa in mid waliba laba hakad leeyahay. Haddaynu hakadyada tuurno

waxaad helaysoo ururo cusub oo ah  $\{123\}$  iyo  $\{1ax\}$ . Ururada-

ni way ka geddisan yihiin ururadii hore ee A iyo B, sababtoo ah A iyo B midba wuxuu lahaa saddex kutirsane, kuwanina midkiiba wuxuu leeyahay hal kutirsane. Haddaba waa inaad ogaataa inay lagama maarmaan yihiin hakadyadu.

Ururadu way isku khaldamaan haddaan xerooyin loo kala samayn. Markaa urur kasta waxa lagu oodaa laba tidic.

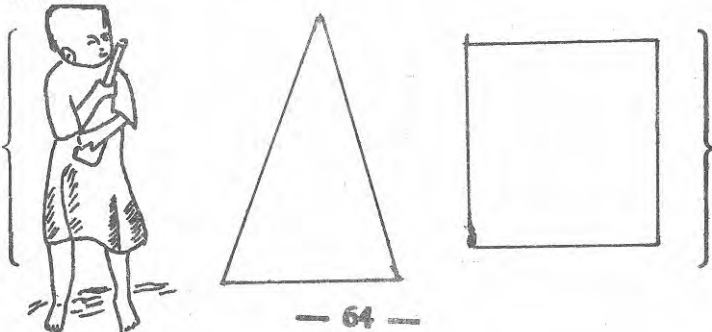
**T U S A A L E**

$$\{2\} \quad \{+\} \quad \{1\}$$

Tusaalahani wuxuu ina tusayaa saddex urur oo kala duwan. Haddaynu afarta tidic ee dhexe tuurno, waxaynu helaynaa urur keliya oo ah  $\{2 + 1\}$ . Markaa taasi waxay ku tusey-

saa in tidicyadu lagama maarmaan yihiin.

**Tusaale :**



Ururkani wuxuu ka kooban yahay sawirro. Ururku mar haddii uu yahay sawirro hakadyo uma baahna sababtoo ah waxba kuma kordhinayaan.

## 2. Habka eray ku tilmaamidda

Sida caadiga ah kutirsaneyaasha ururada xiriir baa ka dhexeeya. Sidaa daraaddeed waxaa la heli karaa erayo lagu tilmaamo ururka. Marar badan baa jira oo ay tira badan yihiin kutirsaneyaashu oo ay dhibaato noqoto sida loo taxaa. Markaasoo kale waxaa hawl yar habkani.

### Tusaale :

- A = ururka wabiyada J. D.S.
- B = ururka xoghayeyaasha J.D.S.
- T = ururka tirsimada.
- J = ururka aadamiga
- X = ururka dalalka madax bannaan ee dunida.

### Layli :

#### 1. Tax ururada soo socda :

- b) Ururka tirooyinka idil ee laba iyo toban ka yar.
- t) Ururka shibaneyaasha xarfaha af Soomaaliga.
- j) Ururka xarfaha laban laabma ee xarfaha af Soomaaliga.
- x) Ururka gobollada J. D.S.
- kh) Ururka dalalka Afrikada Bari.

#### 2. Erayo ku tilmaan ururada soo socda :

Ururada qaar baa iyagoo kooban ay dhib tahay sida loo taxaa. Sababtuna waxa weeye kutirsaneyaashaa la arkaa inay aad u fara badan yihiin. Markaasoo kale waxaad qoraysaa saddexda kutisane ee ururka u horreeya, waxaad ku xigsiinaysaa saddex barood oo ka taagan kutirsaneyaasha maqan dadeedna waxaad dhigtaa kutirsanaha ururka u dambeeya.

### Tusaale :

- 1) Ururka tirsimada ee toban kun ka yar

$$\{1, 2, 3, \dots, 9999\}$$

- 2) Ururka tirooyinka dhabanka ah ee saddex kun ka yar.

$$\{0, 2, 4, \dots, 2998\}$$

- 3) B = ururka aadamiga dunida ku nool.  
(in kastoo ururkani badan yahay; haddana waa koobane).

#### 2. Ururada ma koobanaha ah

Ururada ma koobanaha ahi waxay u qaybsamaan saddex.

- 1) Ururada meel ay ka bilawdaan aan lahayn.

### Tusaale :

Ururka abyoonaayaasha

$$= \{\dots, -3, -2, -1\}$$

Tusaalahan haddaad u fiirsatid waxaad ka aragtaa saddex barood iyo saddex kutirsane oo ka dambeeya. Baruhu waxay ka joogaan kutirsaneyaasha maqan. Sababtuna waxay tahay, abyoone kasta oo taban oo aad maskaxda ku qabatid waxa jira mid ka yar. Markaa waxay inagu kallifaysaa inaynu dhigano baro inooga taagan kutirsaneyaasha ururka xaggiisa hore ka maqan.

- 2) Ururada meel ay ku dhammaadaan aan lahayn.

### T U S A A L E

$$\text{Ururka tirooyinka idil} = \{0, 1, 2, 3, \dots\}$$

Ururka tirooyinka idil waa urur aad  $\bar{u}$  ballaaran. Meel uu ka bilaabmo wuu leeyahay oo waa la yaqaan, laakiin meel uu ku dhammaado ma leh. Sababtuna waxay tahay tiro kasta oo ururka ka mid ah tiro ka weyn baa ururka ku jirta. Markaa waxay ina ku kallifaysaa inaynu saddex barood xagga dambe dhigno oo ka jooga kutirsaneyaasha maqan.

3) Ururada meel ay ka bilawdaan iyo meel ay ku dhammaadaan aan lahayn.

b)  $\{a, i, e, o, u\}$

t)  $\{\text{Ceerigaabo, Laas-qoray, Garadag}\}$

j)  $\{21, 22, 23, 24, 25, 26, 27, 28, 29\}$

x)  $\{b, d, r, g, l, m, n\}$

kh)  $\{\text{ido, riyo, geel, lo'}\}$

3. Hagaaji gafafka ku jira taxniinka ururada soo socda :

b) Ururka tirsiiimada ee 5 ka yar =  $\{1234\}$

t) Ururka tirooyinka idil ee 7 ka yar  
=  $\{0, 1, 2, 3, 4, 5, 6\}$

j) Ururka tirooyinka dhabanka ah ee 14 ka yar  
=  $\{0, 2, 4, 6, 8, 10, 12, 14\}$

x) Tirooyinka mutuxan ee god kaliya leh

$$= \{2, 3, 5, 7, 11\}$$

### Ururada kooban iyo kuwa ma koobnaha ah

Ururada asalkooda hore waxay u qaybsamaan laba qaybood. Labadaa qaybood magacyadooda waxa la yiraahdaa «Koobane» iyo «ma koobane».

#### 1. Ururada kooban

Ururka koobani waa ururka kutirsaneyaashiisu meel ay ka bilawdaan meelna ay ku dhammaadaan. Marka kutirsaneyaasha ururadaa waa la tixi karaa giddigood.

#### Tusaale :

Ururka ayaamaha toddobaadka

$$= \{\text{Sabti, Axad, Isniin, Talaado, Arbaco, Khamiis, Jimce}\}$$

Ururka tirsiiimada ee toddoba ka yar

$$= \{1, 2, 3, 4, 5, 6\}$$

#### Tusaale :

$$\text{Ururka abyoonaayaasha } \{\dots, -2, -1, 0, 1, 2, \dots\}$$

Haddaad u fiirsatid ururada qaybtani waxay kaga gaddisan yihiin labada qaybood ee hore, labada xaaloba way leeyihiin. Markaa waa in saddex barood la dhigaa xagga hore saddexna xagga dambe.

Taasoo caddaynaysa in bilow iyo dhammaad midna ayna lahayn.

### Laylisyo :

- 1) Magacaw saddex urur oo kooban.
- 2) Magacaw saddex urur oo ma koobane ah.
- 3) Sheeg ururadan soo socda ka kooban iyo ka ma koobane ah.

b)  $\{ \dots, -6, -5, -4 \}$

t)  $\{ \dots, -2, 0, 2, \dots \}$

d)  $\{ 2, 4, 6, \dots, 88888 \}$

x)  $\{ 3, 6, 9, 12, \dots \}$

- kh) Ururka tirooyinka mutuxan.
- d) Ururka adhiga dunida ku nool.
- r) Ururka makhaayadaha Hargeysa.
- s) Ururka barkadaha Gobolka Togdheer.

### Urur kutirsane kaliya leh iyo urur madhan

Sida dhaqankeena ah ururku wuxuu ka kooban yahay laba kutirsane iyo wax ka badan. Laakiin xisaabtu way oggoshahay urur kutirsane kaliya leh iyo urur madhanba.

Haddii lagu weydiiyo ururka madaxweynayaasha J. D. S. waxaad qoraysaa urur kutirsane kaliya leh. Sababtu waxaa weeye madaxweyne kaliya baa J.D.S. leedahay. Haddii lagu weydiiyo ururka dadka lixda indhood leh, jawaabtu waxay tahay ma jiraan dad lix indhood lihi. Markaa macnihii waxa weeye ururkaasi kutirsaneyaal ma laha. Ururkaa laba siya-

bood baa loo qori karaa: waa  $\{ \quad \quad \quad \}$  iyo  $\emptyset$ , waxaana la

yiraa **urur madhan**.

### Layli :

Ururada soo socda, kala sheeg kuwa kutirsane kaliya leh iyo kuwa madhan, iyo kuwa aan midnaba ahayn.

- 1) Ururka tirooyinka mutuxan ee dhabanka ah.
- 2) Ururka tirooyinka kisi ah ee ka yar saddex.
- 3) Ururka tirooyinka taban ee ka weyn eber.
- 4) Ururka xarumaha J.D.S.
- 5) Ururka tirsiiimada tirooyinka laba god leh ee ka weyn boqol.
- 6) Ururka ardayda fasalka shanaad ee toban gu' ka weyn.
- 7) Ururka badaha biyaha macaan leh.
- 8) Ururka dalalka Soomaaliyeed ee dawladaha reer Yurub gumaystaan.

### Ururada isle'eg

#### Isle'ekaanta.

Haddii la ina weydiiyo saddex loo geeyay saddex, waxaynu qornaa  $3 + 3 = 6$ . Macnihii waxa weeye waxaynu ku qorno dhinac summadda isla'ekaanshaha ayaa le'eg waxaynu ku qorno dhinaca kale.

Taasi waxay ku tusaysaa in wax isku mid ah aynu u bixino magacyo kala geddisan.



### Tusaale :

$$a = b$$

$$\frac{3}{2} = \frac{9}{6}$$

Muqdisho = xarunta J.D.S.

2 = tirada mutuxan ee ugu yar tirooyinka mutuxan.

### Ururada Isle'eg

U fiirso ururadan soo socda :

$$A = \{b, t, j, x, kh\}$$

$$B = \{t, b, j, kh, x\}$$

T = Ururka shanta xaraf ee u horreeya af Soomaaliga. Haddaynu is barbardhigno labada urur ee A iyo B waxaad aragtaa in kutirsaneyaashoodu isku mid yihiin in kastoo habsiimadoodu ay kala geddisan tahay. Halka waxaynu ku ogaaneynaa in A iyo B ay yihiin laba magac oo loo baxshay urur kaliya. Markaa waxaynu oran karnaa  $A = B$ , sababta oo ah kutirsaneyaashoodaa isku mid ah.

Bal u fiirso ururka T. Ururka T ma le'eg yahay ururada A iyo B? Waa maxay kutirsaneyaasha ururka T? Kutirsaneyaasha T haddii la taxo waa b, t, j, x, kh.

Kutirsaneyaasha ururka T waa la mid kutirsaneyaasha ururada A iyo B. Markaa waxaynu oran karnaa  $A = B = T$ . Markaa guud ahaan ururada is le'eg waa in kutirsaneyaashoodu isku mid ahaadaan.

U fiirso labadan urur :

$$A = \{1, 3, 5, 7\}$$

$$B = \{1, 8, 5, 7\}$$

Kutirsaneyaasha labada urur qaarkood waa isku mid laakiin waxa jira kuwa ku jira A oo aan ku jirin B, waxa kale oo jira kuwo ku jira B oo aan ku jirin A. Dabadeed A iyo B is ma la'eka, marka  $A \neq B$ .

### Layli :

1.  $A = \{2, 4, 6, 8\}$ , B = ururka tirooyinka dhabanka

ah ee 10 ka yar.  
A ma le'eg tahay B?

2. Ururada lammaan ee soo socda sheeg kuwa is le'eg?

b)  $K = \{m, t, h, a, s\}$        $L = \{m, a, t, h, s\}$

t) Ururka faraha gacantaada midig iyo

$$\{1, 2, 3, 4, 5\}$$

j)  $\{5, 10, 15\}$  iyo  $\{5 \times 1, 5 \times 2, 5 \times 3\}$

x)  $\{ \}$  iyo  $\{0\}$

kh)  $\{\text{Muqdisho}\}$  iyo ururka xarumaha J.D.S.

3. Keen saddex urur oo le'eg ururkan soo socda :

$$A = \{3, 5, 7, 9\}$$

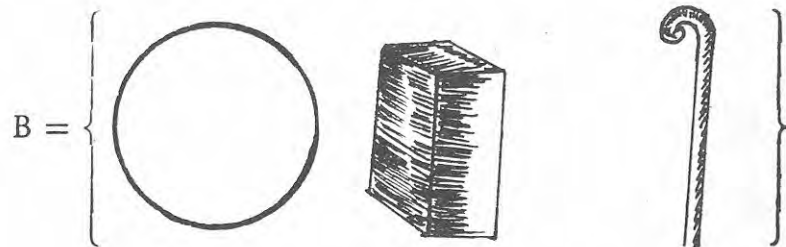
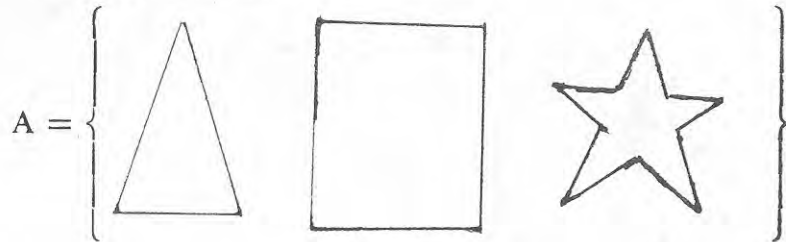
4.  $A =$  Ururka tirsimada ee ka yar 11.  
 $B =$  Ururka tirooyinka idil ee 11 ka yar.

A iyo B ma is le'eg yihiin?  
 Waayo?

### Ururada isudhigma

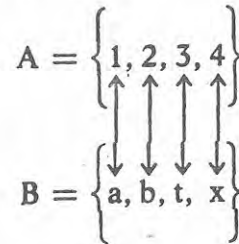
Haddaad ku tiraahdid ilma yar i tus sankaa, far kaliya buu saarayaa sankiisa. Sababtu waxay tahay, sanku waa shay kaliya markaa waxa u dhiganta far kaliya.

U fiirso ururadan :



Marka u horreeya aad eegtid ururadan waxaad ogaaneysaa inayan isle'ekeyn; sababtoo ah kutirsaneyaashoodu isku mid maaha. Laakiin waxaad aragtaa in kutirsane kastaa **ku beegan** yahay kutirsane ururada kale ka mid ah.

U fiirso labadan urur :



Haddaad eegtid labadan urur, kutirsane kastaba **jaal** ayuu ku leeyahay ururka kale. Taasna waxa ku tusaya leebab laba af le. Marka taasoo kale dhacdana waxa la yiraahdaa **isku beegnaan mid mid ah**. Haddaba mar haddii ururo laga helo isku beegnaan mid ah, waxaynu oran karnaa ururadaasi way isku dhigmaan. Dabeeto labada urur ee A iyo B way isku dhigmaan.

### X a s u u s

**Labada urur waxay iskudhigmaan marka tirada ku tirsaneyaashoodu is le'eg tahay.**

Tusaale :

$$B = \{1, 2, 3, 4\}$$

$$T = \{1, 2, 3\}$$

Labadan urur ee B iyo T iskuma dhigmaan, sababtoo ah ma laha isku beegnaan mid mid ah. Waxa kale oo aynu oran karnaa tirada kutirsaneyaasha labada urur baan is le'ekeyn.

Layli:

- 1) Qor toban urur oo isku dhigma.
- 2) Ururadan soo socda ee lammaan sheeg kuwa isku dhigma.

b)  $A = \{1, 2, 3\}$

$B = \{\text{Laas Caanood, Ceerigaabo, Gaalkacyo}\}$

- t) X = Ururka tirooyinka mutuxan ee 40 ka yar.  
Y = Ururka tirooyinka kisiga ah ee 25 ka yar.
- j) A = Ururka xoghayeyaasha J. D. S.  
B = Xarfaha Af Soomaaliga.
- x) A = Ururka tirooyinka idil ee 20 ka yar.  
B = Ururka tirsiimada ee ka yar 21.

kh)  $A = \{1, 2, 3, 4, \dots\}$

$B = \{0, 1, 2, 3, \dots\}$

Hormo urur

Erayga hormo waxa la isticmaalaa marka xoolaha la wa-raabinayo. Xooluhu hadday badan yihiin, mar kaliya kama wada cabbi karaan darka; marka waxa loo qaybshaa qaybo la yiraahdo hormooyin. Haddaba xisaabtuna waa sidaasoo kale, oo urur kasta waxa loo qaybin karaa hormooyin.

Hormo urur waa qayb ka mid ah urur, marka ku-tirsane kasta oo hormada ku jira waa in laga helaa ururka. Ta kale ee loo baahan yahay in la ogaadaa waxay tahay, hormo urur inay

tahay urur. Haddaad haysatid  $B = \{1, 5, 6, 7\}$  iyo

$A = \{1, 6, 7\}$  waxaad aragtaa in kutirsane kasta oo ururka A

ku jiraa inuu ku jiro ururka B. Markaa waxaynu oran karnaa A hormo urur bay u tahay B.

Tusaalooyin

- |                                    |  |
|------------------------------------|--|
| 1) Ururka G. S.K.                  | 1) Ururka madaxweyne xigeenada.                    |
| 2) $\{3, 19, 20, 1000\}$           | 2) $\{3, 1000\}$                                   |
| 3) $\{a, b\}$                      | 3) $\{a\}$   |
| 4) Ururka barayaasha dug-siga.     | 4) Ururka barayaasha xisaabta ee dug-siga.         |
| 5) Ururka gobollada Soomaaliya.    | 5) $\{\text{Togdheer, Hiiraan}\}$                  |
| 6) Ururka dawladaha madax bannaan. | 6) $\{\text{Soomaaliya}\}$                         |
| 7) Ururka tirsiimaada.             | 7) $\{9, 21, 30\}$                                 |
| 8) Ururka xuruufta Af Soomaaliga.  | 8) Ururka Shaqallada.                              |
| 9) Ururka tirooyinka taaban.       | 9) $\left\{-1, -\frac{1}{2}, -\frac{1}{4}\right\}$ |
| 10) Ururka dufsaneyaasha           | 10) $\{12, 18, 72\}$                               |

Haddaad u fiirsatid tusaalooyinka waxaad aragtaa in qayb kasta oo midig ku taalla ay hormo urur u tahay qaybta bidix ku taalla ee ku beegan. Sababtuna waxay tahay, ku tirsane kasta oo ururka midig ku jiraa wuxuu ku jiraa ururka bidix ku yaal.

Tusaale :

$$A = \{a, b\} \quad B = \{a, b\} \quad T = \{ \quad \}$$

Haddaad aad ugu fiirsatid ururada A, B iyo T; waxaad ogaaneysaa in A iyo B isle'eg yihiin, Tna madhan tahay.

Haddaynu mar labaad darisno waxaynu ogaan karnaa in B hormo urur u tahay ururka A ama A hormo urur u tahay ururka B. Sabatu waxa weeye kutirsane kasta oo B ku jira waxa laga helaya A; kutirsane kasta oo A ku jira waxa laga helayaa B.

Waxaynu ognahay in T tahay uru madhan; laakiin taasi iyadoo jirta baa T hormo urur u tahay A iyo Bba . Sababtu waxa weeye wixii T laga helaba A iyo Bba waa laga helayaa.

Markaa waxaynu oran karnaa ururada isle'egi waa isku hormo urur; ta labaad urur madhani hormo urur buu u yahay urur kasta.

Xisaabtu had iyo jeer waxay leedahay astooyin lagu beddalo ereyada. Markaa ereyga hormo urur waxa lagu beddelaa

$$\text{astada} \subseteq. \text{ Haddaad haysatid } B = \{9, 16, 20\} \text{ iyo } T = \{16\},$$

laba siyaabood baad u tilmaami kartaa xiriirka labada urur ka dhexeeya. Mar waxaynu oran karnaa T hormo urur bay u tahay B; marna  $T \subseteq B$ .

Tusaale :

$$L = \{5, 6, 7\}$$

$$M = \{5, 6, 7\}$$

$$N = \{ \quad \}$$

$$K = \{5, 6\}$$

Markaa  
 $N \subseteq L$   
 $N \subseteq M$   
 $N \subseteq K$

$K \subseteq L$   
 $K \subseteq M$   
 $L \subseteq M$   
 $M \subseteq L$

B. Meelaha bannaan ku buuxi ereyo ku habboon?

1. b)  $\{a, m, n\}$  wuxuu ----- u yahay  $\{1, m, n, a, t\}$

t) Waxaad haysataa ururada  $A = \{1, 2, 3, 4, 9\}$

iyo  $B = \{9, 1\}$ . Markaa ururka -----

hormo-urur buu u yahay ururka -----

2. Ururka  $W = \{ \text{hal, dibi, wan, orgi, sac} \}$

Ururka  $Y = \{ \text{dibi, sac, hal} \}$

Tee baa hormo-urur u ah ta kale?

3.  $\{a, e, i, o, u\}$  ma u yahay hormo urur

$\{a, e, o, u\}$  ? Waayo?

T. Waxaa lagu siiyey ururadan

$L = \{7, 16, k, y, 20\}$        $B = \{ \quad \}$

$$T = \{0\}, \quad N = \{16, k, 20\}, \quad W = \{k, 16, 20\}$$

Kala sheeg ta hagaagsan iyo ta kale:

$$\begin{array}{l} 1) \quad L \subseteq I \\ 3) \quad B \subseteq N \\ 5) \quad W \subseteq N \\ 7) \quad B \subseteq T \end{array}$$

$$\begin{array}{l} 2) \quad T \subseteq B \\ 4) \quad N \subseteq W \\ 6) \quad W \subseteq L \end{array}$$

### Isutagga ururada

Haddaynu labada fasal ee 8-A iyo 8-B fasal isugu geyno waxaynu helayna fasal weyne labadooda ka koobma. Macnihii waxa weeye arday kasta oo ku jira fasalka 8-A ama 8-B waa in laga helaa fasalka cusub.

Haddaba haddaynu haysano labada urur ee

$$A = \{9, 10, 20\} \text{ iyo } B = \{1, 2\} \text{ isu taggoodu wuxuu noqo-}$$

$$\text{nayaa urur cusub oo ah } \{9, 10, 20, 1, 2\}$$

Waxaad ogaataa waxa samaysmay inuu yahay urur; ta la-aad ogsoonow kutirsane kasta oo A ama B ku jira in laga helayo ururka cusub. Waxa haddaba isu keenka ururada la isu keenayo lagu magacaabaa **Isutag**

$$\text{Isutagga labada urur ee } T = \{4, 5, 6, 7\} \text{ iyo}$$

$$J = \{4, 6, 8, 9\} \text{ waa ka gedisanaanayaa isutagga ururadii ay-}$$

nu hore u soo falanqaynay. Sababtu waxay tahay ku tirsanayaa-sha qaar baa labada ururba ku jira; waxaana ka mid ah 4 iyo 6.

$$\text{Isutagga } T \text{ iyo } J \text{ wuxuu noqonayaa } \{4, 5, 6, 7, 8, 9\}. \text{ Kutirsane}$$

keliya lama oggola in laba goor la qoro, markaa 4 iyo 6 mar keliyaa la qorayaa.

Astada ururada isutagooda waxa weeye  $U$ .  $A \cup B$  waxa loo akhriyaa «A utag B».

### 1. Tusaale

$$A = \{a, b\}, \quad B = \{a, t, x\}, \quad C = \{1, 2\}$$

$$A \cup B = \{a, b, t, x\}$$

$$A \cup C = \{a, b, 1, 2\}$$

$$B \cup C = \{a, t, x, 1, 2\}$$

$$A \cup \emptyset = \{a, b\}$$

### 2. Tusaale

A = Ururka tirsimada.

$$B = \{0\}$$

$A \cup B$  = Ururka tirooyinka idil.

### 3. Tusaale

$$A = \{1, 2\}, \quad B = \{3, 4\}, \quad T = \{5, 6, 7, \dots\}$$

$$i) \quad A \cup B = \{1, 2, 3, 4\}$$



$$\text{ii) } B \cup A = \{3, 4, 1, 2\}$$

Halkaa waxaad aragtaa in  $A \cup B = B \cup A$ ; haddaba waxaynu oran karnaa isutagga ururadu wuu oggol yahay xeerka ka hormarinta.

$$\text{iii) } (A \cup B) \cup T = \{1, 2, 3, 4\} \cup \{5, 6, 7, \dots\}$$

$$(A \cup B) \cup T = \{1, 2, 3, 4, 5, 6, 7, \dots\}$$

$$\text{iv) } B \cup T = \{3, 4, 5, 6, 7, \dots\}$$

$$\text{v) } A \cup (B \cup T) = \{1, 2, 3, 4, 5, 6, 7, \dots\}$$

$$\text{v) } (A \cup B) \cup T = \{1, 2, 3, 4, 5, 6, 7, \dots\}$$

Haddaad eegtid qaybta (iii) iyo qaybta (v) waxaad ogaaneysaa  $(A \cup B) \cup T = A \cup (B \cup T)$

Haddaba xeer baa sheegaya in ururada la hormogalin karo. Waxaynu ogaanay in isutagga laba urur uu ka kooban yahay kutirsanayaasha labada urur.

Taa macneheedu waxa weeye urur kasta oo labada ka mid ahi hormo urur buu u yahay isutagga labada urur. Kasoo qaad

inaynu haysano labada urur ee  $A = \{1, 3\}$ , iyo  $B = \{5, 6\}$ ;

$$\text{markaa } A \cup B = \{1, 3, 5, 6\}$$

Haddaba waxaynu aragnaa kutirsane kasta oo ku jira A in laga helo  $A \cup B$ , kutirsane kasta oo B ku jiraana wuxuu ku jiraa  $A \cup B$ .

Markaa waxaynu oran karnaa  $A \subseteq A \cup B$ ,  $B \subseteq A \cup B$ .

**Layli :**

Ururada lammaan ee soo socda isutaggooda soo saar?

$$1) X = \{1, 2, 3\}$$

$$Y = \{2, 3, 4\}$$

$$2) T = \{5, 10, 15\}$$

$$R = \{15, 20\}$$

$$3) \{ \}$$

$$F = \{a, b\}$$

$$4) H = \{1, 3, 6\}$$

$$M = \{1, 3, 6\}$$

$$5) N = \{\text{Adhi, geel, lo'}\}$$

$$W = \{\text{bakayle, lo'}\}$$

$$6) A = \{\otimes \Delta\}$$

$$KH = \{\otimes \square \Delta\}$$

$$7) I = \{\dots, -3, -2, -1\}$$

$$Q = \{0, 1, 2, 3, 4, \dots\}$$

$$8) T = \{0, 1, 2, 3, \dots\}$$

$$Y = \{0, 1, 2\}$$

$$9) A = \text{Ururka shaqallada xarfaha af Soomaaliga.}$$

B = Ururka Shibanayasha af Soomaaliga.

$$10) E = \{Lax\} \quad O = \{1, a, x\}$$

B. Buuxi meelaha bannaan

$$1) \{1, 3\} \cup \{ \quad \quad \quad \} = \{1, 4, 5\}$$

$$2) \{a, b\} \cup \{t, c\} = \{a, b, t, c, n\}$$

**Dhexaalka ururada**

$$\text{Haddaad fiirisid ururada } A = \{2, 6, 9\}, B = \{1, 9, 10\};$$

waxaad aragtaa in kutirsanaha 9 uu labada ururba ku jiro. Markaa waxaynu oran karnaa ku tirsanaha 9 wuxuu ka dhaxeeyaa labada urur. Haddaba dhextaalka ururada A iyo B waa ururka  $\{9\}$ .

Waa inaynu ogsoonaanaa in dhextaalka ururradu yahay urur. Astada dhextaalku waa  $\cap$ ;  $A \cap B$  waxa loo akhriyaa «A dhextaal B».

**Tusaale :**

- 1)  $A = \text{Xoghayaasha J.D.S.}$   
 $B = \text{Ururka katirsanayaasha G.S.K.}$   
 $A \cap B = \text{Xoghayaasha G.S.K. ku jira.}$

2) **Tusaale**

$$A = \{1, 2, 3\}, B = \{2, 3, 9\}, C = \{9, 20, 21, 30\}$$

$$i) A \cap B = \{2, 3\}$$

$$i) B \cap C = \{9\}$$

$$iii) A \cap C = \{ \quad \quad \quad \}$$

Haddaad u fiirsatid qaybta (iii) waxaad aragtaa in

$$A \cap C = \{ \quad \quad \quad \} \quad \text{Maxay ku dhacday? Marka hore waa in-}$$

aad ogaataa inaan kutirsanayaal ka dhexayn labada urur. Marka labaad waa inaad ogaataa in dhextaalku asalkiisu yahay urur. Dabeeto dhextaalka A iyo C waa urur madhan.

3) **Tusaale**

$$A = \{1, 2, 3, \dots\}, B = \{0, 1, 2, \dots\}$$

$$i) A \cap B = \{1, 2, 3, \dots\}$$

$$ii) A \cap B = A$$

Maxay ku dhacday in  $A \cap B = A$ ? Haddaad u fiirsatay A waxay ka taagan tahay ururka tirsimada, Bna waxay ka joogtaa ururka tirooyinka idil. Haddaba  $A \subseteq B$ , dabadeedna

$$A \cap B = A.$$

Waxaynu ognahay in dhextaalku ka abuurmo kutirsanayaasha labada ururba ku jira. Markaa waxaynu oran karnaa dhextaalka laba urur, labada urur mid walba gooni ahaantii ayuu hormo ugu noqdaa.

Haddii la ina siiyo labada urur ee  $A = \{a, b, t, j\}$

iyo  $B = \{a, b, x, d\}$ , markaa  $A \cap B = \{a, b\}$

Haddaba waxaad aragtaa kutirsanayaasha ku jira  $A \cap B$  inay ku jiraan  $A$  iyo  $B$ . Markaa  $A \cap B \subseteq A$ , isla markaana

$A \cap B \subseteq B$ .

**Layli :**

1) Ururada lamaan ee soo socda hel dhextaalkooda :

$$a) X = \{1, 2, 3\} \quad Y = \{2, 3, 4\}$$

$$b) R = \{5, 10, 15\} \quad T = \{15, 20\}$$

$$t) E = \{ \quad \quad \quad \} \quad M = \{a, b, t, j\}$$

$$j) N = \{1, 2, \text{dameer}\} \quad F = \{d, a, m, e, e, r\}$$

$$x) W = \{1 \ 2 \ 3\} \quad H = \{1, 2, 3, 4\}$$

$$kh) K = \{+ \ - \ X \ \div\} \quad D = \{X \ \Delta\}$$

d) Q = Ururka dadka muslimka ah.

L = Ururka dadka galada ah.

$$r) B = \{1, 5, 7\} \quad C = \{1, 1, 5\}$$

2) Buuxi meelaha bannaan:

$$a) \left\{ a, \quad \right\} \cap \left\{ b, c \right\} = \left\{ \quad b \right\}$$

$$b) \left\{ 1, \quad , \quad , 4 \right\} \cap \left\{ 4, \quad , 3, 6 \right\} = \left\{ 2, 3, 4 \right\}$$

### Urur guud

Haddii lagu siiyo ururro waxaad heli kartaa urur ururdaas oo dhami ay u noqonayaan hormo urur; ururka waxa la yiraa urur guud. Had iyo jeer ururkaaga guud wuxu ku xiran yahay ururada aad falanqayneysid. Haddii aad haysatid ururka dalalka Afrikada Bari, ururka dalalka Afrikada Galbeed, ururka Afrika Waqooyi iyo ururka dalalka Afrikada Dhexe, giddigood waxa urur guud u noqonaya ururka dalalka Afrika. Waxaa dhici kara in ururo guud oo kale la helo, waxa ka mid ah ururka dalalka dunida.

### Tusaale 1

A = Ururka abyooneyaasha taban.

B = Ururka tirooyinka kisi.

C = Ururka tirooyinka dhaban.

Ururadaas oo dhan waxa urur guud u noqon kara ururka

abyooneyaasha.

### Tusaale 2

$$A = \{1, 2, 3, \dots, 30000\}$$

$$B = \{5, 6, 7, \dots, 1000\}$$

$$T = \{5, 7, 9, 11, 13, 15, 17\}$$

$$J = \{5, 10, 15, \dots, 4000\}$$

Dhowr urur guud baynu heli karnaa oo ururadaas oo dhaani ay u noqonayaan hormooyin. Ururadaas waxa ka mid ah

ururka tirsiimada, ururka tirooyinka idil,  $\{1, 2, 3, \dots, 40000\}$

iwm

**Layli :**

$$B = \{1, 2, 3, \dots, 50\}$$

$$T = \{ \}$$

$$J = \{5, 10, 15, \dots, 1000\}$$

$$X = \{3, 6, 9, \dots\}$$

$$KH = \{2, 4, 6, \dots, 180\}$$

$$D = \{10, 20, 30, \dots, 90\}$$

$$R = \{30, 60, 90, \dots, 270\}$$

Sheeg in ururrada hoos ku qorani ay u yihiin urur guud ururrada kor ku yaal. Weliba sheeg urur kasta inta uu urur guud u noqon karo.

- b) Ururka Dhufsaneyaasha 2
- t) Ururka tirsiiimada.

- j) Ururka  $\{1, 2, 3, \dots\}$

- x) Ururka abyooneyaasha.

- kh) Ururka  $\{1, 2, 3, \dots, 999\}$

- d) Ururka  $\{5, 10, 15, \dots, 1000\}$

- 2. Keen urur u ah urur guud ururrada hoos ku yaal:

- i) b.  $\{a, e, i, o, u\}$

- t.  $\{b, t, j, x, kh\}$

- j.  $\{r, m, n, s, h\}$

- x.  $\{sh, w, q, y, f\}$

- ii) b. (Ururka degmooyinka Xamar.
- t. Ururka degmooyinka Gobolka Togdheer.
- j. Ururka degmooyinka Gobolka Sanaag.
- x. Ururka degmooyinka Gobolka Mudug.

- iii) b. Ururka dhufsaneyaasha 4
- t. Ururka dhufsaneyaasha 8
- j. Ururka dhufsaneyaasha 12
- x. Ururka dhufsaneyaasha 10

### Urur Duleed

Haddaad haysatid ururka A iyo ururka guud ee G; urur duleed A oo loo qoro  $\bar{A}$  wuxuu ka koobnaanayaa kutirsane-yaasha ku jira ururka guud ee G ee aan ku jirin ururka A.

Waa inaad ogaataa in urur duleedku asalkiisu yahay urur.

#### Tusaale 1

Waxaa lagu siiyey

$$G = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

$$A = \{1, 3, 5, 7, 9\}$$

$$B = \{2, 4, 6, 10\}$$

$$T = \{3, 6, 9\}$$

$$J = \{ \}$$

G waa urur guud

$$i) \bar{A} = \{2, 4, 6, 8, 10\}$$

$$ii) \bar{B} = \{1, 3, 5, 7, 8, 9\}$$

$$iii) \bar{T} = \{1, 2, 4, 5, 7, 8, 10\}$$

$$iv) \bar{J} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

#### Tusaale 2

$$G = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$$

G waa urur guud

$$A = \{1, 5, 6, 8, 9\}$$

$$B = \{1, 2, 3, 4, 5, 6\}$$

$$i) A \cap B = \{1, 5, 6\}$$

$$ii) \overline{(A \cap B)} = \{2, 3, 4, 7, 8, 9\}$$

$$iii) A \cup B = \{1, 2, 3, 4, 5, 6, 8, 9\}$$

$$vi) \overline{(A \cup B)} = \{7\}$$

$$v) \bar{A} = \{2, 3, 4, 7\}$$

$$vi) \bar{A} \cap B = \{2, 3, 4\}$$

$$vii) \bar{A} \cap A = \{ \}$$



Haddii lagu weydiyo urur duleedka isutagga laba urur:  
 ka soo qaad  $\overline{(A \cup B)}$ , waa inaad marka hore soo saartaa  
 $(A \cup B)$ , dabeetana raadisaa urur duleedkooda.

Sidaas oo kale ayaa lagu heleyaa  $\overline{(A \cap B)}$ . Marka hore  
 soo saar  $A \cap B$ ; dabeetana raadi  $\overline{(A \cap B)}$ .

### Layli :

Waxa lagu siiyey ururka guud ee

$$G = \{9, 10, 11, 12, 13, 14, 15, 16\}$$

$$A = \{10, 11, 15\}$$

$$B = \{11, 12, 13, 16, 10\}$$

$$T = \{ \}$$

$$J = \{9, 14, 15, 16\}$$

Soo saar :

- 1)  $\overline{A}$
- 2)  $\overline{B}$
- 3)  $\overline{T}$

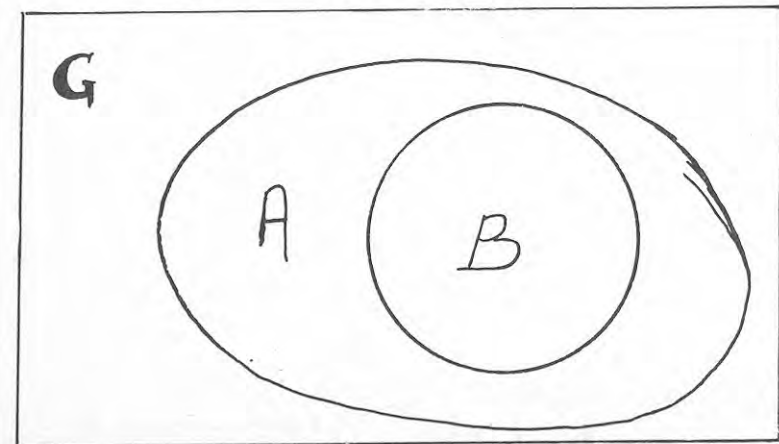
- 4)  $\overline{J}$
- 5)  $\overline{A \cup B}$
- 6)  $\overline{(A \cup B)}$
- 7)  $\overline{A} \cap \overline{T}$
- 8)  $\overline{B} \cap \overline{J}$
- 9)  $\overline{(A)}$
- 10)  $\overline{G}$

### Jaantusyada Fen (Venn)

Waxa jira hab sawirra ah oo si fudud kaaga dhaadhicinaya hormooyinka iyo xisaabfallada ururrada (isutagga iyo dhex-taalka ururrada). Laba sawir baynu aad u isticmaalaynaa, ku-waas oo ah Laydi iyo Goobo. Laydigu wuxuu ka joogaa ururka guud, goobooyinkuna waxay ka joogaan ururrada.

### Tusaale 1

- G = Ururka dadka ku nool dunida.  
 A = Ururka dadka ku nool Afrika.  
 B = Ururka dadka ku nool J.D.S.

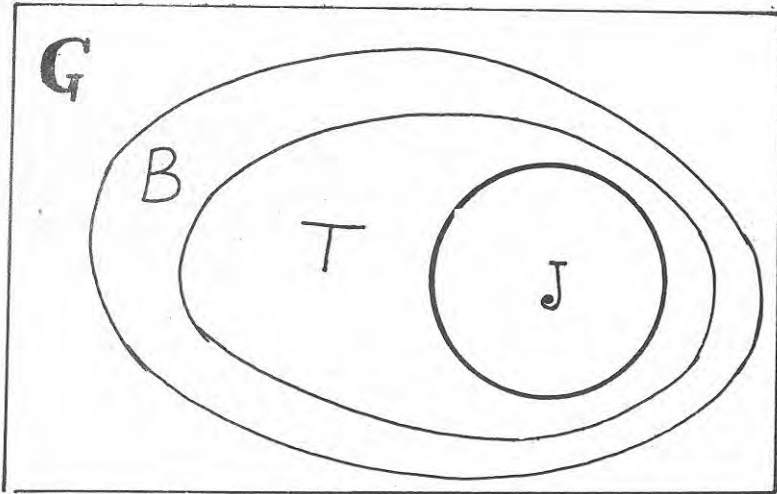


Haddaad u fiirsatid jaantuska, waxaad markaaba arkaysaa inay B tahay qayb ka mid ah A, A na ka mid tahay G. Markaa  $B \subseteq A$ ,  $A \subseteq G$  iyo  $B \subseteq G$

**Tusaale 2**

- G = Ururka abyoonaayaasha.
- B = Ururka tirooyinka idil.
- T = Ururka tirsimada.
- J = Ururka dhufsaneyaasha shan ee aan tabneyn.

Waxaynu doonaynaa inaynu Jaantuska ku muujino xiirka ururrada



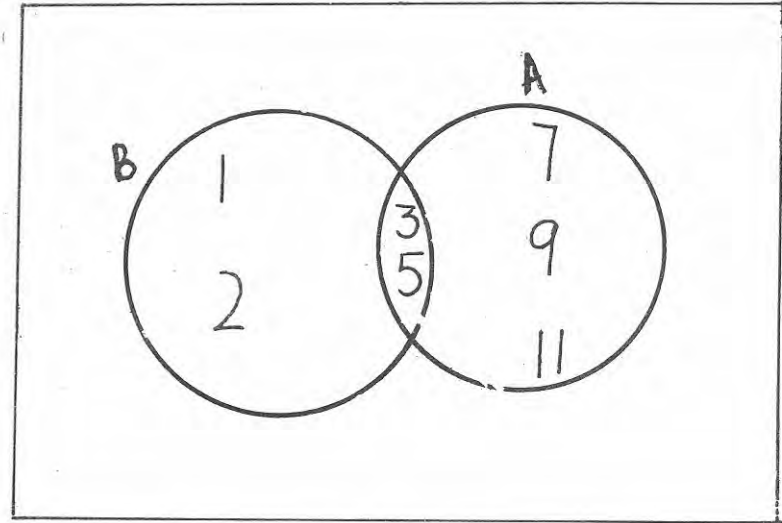
**Tusaale 3**

$$A = \{3, 5, 7, 9, 11\}$$

$$B = \{1, 2, 3, 5\}$$

$$A \cap B = \{3, 5\}$$

Dhextaalka labada urur ee A iyo B waxaynu ku muujin karnaa jaantus.



Qaybta ka dhaxeysa labada goobo waxay ku tusaysa dhextaalka labada urur ee A iyo B oo ah  $\{3, 5\}$

**Tusaale 4**

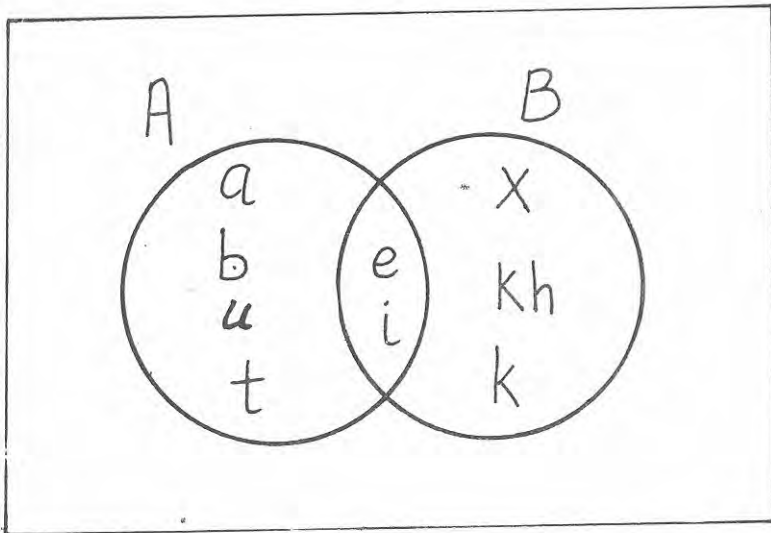
$$A = \{a, b, e, i, u, t\}$$

$$B = \{o, e, i, x, kh, k\}$$

$$A \cup B = \{a, b, e, i, u, t, o, x, kh, k\}$$

$$A \cap B = \{e, i\}$$

Isutagga iyo dhextaalka labada ururba waxaynu ku muujin karnaa jaantus.



Jaantusku wuxuu ku tusayaa saddex qaybood oo kala ah:

- i) Qaybta A gooni u leedahay.
- ii) Qaybta B gooni u leedahay.
- iii) Qaybta A iyo B ka dhexeysa.

Haddaba qaybtani waxay tahay dhextaalka labada urur ee

A iyo B, kaasoo ah  $\{e, i\}$ .

Haddaba waa inaynu helnaa isutagga labada urur ee A iyo B. Saddexda qaybood haddaynu isku darno waxaynu heleynaa isutagga labada urur ee A iyo B.

**Tusaale 5**

Urur guud =  $G = \{1, 2, 3, \dots, 10\}$

$A = \{3, 4, 6, 7, 8\}$

$B = \{1, 2, 3, 4, 9, 10\}$

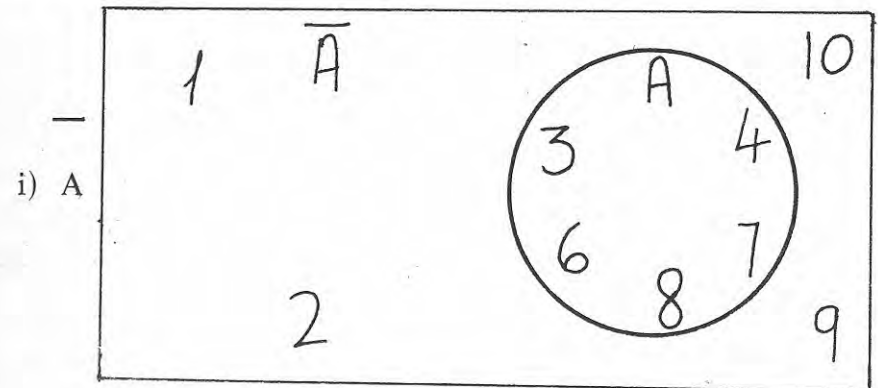
i)  $\overline{A} = \{1, 2, 5, 9, 10\}$

$A \cup B = \{1, 2, 3, 4, 6, 7, 8, 9, 10\}$

ii)  $\overline{(A \cup B)} = \{5\}$        $(A \cap B) = \{3, 4\}$

iii)  $\overline{(A \cap B)} = \{1, 2, 5, 6, 7, 8, 9, 10\}$

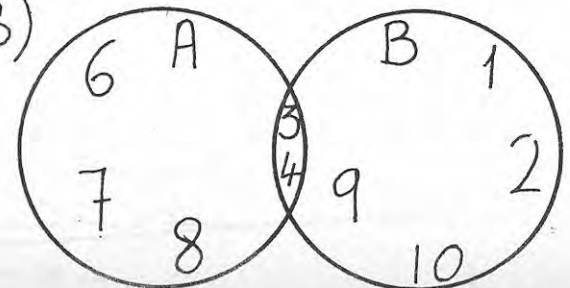
Saddexda urur duleed ee  $\overline{A}$ ,  $\overline{(A \cup B)}$  iyo  $\overline{(A \cap B)}$  baynu ku muujinaynaa jaantusyo.



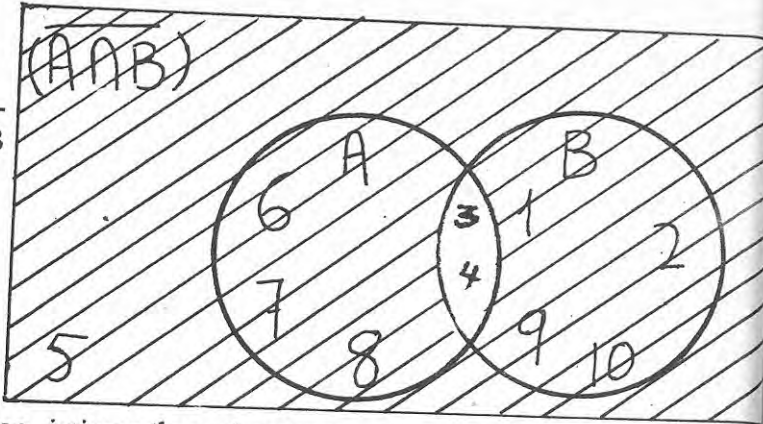
i) A

$\overline{(A \cup B)}$

ii)  $\overline{(A \cup B)}$  5

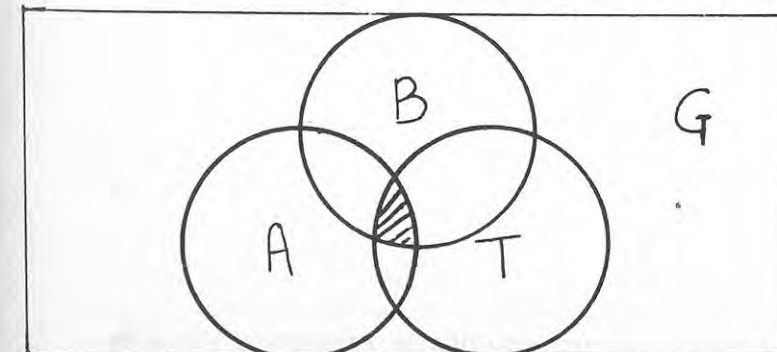
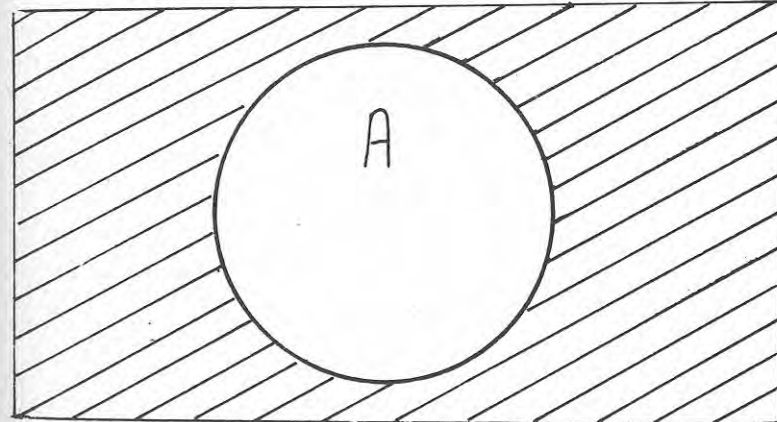
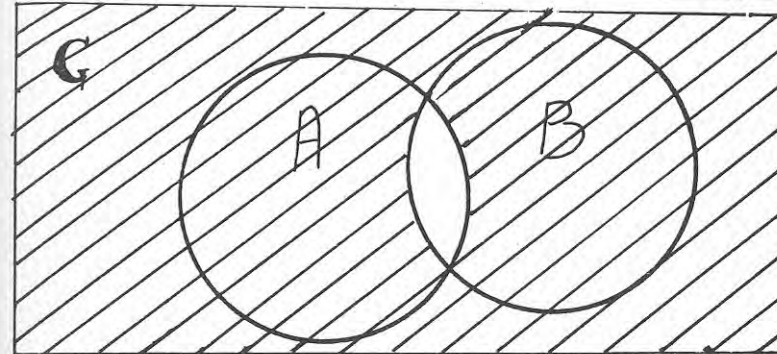
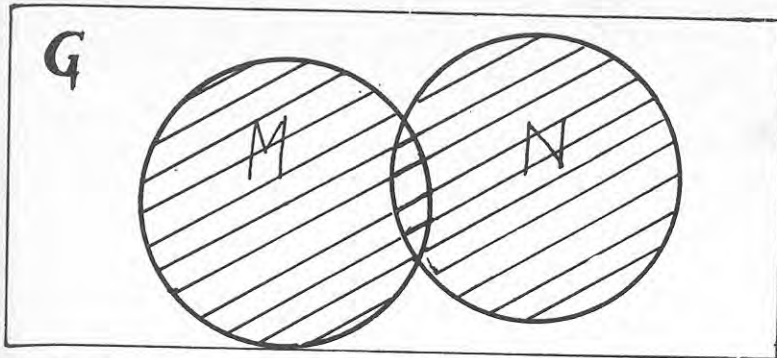
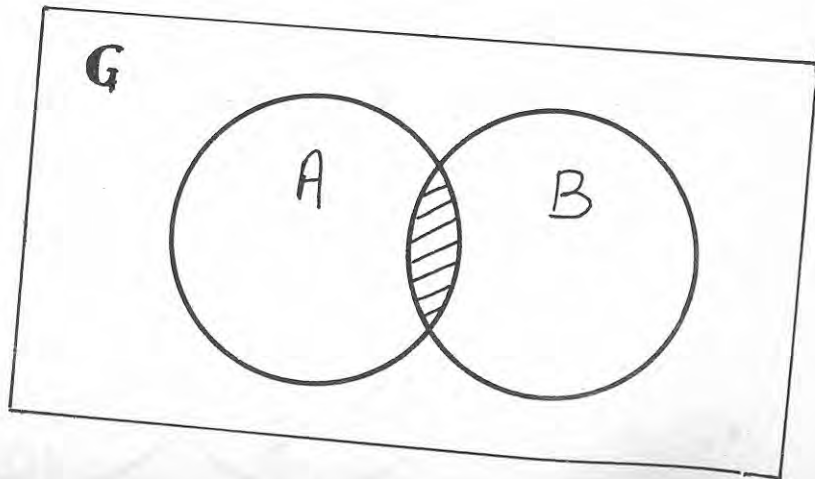


iii)  $(A \cap B)$



Layli :

1. Adoo isticmaalaya jaantusyada, tus xiriirka ka dhe-xeeya ururradan soo socda.
  - b) A = Buugagga xisaabta ee dugsiga.  
B = Buugagga aljabrada ee dugsiga.  
C = Buugagga Sayniska ee dugsiga.  
D = Buugagga dugsiga.
  - t) A = Maalmaha toddobaadka.  
B = Maalmaha toddobaadka ee ka bilawda xa-rafka S.  
C = Maalmaha toddobaadka ee ka bilawda xa-rafka A.  
D = Maalmaha toddobaadka ee ka bilawda K.
- 2) U fiiro jaantusyada soo socda, dabadeedna magacaw inta xardhan.



3. Adoo jaantus isticmaalaya, tus dhextaallada iyo isutagayada ururrada lammaan ee soo socda :-

$$b) \quad X = \{1, 5, 9, 11\}, \quad Y = \{1, 2, 3, \dots, 10\}$$

$$t) \quad A = \{a, b, t\} \quad B = \{kh, dh, sh, b\}$$

$$j) \quad T = \{x, y, n\}$$

## C U T U B II

### WEEDHO FURAN

#### Weedho:

Af, kuu doonaba ha ahaadee, wuxu ka dhisan yahay ereyo. Dhawrkii erey ee marka la isu xiro macne sameeyaba waxa loo yaqaan **tibaax ama weedh**. Bal u fiirso tusaalooyinka hoos ku qoran :-

- 1) Ubax qurux badan.
- 2) Arday akhlaaq wanaagsan.
- 3) Ubax qurux badan buu Cali ii keenay.
- 4) Maxamed waa arday akhlaaq wanaagsan.
- 5) Soomaaliya horumar weyn bay samaysay.

Labada tusaale ee hore waa tibaaxo, saddexda dambena waa weedho.

Xisaabtuna, sida afafka ayay leedahay tibaaxo iyo weedho, afka ku dhisanna waxaan ku magacaabi karnaa «af Xisaa-beed». Bal hadda u fiirso weedha  $4 + 3 = 7$ .  $4 + 3 = 7$  waa weedh wax ka sheegeysa tirooyin; waxay sheegeysaa inay  $(4 + 3)$  iyo 7 astooyin yihiin magacaabaya tiro qudha. Waa weedh run ah.

Weedhahani waa qaar run ah :

$$\begin{aligned} 2 + 3 &= 5 \\ 8 - 6 &= 2 \\ 9 \times 3 &= 27 \\ 5 + 6 &= 9 \end{aligned}$$

Weedhahani waa qaar ka kooban tirooyin iyo astooyin xisaabeed; waxa lagu isticmaalay af xisaabeed. Weedha caynkaas oo kale ahna waxa la yiraa weedh tiro. Sida uu af Soomaaliguba u leeyahay weedho qaarna run yihiin qaarna been



yihiin, ayay u jiraan weedho tiro oo run ah iyo kuwa been ihiba. Weedha, haddii run ama been mid uun lagu sheegi karo, waxa la yiraahdaa **hawraar**. Waxaad eegtaa weedha  $6 + 7 = 15$ . Weedhanu waxay wax ka sheegaysaa tirooyin, hase yeeshee waan naqaannaa inaanay  $6 + 7$  iyo  $15$  ahayn astooyin u taagan tiro keli ah. Sidaa daraaddeed, weedhani waa mid been ah.

Tusaalooyin kale oo weedho tiro been ihi waxay yihiin :

$$\begin{aligned} 5 \times 6 &= 13 \\ 14 + 8 &= 20 \\ 32 + 47 &= 68 \end{aligned}$$

### Laylisyo

- 1) Dhowr weedh tiro run ah qor.
- 2) Dhowr weedh tiro been ah qor.
- 3) Weedhahan kuwee run ah kuweese been ah :
 

b) $8 + 9 = 17$	d) $7 = 3 \times 4$
t) $13 \times 3 = 39$	r) $5 + 9 = 9 \times 5$
j) $18 - 6 = 15$	s) $72 = 8 \times 7$
x) $41 + 98 = 98 + 41$	sh) $19 + 4 = 2 \times 2$
kh) $2 + 3 + 6 = (2 \times 5) + 7$	dh) $3 \times 8 = 24$
	c) $6 - 5$
- 4) Meelaha bannaan ku buuxi  $=$ ,  $>$ , ama  $<$  si ay u samaysanto weedh run ihi :

b) $9 + 4$	.....	$1 + 12$
t) $8 - 5$	.....	$4 + 4$
j) $2 \times 3$	.....	$5$
x) $2^2$	.....	$3^2$
kh) $12^2$	.....	$144$
		$3$
d) $\frac{3}{4}$	.....	$\frac{3}{2}$
		$1$
r) $1\frac{1}{2} + \frac{1}{2}$	.....	$1.5$
		$1$
s) $-9$	.....	$-10$

### Weedh Furan :

Weedha «Soomaaliya waxay ku jirtaa Ururka Midowga Afrika» waa weedh run ah. Haddaan ereyga Soomaaliya jaga-diisa bannayno, waxaan helaynaa weedha «----- waxay ku jirtaa Ururka Midowga Afrika». Weedhan dambe run iyo been toona maaha, hase yeeshee waxay noqon hawraar macne leh marka meesha bannaan lagu buuxiyo dal gaar ah magacii. Metelan, haddaan meesha bannaan dhigno Liibya, waxaynu heli hawraar run ah, haddaan ku doorino Kuuba waxaynu heli hawraar been ah.

Weedh, sida tan hore oo kale ah, ee ay runnimadeeda iyo beennimadeedu ku xiran tahay hadba ereyga meesha bannaan la geliyo, waxa loo yaqaan **Weedh Furan**. Weedhaha furani aad bay ugu badan yihiin afka caadiga ah. Bal hadda tusaale ahaan, u fiirso weedhan : «Isagu shaadh cagaar ah buu gashan yahay». Dheeho inu magacuyaalka «Isagu» uu u shaqaynayo sida meesha bannaan ee tusaalihii hore. Weedhani runna maaha beenna maaha, waxase ka curanaya hawraar macne leh marka jagada magacuyaalka la dhigo magac. Xisaabtana, sida afafka, ayay aad ugu badan yihiin weedhaha furani; sida runta ah waxay sal u yihiin isdhaafsiga fikradaha xisaabta.

$$\dots + 4 = 9$$

Haddii aan meesha bannaan asto-tiro dhigno waxaan heleynaa weedh run iyo been mid uun ah — waa hawraar waxaan helnaa. Meesha bannaan haddaan 6 dhigno waxaynu heli hawraarta  $6 + 4 = 10$ , oo ah weedh been ah. 7 haddaan dhigna-na waxaynu heli  $7 + 4 = 10$ , oo iyana been ah. Ma heli kaysaa asto-tiro marka meesha bannaan la geliyo weedha ka dhigta run?

Waan aragnay inaanay 6 iyo 7 shaqaynayn, tirada ay u taagan tahay ( $\dots + 4$ ) bay ka weyneeyaan 9. Ma habboon tahay in lagu dayo tiro 6 ka weyn? Bal dhawr ku day. Bal kuwo 6 ka yarna ku eeg.

Ma ogaatey inay weedha ( $\dots + 4 = 9$ ) run noqoto haddii 5 la dhigo meesha bannaan? Ma u malayn inay tiro kale shaqaynayso? Celisku wuxuu yahay inay 5 tahay tirada keli

ah ee ay weedhu ku rumowdo; tirooyinka kale oo dhammi waxay ina siinayaan hawraarro been ah.

Halka aan imminka ka isticmaalnay meesha bannaan waxaynu ka adeegsan karnaa afargees, weedhii horena waxay u qormi  $\square + 4 = 9$ . Xagga xisaabtana weedha jaadkan ah waxa loo yaqaan weedh furan. Weedhaha furanna waxa ka samaysma hawraarro, marka jagada bannaan ama afargeeska la dhigo asto- tiro gaar ah.

Ururka ka koobma tirooyinka weedh furan ka dhiga run waxa la yiraahdaa **urur rumeed**. Urur rumeedka  $\square + 4 = 9$

waa  $\left\{ \begin{array}{l} 5 \end{array} \right\}$ . 5 kujire ayay u tahay urur rumeedka weedha

$\square + = 9$ . Bal hadda aynu eegno weedh furan kale.

$$(3 \times \dots) + 7 = 25$$

Aan ku dayno tirada 2 inaan dhigto meesha bannaan. Tani waxay ina siinaysaa weedha  $(3 \times 2) + 7 = 25$ , oo been ah maxaa yeelay  $(3 \times 2) + 7 = 13$ , 13 na ka yar 25. Bal hadda 4 ku eeg muujina inay weedha ka dhigto been. Waxaad isku daydaa inaad hesho tirada weedha ka dhigaysa run, daba-deedna qor urur rumeedka weedha.

### Layli :

1) Weedhahan kala sheeg kuwa hawraarro ah iyo kuwa weedho furan ah. Hadday weedhi tahay hawraar sheeg run iyo been midda ay tahay :

b) Biyaha baddu waa dhanaan.

t) Iyadu way dheer tahay.

j)  $58 + 19 = 64$

x)  $\square - 3 = 1$

kh) 9 waa tiro dhaban ah.

d)  $26 > 6 \times 4$

r)  $\frac{1}{3} + \frac{1}{2} < \frac{2}{3}$

s)  $6 = 2 \times \square$

sh)  $\square = 6 + 5$

dh)  $(2 \times \square) + 8 = 20$

2) Weedhaha furan ee ku jira maselada hore raadi mid waliba urur rumeedka.

3) Raadi urur rumeedyada weedhaha furan ee hoos ku qoran :

b)  $4 + 17 = \square$

t)  $\square + 8 = 23$

j)  $6 + 3 = \square$

x)  $15 = 31 - \square$

kh)  $29 = \Delta - 14$

d)  $1 = \Delta + 1$

r)  $5 \times \Delta = 10$

s)  $\Delta \times 6 = 10$

sh)  $3 \times 9 = \square$

dh)  $16 = \Delta \times 2$

c)  $\frac{1}{16} \times \square = 3$

l)  $6 + (2 \times \Delta) = 24$

m)  $15 = 8 + (\Delta \times 7)$

### Doorsoome :

Weedhaha furan marka uu qorayo nin xisaabyahan ahi wuxuu doorbidaa inuu adeegsado xarfo, halkii aynu ka isticmaaleynay meelaha bannaan ama afargeesyada. Marka waxa laga yaabaa weedha  $\square - 3 = 1$  inuu u qoro  $x - 3 = 1$ ; xaraf alla xarafkii la doono ayaa qaban kara shaqada ay x weedha hore ka hayso.

Astada  $\square$ ,  $\text{---}$ , ama x, oo kale ah ee u taagan ku jire urur la yaqaan kuna jirta weedh furan waxaa la yiraahdaa «doorsoome». Inta badan, xagga aljebraha ururka ku jirayaa-shiisa uu doorsoome u taagnaadaa waa urur tirooyin ah; marmarna wuu noqon karaa urur baro ah, urur xariiqyo ah, urur shaxano joometry ah, iwm.

### Layli :

Weedhaha soo socda mid walba sheeg inay run tahay marka doorsoomuhu leeyahay qiimaha lagu siiyay.

- |     |  |                              |                  |
|-----|--|------------------------------|------------------|
| 1.  | $5 + \square = 11;$                              | ka dhig $\square$ inay tahay | 6.               |
| 2.  | $-\frac{2}{3} + x \neq -1;$                      | » » x » »                    | $-\frac{1}{3}.$  |
| 3.  | $d + (-3) = 2;$                                  | » » d » »                    | $-1.$            |
| 4.  | $t + 9 \neq 11;$                                 | » » d » »                    | $-\frac{5}{6}.$  |
| 5.  | $6 + x < -\frac{1}{5},$                          | » » x » »                    | $-6\frac{1}{5}.$ |
| 6.  | $(2 \times k) + 8 = 18;$                         | » » k » »                    | 4.               |
| 7.  | $(\frac{1}{3} \times n) - 1 = 0;$                | » » n » »                    | 3.               |
| 8.  | $(\frac{3}{5} - x) + \frac{1}{5} = -\frac{1}{5}$ | » » x » »                    | 1.               |
| 9.  | $5 \div y = 5;$                                  | » » y » »                    | 1.               |
| 10. | $q - \frac{1}{2} = 1\frac{1}{2};$                | » » q » »                    | 5.               |

### Horaad doorsoome

Weedh furan oo xisaabeed marka xaraf loo adeegsado inuu u taagnaado tiro, xarafka waxa la yiraa doorsoome; weedha furan ee  $x + 4 = 15$ , x baa ah doorsoomaha. Weedhaha furan ee wata doorsoomayaashu waxay run ama been noqdaan marka doorsoomaha la siiyo qiime gaar ah, metelan :

$x + 4 = 15$  waxay run tahay marka  $x = 11$ , maxaa yeelay  $11 + 4 = 15$  baa run ah.  $2y + 3 = 8$  waa been marka  $y = 3$ , maxaa yeelay  $2(3) + 3 = 8$  baa been ah.

Mararka qaarkood baynu u danleenahay inaan helno tiro, hadday jirtaba, urur la ina siiyey oo tirooyin ah ku jirta oo wedh run ka dhigaysa. Metelan, waxaa laga yaabaa inaan doonno

inaan ogaanno tirada ku jirta ururka.  $\{3, 4, 5, 6, 7, 8, 9\}$ , ee

haddii lagu beddelo doorsoomaha x ee ku jira weedha  $x + 2 = 7$ , ka dhigaysa run. Waxaan aragnaa haddii 5 oo ku

jirta ururka  $\{3, 4, 5, 6, 7, 8, 9\}$  lagu beddelo x inay weedha

$x + 2 = 7$  run noqonayso. Ururka tirooyinka ah ee qiimaha doorsoomaha laga dooran karo waxaa la yiraahdaa **horaadka doorsoomaha**, kujirayaasha horaadkana waxaa loo yaqaan **qiimayaasha doorsoomaha**. Tusaalaha hore, waxaan ka dhi-

ganay horaad ururka  $\{3, 4, 5, 6, 7, 8, 9\}$ , qiimaha doorsooma-

ha ee ay Weedha  $x + 2 = 7$  run ku noqonaysaana waa 5.

### Tusaale :

U fiirso weedha  $x + 2 = 8$ . Haddii horaadka doorsoomuhu yahay ururka tirooyinka tirsiimo  $\{1, 2, 3, 4, 5, 6, \dots\}$  tirada

qura ah ee ay weedhu ku rumoobeysaa waa 6, haddii horaadka doorsoomuhu yahay ururka tirooyinka lakab ahna qiimaha x marka la siiyo ay weedha  $x + 2 = 8$  ku rumowdaa waa 6 keli ah, ku jirayaasha kale ee ururka oo dhari weedhu way ku wada beenoobeysaa. Waxaad ka soo qaaddaa inay x u taagan tahay

tiro ku jirta ururka  $B = \{1, 2, 3, 4, 5, 6, 7\}$  oo keli ah. Da-

beeto waxaan arki karnaa inay weedha  $x + 2 = 8$  run tahay marka ay  $x = 6$  iyo inay been tahay marka x u taagan tahay

1, 2, 3, 4, 5, 7, midkood. Sadeexdaa horaad ee doorsoomaha x ee aan indha-indhaynay, waxaan aragnay inay tiro qudhu-huuni (tirada 6) rumaynaysey weedha  $x + 2 = 8$ .

Bal hadda horaadka doorsoomaha aan ka dhiganno ururka

$$G = \{1, 2, 3, 4, 8, 9, 10\}. \text{ Ma heli karnaa tiro ku jirta ururka}$$

G oo marka lagu beddelo x weedha  $x + 2 = 8$  run ka dhigaysa? Jawaabtu waa maya. Taa maanaheedu wuxuu yahay marka horaadka doorsoomuhu yahay ururka G inuu urur rumeedka

weedha  $x + 2 = 8$  yahay  $\{ \quad \quad \quad \}$  oo ah ururka madhan.

### Layli:

1. Weedhaha soo socda mid walba u fiirso. Tirooyinka ku jira horaadka kuweebaa ka dhiga weedha, hawraar run ah?

$$b) x + \frac{2}{3} = \frac{8}{3} \quad D = \{0, 1, 2, 4\}$$

$$t) y - 5 = 2 \quad D = \{5, 6, 9, 100\}$$

$$j) 2m = 5 \quad D = \{\text{ururka tirooyinka idil}\}$$

$$x) 19 - 23 = x \quad D = \{\text{ururka } \gg \gg \}$$

$$kh) 3n + 8 = 14 \quad D = \{0, 1, 2, 3, \dots\}$$

$$d) 19 - 23 = x \quad D = \{\text{abyoonayaasha}\}$$

$$r) x - 5 \geq 1 \quad D = \{\text{tirooyinka lakab}\}$$

$$s) c - \frac{4}{5} = \frac{1}{5} \quad D = \{\text{Abyoonayaal}\}$$

$$sh) y - \frac{4}{5} = \frac{1}{5} \quad D = \{0, 1, 2, 3, 4, 5\}$$

2. Weedhahan mid walba raadi urur rumeedkeeda adi-goo la kaashanaya horaadka lagu siiyay.

$$b) 3x = 10; \quad D = \{\text{tirooyinka lakab}\}$$

$$t) 3x > 10; \quad D = \{2, 4, 6, 8\}$$

$$j) \frac{x}{3} = 10; \quad D = \{\text{tirooyinka idil}\}$$

$$x) 5 - x > 10; \quad D = \{\text{Abyoonayaal togan}\}$$

$$kh) \frac{3}{x} = 0; \quad D = \{\text{tirooyinka lakab}\}$$

$$d) x + 5 = 10; \quad D = \{1, 2, 3, 4, 5, 6, 7, 8, 0\}$$

$$r) b^2 = 100; \quad D = \{\text{Abyoonayaal}\}$$

$$s) 6x = 24; \quad D = \{1, 2, 3, 4, 5, 7\}$$



$$\text{sh) } 13 - x = -5; \quad D = \left\{ \text{Abyoonayaal taban} \right\}$$

$$\text{dh) } x - 3 \geq 5; \quad D = \left\{ 2, 3, 5, 7, 8, 9, 10 \right\}$$

### X A S U U S :

- 1) Xarfaha ama astooyinka kale ee lagu isticmaalo weedh furan si ay ugu taagnaadaan tirooyin waxaa lagu magacaabaa doorsoomayaal.
- 2) Weedh furani waxay run ama been noqotaa marka qiime gaar ah la siiyo doorsoomaha (doorsoomayasha).
- 3) Ururka qiimayaasha doorsoomaha laga dooranayo waxaa laga yaabaa inaan ku koobno urur gaar ah. Ururka gaarka ah waxa la yiraahdaa horaadka doorsoomaha.
- 4) Kujirayaasha urur-rumeedka weedh furan haddaanu midkoodna ku jirin horaadka doorsoomaha, urur-rumeedka weedhu marka loo eego horaadka gaarka ah waa ururka madhan.

### Isleegyo isudhigma

Waa maxay **ururrada rumeed** ee weedhahan furan?

$x + 4 = 10$	$12 + x = 18$
$x + 5 = 11$	$5 + x = 11$
$x + 3 = 9$	$4 + x = 10$
$x + 12 = 18$	$3 + x = 9$

Weedhahan furani waa isleegyo kala geddisan. Hase ahaatee waxay wadaagaan baa jira; urur rumeedkooda ayaa isku mid ah. Weedhaha sare mid walba urur rumeedkeedu waa 6.

Weedhahanna bal hadda u fiirso :-

$$3 \times b = 15$$

$$6 \times b = 30$$

$$2 \times b = 10$$

$$1 \times b = 5$$

**Isleegyada urur rumeedyadoodu isku midka yihiin waxaa la yiraahdaa isleegyo isudhigma.**

### L a y l i :

1) Weedhahan u buuxi si uu mid walba urur rumeedkeedu ula mid noqdo ka  $a + 5 = 14$ .

$$\text{b) } a + ? = 10$$

$$\text{x) } 2 + a = ?$$

$$\text{t) } a + 4 = ?$$

$$\text{kh) } a + 23 = ?$$

$$\text{j) } ? + a = 16$$

$$\text{d) } ? + a = 54$$

2) Weedhahan buuxi si uu mid walba urur rumeedkeedu ula mid noqdo ka  $5 \times b = 20$ .

$$\text{b) } b \times 6 = ?$$

$$\text{x) } 12 \times b = ?$$

$$\text{t) } 1 \times b = ?$$

$$\text{kh) } b \times 3 = ?$$

$$\text{j) } ? \times b = 28$$

$$\text{d) } ? \times b = 36$$

Waxaa laga yaabaa inaad hadba weedha lagu siiyey soo saaraysey urur rumeedkeeda, dabadeedna aad tiradaa isticmaaleysey si aad u hesho qiimaha calaamadda weydiiska.

Haddaba imminka waxaan rabnaa inaan helno habab lagu abuurto isle'egyo isudhigma innaagoon raadin urur rumeedka.

Waxaa jira dhowr hab oo innaga caawin kara samaynta isle'egyada isudhigma. Waxaad ka soo qaaddaa inaan damacsannahay inaan raadino isleegyo ay isudhigmaan isleegta  $b + 3 = 9$ . Astooyinka ku yaalla labada dhinac ee isle'egta waxay yihiin laba magac oo ay tiro qudhihi leedahay. Bal aynu eegno waxaa dhaca haddii ayntu tiro u geyno tirada ku astaysan labadceda dhinac. Tirada aan u geyneyno aan kaba dhiganno 6. Isle'egta cusubi waxay tahay :-



$$\begin{aligned}(b + 3) + 6 &= 9 + 6 \\ b + (3 + 6) &= 9 + 6 \\ b + 9 &= 15\end{aligned}$$

Weedhan furan ee  $b + 9 = 15$  iyo tii hore ee  $b + 3 = 9$  isku urur rumeed ma yihiin?

Hadda aan ku eegno inaan 36 labada dhinacba u geyno.

$$\begin{aligned}b + 3 &= 9 \\ (b + 3) + 36 &= 9 + 36 \\ b + (3 + 36) &= 9 + 36 \\ \text{ama } b + 39 &= 45\end{aligned}$$

Waxaynu helnay isleeg kale oo ay isudhigmaan  $b + 3 = 9$ . Maxaa dhici haddii aynu tiro u geyno labada dhinac ee isleegta  $b + 3 = 9$ ?

Tiradu in kasta ha ahaatee, ma heleynaa isleegyo u dhigma tii hore? Isleeg kasta qaar ay isudhigmaan habkan ma ku abuurri karnaa?

### Layli :

Lamaanayaashan isleegyada ah kuweebaa isudhigma?

- b)  $3 + x = 8$  iyo  $x + 9 = 14$
- t)  $b + 3 = 15$  iyo  $b + 6 = 18$
- j)  $7 + y = 16$  iyo  $18 + y = 24$
- x)  $c + 13 = 50$  iyo  $c + 20 = 57$
- kh)  $139 + d = 151$  iyo  $d + 2493 = 2504$

Isleeg walba saddex isleeg oo ay isudhigmaan qor adigoo istimcaalaya habkii, hore looga soo hadlay.

- b)  $8 + x = 27$
- j)  $23 + y = 89$
- kh)  $2 + 10 = x$
- t)  $b + 115 = 256$
- x)  $a + 0 = 139$

Haddaba si cad aynu u sheegno habkan lagu helo isleegyada isudhigma. **Haddii tiro loo geeyo tirada labada dhinac ee isleeg ku astaysan, urur rumeedku isma beddelo.**

Imminka way ka fududahay sidii hore in la sameeyo isle'egyo isudhigma. Matelan labada weedhood ee  $x + 8 = 12$  iyo  $x + 3 = 7$  waa isku urur rumeed. Isleegta  $x + 2 = 12$  haddaan labadeeda dhinacba ka goyno 5 waxaan heleynaa  $(x + 8) - 5 = 12 - 5$  oo la mid ah  $x + 3 = 7$ .

Markaa, weedh **la inna siiyey tu u dhiganta waa laga yaa-baa inaan kala goyn ku helno.** Waxaa haddaba dhab ah **in haddii tiro laga gooyo tirada labada dhinac ee isleeg ku astaysan aanu urur rumeedku isbeddeleyn.** Hore waxaa innoo soo maray  $3 \times b = 15$  iyo  $6 \times b = 30$  inay isku urur rumeed yihiin. Weedha dambe bal u fiirso.  $6 \times b = 30$  waxay la mid tahay  $2 \times (3 \times b) = 2 \times 15$ . Taasi waxay inna tusaysaa **haddii tiro eber ka geddisan lagu dhufto tirada labada dhinac ee isle'eg ku astaysan in ay isleegta kale ee soo baxdaa tii hore u dhiganto.**

Kol hadday isku dhufsashada iyo isuqaybintu laba xisaab fal oo isweydaar ah yihiin, waxaa dhab ah **haddii tiro eber ka geddisan loo qaybiyo tirada labada dhinac ee isleeg ku astaysan in aanu urur rumeedku isbeddeleyn.**

### Layli :

Qindiyadan isleegyada ah kuweebaa isudhigma? Qindiyada ah isleegyada isudhigma sheeg waxa midkood lagu samayn karo si ta kale loo helo.

- 1)  $3 \times b = 12$  iyo  $1 \times b = 4$
- 2)  $5 + y = 10$  iyo  $3 + y = 8$
- 3)  $18x = 36$  iyo  $6x = 12$
- 4)  $2 + x = 9$  iyo  $17 + x = 24$
- 5)  $31 - d = 30$  iyo  $27 - d = 26$
- 6)  $x + 4 = 9$  iyo  $x = 9 - 4$
- 7)  $2x - \frac{3}{8} = \frac{3}{4}$  iyo  $2x = \frac{9}{8}$
- 8)  $y - 8 = 0$  iyo  $2y + 17 = 33$
- 9)  $7x + 12 = 2$  iyo  $7x = 14$
- 10)  $3y + 2 = 8$  iyo  $y + 1 = 4$

Isleegyadan isudhigma teebaa ugu fudud ee dhaqso urur rumeedku uga muuqanayaa? Sheeg sida isleegtaa tii ugu ho-raysey looga keenay.

$$\begin{aligned} \text{b) } x + 8 &= 75 \\ x - 12 &= 55 \\ x - 8 &= 59 \end{aligned}$$

$$x = 83$$

$$\text{t) } 6a = 13$$

$$2a = \frac{13}{3}$$

$$a = \frac{13}{6}$$

$$3a + 4 = \frac{21}{2}$$

$$\text{j) } \frac{1}{3}x = 3$$

$$\frac{1}{3}x - 3 = 0$$

$$\begin{aligned} x &= 9 \\ 3x &= 27 \end{aligned}$$

$$\begin{aligned} \text{x) } 3x - 9 &= 12 \\ 3x &= 21 \\ x &= 7 \end{aligned}$$

## ISLEEGYADA IYO URUR RUMEEDYADA

Fikradda isleegyada isudhigmaa kaalin weyn bay kaga jirtaa furfurista isleegyada. Marka aan rabno isleeg la inna siiyey in aan urur rumeedkeeda raadino, waa inaan horta isleegtaa mid ka fudud raadinaa. Sida aan u raadinaynaana waxay tahay in aan adeegsanno isleegyada isudhigma; waxaan samaynaynaa isleeg tii la inna siiyey u dhiganta kase fudud.

Isleegta aan helno haddii aanu ka muuqan urur rumeedku waxaan haddana raadineynaa taa tu u dhiganta kase fudud. Habkaas baan ku soconaynaa ilaa aan helno isle'eg si cad uu uga muuqdo urur rumeedku.

### Tusaale 1

$$\text{Furfur isleegta : } x + 38 = 69$$

**Furfuris :** Waxaad iska dhigtaa inaanad urur rumeedka garanayn. Ma heli karaysaa isleeg u dhiganta kana fudud  $x + 38 = 69$ ? Haddii aad 38 ka goyso  $x + 38$  iyo 69 ba isleeg ka fudud tii hore ayaynu heli.

$$\begin{aligned} 1) \quad x + 38 &= 69 \\ x + 38 - 38 &= 69 - 38 \\ x + 0 &= 31 \\ x &= 31 \end{aligned}$$

Kol haddii urur rumeedka isleegta ugu dambaysa, oo ah 31, uu la mid yahay urur rumeedka isleegta hore, waxaa dhab

ah in urur rumeedka  $x + 38 = 69$  uu yahay  $\left\{ 31 \right\}$ . Bal hadda

tusaale kii hore ka yara kakan aan qaadanno.

### Tusaale 2

$$\text{Raadi urur rumeedka } \frac{1}{2}x - 3 = 1?$$

**Furfuris :** Waxaan rabnaa inaan helno isleeg u dhiganta  $\frac{1}{2}x - 3 = 1$ , qiimaha  $x$  ee ay ku rumoobeysaana si cad uu uga muuqdo. Haddaba waa inaynu helnaa isleeg sansaanteedu ta-

hay ( $x = \text{tiro}$ ) una dhiganta tii hore. Si aynu isleegtaa u helno, tallaabooyinkan baynu qaadi.

$$\frac{1}{2}x - 3 = 1 \text{ ayaa la inna siiyey}$$

$$(\frac{1}{2}x - 3) + 3 = 1 + 3 \text{ labada dhinacba 3 uu gee}$$

$$\frac{1}{2}x + (-3 + 3) = 4 - \text{Xeerka hormagelinta isugeynta.}$$

$$\frac{1}{2}x + 0 = 4 - \text{Astaanta isweydaarka isugeynta.}$$

$$\frac{1}{2}x = 4 - \text{Asal ma doorshaha isugeynta.}$$

$$2 \times (\frac{1}{2}x) = 2 \times 4 - \text{Labada dhinacba 2 ku dhufo.}$$

$$x = 8$$

Isleegta ugu dambaysa waxaa si cad uga muuqda in-

uu urur rumeedku yahay  $\left\{ 8 \right\}$ . Sidaa daraaddeed isleegta

$$\frac{1}{2}x - 3 = 1, \text{ oo ay u dhigantana, urur rumeedkeedu waa } \left\{ 8 \right\}.$$

Marka aan u baranno habkan isleegyada isudhigma, waxaa dhici inaynaan tallaabooyinka qaarkood qorin; maskaxda ayaynu ku hayn. U fiirso tusaalaha soo socda. Isleeg waliba ta ka horraysa ma ka fududahay? Ma sheegi kartaa sababta isleeg waliba ta ka horraysa ay ugu dhiganto?

$$9x - 5 = 24 + 5x + 10$$

$$9x = 24 + 5x + 10 + 5$$

$$9x = 39 + 5x$$

$$4x = 39$$

$$39$$

$$x = \frac{\quad}{\quad}$$

$$4$$

Waa maxay urur rumeedku?

### Laylisyo :

Raadi urur rumeedyada isleegyada soo socda adigoo adeegsanaya habka isleegyada isudhigma.

$$1) \quad 3x - 13 = 26$$

$$2) \quad 4x - 8 = 46 - 5x$$

$$3) \quad 34 = 7 + 3x$$

$$4) \quad \frac{b}{3} + 5 = 7$$

$$5) \quad \frac{1}{2}(2x + 5) = 10$$

$$6) \quad \frac{3}{2}x = 2 + x$$

$$7) \quad y - 18 = 7y + 3$$

$$8) \quad 2(x + 3) = x + 1$$

$$9) \quad -(5x + 15) = x + 3$$

$$10) \quad 64 - 4x = \frac{1}{2}(8 + 7x).$$

### Masalooyinka iyo Weedhaha furan

Tiraan qabsaday. Afar baan tiradaan qabsaday u geeyey. Wadartu waa 9 Tiradaan qabsaday imisay ahayd?

Way fududay sida aad tirada aan qabsaday u heshaa. Waxaad kasoo qaaddaa inaad damacsan tahay masaladan inaad si kale u dhigto adigoo erayo intii hore ka yar isticmaalaya aseent fikraddana beddeleyn. Waxaa laga yaabaa inaad tiraahid: «Tiro gaar ah iyo afar wadartoodu waa 9. Raadi tirada».

Waxa suuragal ah inaad isleedahay, «Sidan si ka sii gaaban baa loo qori karaa». Waa sidee? Ma kula tahay in haddii doorsoome la isticmaalo masaladii sidan loo qori karo:  $x + 4 = 9$  raadi  $x$ ?

Fikradihii ay masaladu koobeysey waxaynu u dhignay sansaan weedh furan :  $x + 4 = 9$ .

Haddaba, maxaa masalo sansaan weedh furan loogu dhigaa? Isleegyada qaarkood baynu furfuri karnaa. Marka aynu masalada u tarjimeyno weedh furanna waxaan u danleenahay inaan u dhigno sasaan aynu jawaab u heli karno. Waxa kale oo aynu aragnay inay weedha furani masalada u dhigto si gaaban oo qayaxan. Marka aad muddo furfurto masalooyin adigoo adeegsanaya weedho furan, waxaad ogaani masalooyin kala geddisan weedhaha furan ee u taagani inay isku mid yihiin. Bal aan isgarab dhigno dhawr masalo.

Inan baa isagoo qaddar lacag ah haysta uu walaalkii 4 shilin siiyey. Hadday lacagtuu haystey iyo tii walaalkii siiyey isku noqotay 9 shilin, imisa shilin buu markii hore haystey?

Ka dhig inuu inanku markii hore haystey b shilin. Markaa masalada waxa loo tarjimi karaa:  $b + 4 = 9$ . Waa intee b? Ma aragtaa  $b + 4 = 9$  iyo  $x + 4 = 9$  inay isudhigmaan.

Bal masalo kalena aan eegno.

Oday baa dhalay dhowr gabdhood iyo afar wiil. Haddii ay tirada carruurtiisu tahay 9 waa imisa gadhihiisu?

Ka dhig inay tirada gabdhuhu tahay y. Waxaanan ognahay inay tirada gabdhaha + tirada wiilasha = 9. Markaa,  $y + 4 = 9$ . Maxaa ka dhexeeya weedhan furan iyo labadii hore? Haddii aad weedhahaa midkood furfurto, saddexda masalaba jawaabohooda waad heli. Ma abuur kartaa masaloo-yin kale oo isleegy saddexdii hore u dhigma laga samayn ka-ro? Haddii aad haysato weedh furan, waxaad ka samayn kar-taa masalo ay u taagnaato weedhaasi.

### Layli :

Samee masalooyin weedhahan furan loo tarjimi karo.

- |                 |                 |
|-----------------|-----------------|
| 1) $9 + x = 14$ | 2) $6 - x = 8$  |
| 3) $4 + y = 30$ | 4) $x - 7 = 12$ |
| 5) $x + 9 = 16$ |                 |

### Furfurista Masalooyinka

Waxaynu niri aad bay u waxtar badan tahay in masalo loo tarjimo weedh furan marka la rabo in masaladaa la furfuro. Haddaba, bal aynu hal masalo tusaale u qaadano.

**Tusaale :** Fasal ay ku jiraan 44 arday bay wiilashu gabdhaba dheer yihiin 12. Imisa gabdhood baa fasalka ku jira?

### Habka loo furfurayo :

Horta waa inaad fahamtaa waxa ay masaladu ku saabsan tahay inta aanad isku deyin inaad furfurto. Aan isku dayno inaan furfurno masaladaa. Waxaa laga yaabaa inaad istiraahid; «Maxaan u malayn waayey inta ay tahay tirada gabdhuhu?» Bal male ku day. Waxaad ka soo qaaddaa in maleheenu yahay inay tirada gabdhuhu tahay 11. Malaha dabadii waa inaynu hubinaa inaan qummannahay iyo in kale. Waxaynu ti-

rada gabdhaha u qaadannay 11, waxana la inna siiyey inay wiilashu gabdhaha 12 dheer yihiin. Markaa tirada wiilashu waa inay noqotaa (11 + 12). Kol hadday gabdhaha iyo wiilashu isku yihiin 44 waa inay weedh tirada soo socotaa run ahaataa.

$$11 + (11 + 12) = 44$$

$$11 + 23 = 44$$

$$34 = 44$$

Hase yeeshee 34 ma leeka 44. Sidaa daraaddeed weedha  $34 = 44$  waa been. Markaa, tirada gabdhaha fasalka ku jiraa way ka geddisan tahay 11. Hadda bal dhowr male oo kale isku day si aad jawaab sax ah u gaadho. Isku day inaad malayso jawaabaha masalooyinka; laakiin waa inaad hubisaa. Maluhu, inkastoo uu qalad yahay, wuu inna anfici haddii la hubiyo. Malihii aynu haddeer qaadannay wuu qaldanaa, laakiin bal waynu eegi sida uu innoo anfaco. Bal hadda mar labaad u fiirso masaladii. Aan isku dayno inaan furfurno innagoo adeegsaneyna weedh furan. Si ay sidaasi innoogu suuragasho waa inaynu horta garanaa tirooyinka aynaana aqoon, oo aynu u dooranaa doorsoome u taagnaada. Tirooyinka qarsoon waxaa mararka qaarkood la yiraahdaa «lama-yaqaanno». Lama yaqaannada masaladan ku jiraa waxay yihiin :

b) Tirada gabdhaha.

t) Tirada wiilasha.

Waxase jirta inay isku xiran yihiin tirada gabdhaha iyo ta wiilashu; tirada wiilashaa ta gabdhaha 12 dheer. Haddaba, waxaad ka soo qaadda inay tirada gabdhuhu tahay x. Haddaad dib ugu noqoto maleheeni waxaad arki markaan tirada gabdhaha u qaadannay 11 inaynu niri ta wiilashuna waa (11 + 12). Sidii oo kale kol hadday tirada gabdhuhu tahay x ta wiilashuna waxa weeye  $x + 12$ . Tibaaxda  $(x + 12)$  tiray u taagan tahay, sida ay x tiro kale ugu taagan tahay. Waxaan naqaannaa wadarta tirada gabdhaha iyo ta wiilashu inay tahay 44. Markaa  $x + (x + 12) = 44$ . Isleegtan baan ku heli karnaa jawaabta masalada. Markaa waxaynu u baahan nahay inaynu furfurno isleegtan.



$$\begin{aligned}
 x + (x + 12) &= 44 \\
 (x + x) + 12 &= 44 \\
 2x + 12 &= 44 \\
 2x &= 44 - 12 \\
 2x &= 32 \\
 x &= 16
 \end{aligned}$$

Marka tirada gabdhuhu waa 16, ta wiilashuna waa (16 + 12) oo ah 28.

#### Hubsiiimo :

Tirada ardaydu waa 44:  $16 + 28 = 44$ .  
 Wiilashu 12 bay gabdhaha dheer yihiin:  $12 = 28 - 16$ .  
 Markaa waa sax jawaabihii aynu helnay.

#### Tibaaxo :

Tusaalihii hore markii aynu tirada gabdhaha u qaadannay x waxaynu niri ta wiilashuna waa  $x + 12$ ; tibaaxo ayaynu dhiganay jagooyinkii tirooyinka. Bal hadda tusaalahanna eeg.

**Tusaale :** Laba tiro ayay wadartoodu 15 tahay. Haddii ay midkood tahay x qor tibaax u taagnaan karta tirada kale.

Inta aynaan qorin tibaaxda la inna warsaday, bal aynu horta x u qaadanno tiro gaar ah. Kaba dhig inay x tahay 3. Tiradee aan u geynaa 3 si aynu u helno wadar ah 15?

Waxaynu u geynaa 12. Ma kuu muuqataa inay 12 u dhiganto (15 - 3). Haddaba marka wadarta laba tiro ay tahay 15, midkoodna ay tahay x ta kale waa (15 - x). Markaa, haddii ay x afar tahay (15 - x) waa (15 - 4) oo ah 11. 4 iyo 11 wadartooduna waa 15. Haddii ay x tahay 9 na (15 - x) waa (15 - 9) oo ah 6. 6 iyo 9 wadartoodu ma tahay 15? Hadda x u qaado inay tahay tirooyin kale? Had iyo jeer (15 - x) ma u taagnaan karta tiradii aynu rabnay?

Marar badan ayaynu u baahanaynaa tibaaxo aynu ku isticmaalno furfurista masalooyinka. Marka aad rabto inaad masalo weedh furan u tarjinto waa inaad si fiican horta u fahamtaa masalada, si aad tibaaxo habboon ugu heshid. Bal tusaalayashan tibaaxo samayska ah eeg.

- 1) Maxamed 5sm. buu ka dheer yahay Jaamac. Haddii uu dhererka Jaamac yahay x sm. Maxamed waa (x + 5) sm.
- 2) Miisaanka Maxamed waa ka Jaamac saddex laabkii. Haddii uu miisaanka Jaamac yahay y kg. ka Maxamed waa 3y kg.
- 3) Caasha iyo Cibaado waxay wada haystaan 35 shillin. Haddii ay Cibaado haysato b shillin Caashi waxay haysataa (35 - b) shillin.
- 4) Cali afar sannadood buu Siciid ka yar yahay. Hadduu Siciid n jir yahay, Cali waa (n - 4) jir.
- 5) Maxamed waa n jir. Afar sannadood hortood wuxuu ahaa (n - 4) jir.

#### Layli :

- 1) Laba tiro ayay wadartoodu tahay 82. Haddii midkood yahay x waa intee ka kale?
- 2) Laba tiro ayay tarantoodu tahay 24. Midkood baa ah b. Waa imise ka kale?
- 3) Hodan iyo Faadumo ayay 50 shillin ka dhexaysaa. Hadday Hodan qaadatay k shillin imisaa u soo hadhay Faadumo?
- 4) Hadduu Ibraahim 8 sannadood ka weyn yahay Aadan oo uu Aadanna x jir yahay waa imisa jir Ibraahim.
- 5) Cali iyo Xuseen ayaa wada haysta afar buug. Qor tirada buugagga uu Xuseen haysto adigoo adeegsanaya tirada buugagga uu Cali haysto.
- 6) Tiro togan ayaa tu kale badhkeed ah. Tibaax u qor ta weyn adigoo ta yar gargaarsanaya.
- 7) Tiro lagu siiyey u gee 5 dabadeedna wadarta ku dhufo 3, tiradii lagu siiyey ka goo ta kuu soo baxda. Tirada aad heleyso tibaax u taagnaan karta qor adigoo isticmaalaya tii lagu siiyey.



- 8) Tiro ayaa tirada  $x$  ka yar lix. Tibaax u taagnaata u qor tiradaa.
- 9) Tiro ayaa mid kale labanlaabkeed 19 dheer. Tirada weyn qor adigoo gargaarsanaya ta yar.
- 10) Cabdi lix sannadood buu ka weyn yahay Caasha. Sheeg da'da Cabdi adigoo ta Caashaad isticmaalaya?
- 11) Oday bay da'diisu ta inankiisa afar laabkeed tahay. Tibaax u qor da'da odayga adigoo ta yarkiisa adeegsanaya.
- 12) Dugsi bay gabdhaha ku jiraa yihiin wiilasha  $\frac{2}{3}$ kood.  
Adigoo tirada wiilasha isticmaalaya qor tirada gabdhaha.
- 13) Nin baa guri ku renjiyeyn kara  $b$  maalmood. Guriga intiisee buu maalin ku renjiyeyn karaa?
- 14) Laydi baa dhererkiisu 25 mitir yahay, baladhkiisuna  $b$  mitir yahay. Waa intee wareeggiisu.
- 15)  $n$  waa tiro dhaban ah. Tirada dhabanka ah ee ku xigtaa waa tee?

### Tarjimadda Masalooyinka iyo Furfuristooda

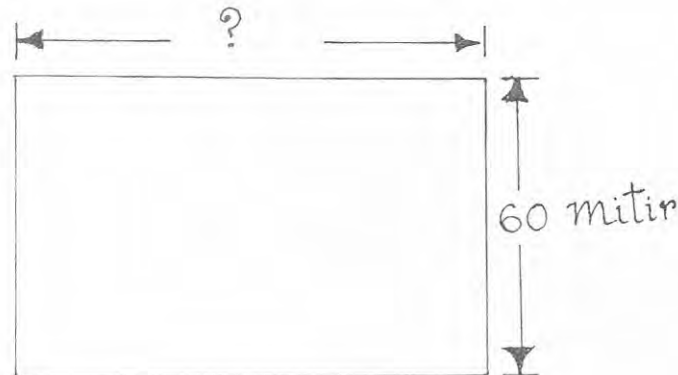
Ilaa iyo imika waxaad baratay sida loo qoro tibaaxo u taagan odhaahyo ku jira masalooyin. Waxaa innoo xigi sidii tibaaxahaa la isugu xiri lahaa si ay u noqdaan weedho furan. Marka aad weedha furan qorato waxaa suuragal ah inaad furfuri karto, dabadeedna aad sidaa ku heli karto jawaabta masalada.

Bal hadda aynu dhowr masalo qaadan oo aynu isla eegno sida loogu tarjimi karo weedho furan.

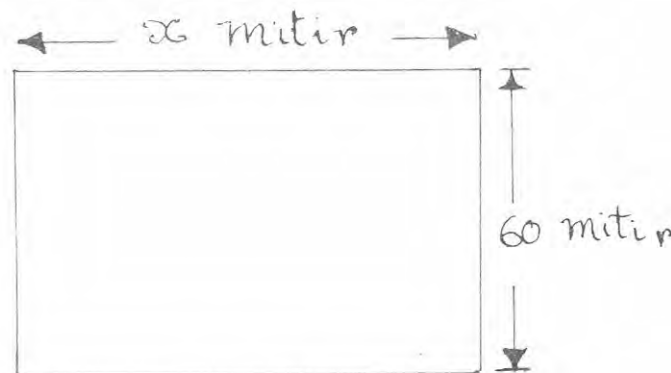
#### Tusaale 1

Beer laydi ah baa balladhkeedu yahay 60 mitir. Waa imisa mitir dhererkeedu haddii uu wareegeedu yahay 340 mitir?

**Furfuris :** Sidii horeba loo yiri, waxad u baahan tahay inaad horta aad u akhrido masalada si aad u fahamto waxa ay ka hadlayso oo dhan. Ugu horrayn waxa habboon in aynu sawirno beerta.



Dabadeed, waa inaynu garannaa waxyaabaha aynaan weli aqoon. Doorsoome u taagnaada lama-yaqaanka aynu u danleenahay baynu dooran. Imika waxaynu rabnaa inaynu helno dhererka beerta. Haddaba aynu dhererka beerta u qaadanno  $x$  mitir. Sawirkii markaa sidan buu noqon :



Haddaba inta sawirka ku muujisan maahee maxaa la inooga sheegay masalada? Waxaa la inoo sheegay oo aynu ognahay inuu wareegga beertu yahay 340 mitir. Waxaa kale oo aynu naqaannaa in wareegga lagu helo iidkan :

$$2 (\text{dherer} + \text{balladh}) = \text{wareeg}$$

Markaa, beertan wareeggeeda, marka la isticmaalo jidkan, dhererka oo  $x$  mitir ah iyo balladhka oo 60 mitir ah, sidan baa loo qori karaa :

$$2 (x + 60) \text{ mitir}$$

Haddaba ma qori kartaa weedh furan oo u tgaanaata fikradihii ay masaladu koobeysay? Waxaan oran karnaa :

Wareegga beertu waa 54 mitir. Tibaaxda «Wareegga Beerta» waxaan ku beddeli karnaa tibaax aljabraha  $2 (x + 60)$  weedhi horena waxay u qormi ...

$$2 (x + 60) \text{ mitir waa } 340 \text{ mitir}$$

Weedhaasina waxay u dhiganta weedha furan ee  $2 (x + 60) = 340$ .

Raadi qiimaha  $x$  ee ay weedhani ku run tahay. Tirada aad hesho oo mitiro ah baa ah dhererka beerta.

**Tusaale 2** Laba tiro wadartood baa ah 18. Midkood iyo ta kale badhkeed haddii la isugeeyana waxa la helaa 15. Raadi labada tiro.

**Furfursi :** Kaba dhig inay labada tiro midkood tahay  $y$ . Kol haddii ay labada tiro wadartoodu tahay 18, tirada kale waxa loo qori karaa  $(18 - y)$  badhkeedna waa  $\frac{1}{2} (18 - y)$ . Markaa waxa dhab ah inay  $y + \frac{1}{2} (18 - y) = 15$ . Bal aynu isku dayi u inaynu weedhan urur rumeedkeeda helno.

$$y + \frac{1}{2} (18 - y) = 15$$

$$2 \left[ y + \frac{1}{2} (18 - y) \right] = 2 \times 15$$

$$2y + (18 - y) = 30$$

$$2y + (-y + 18) = 30$$

$$(2y - y) + 18 = 30$$

$$y + 18 = 30$$

$$y = 30 - 18$$

$$y = 12$$

Marka urur rumeedka weedhani waa  $\left\{ 12 \right\}$ . Kol hadduu

qiimaha keli ah ee  $y$  ee ay weedhu ku run tahay u noqday 12, tiradii aynu u qaadannay  $y$  waa 12. Tii kalana waa  $(18 - 12)$

oo ah 6.

**Hubi :** Wadartoodu waa :  $12 + 6 = 18$

Midda kale :  $12 + (\frac{1}{2} \times 6) = 15$

### Tusaale 3

Inan baa aabihii 30 sannadood ka yar. Haddii ay wadarta da'doodu tahay 40 sannadood, inanka iyo aabihii waa imisa jirro?

**Furfuris :** Haddii uu odaygu  $x$  jiro, inankiisu waa  $(x - 30)$  jir. Waxa la innoo sheegay inay wadarta da'doodu tahay 40 sannadood. Markaa;

$$x + (x - 30) = 40$$

$$2x - 30 = 40$$

$$2x = 70$$

$$x = 35$$

Odaygu waa 35 jir inankiisuna waa  $(35 - 30)$  jir ama 5 jir.

**Hubi :**

Inanku 30 sannadood buu odayga ka yar yahay  $5 = 35 - 30$ .

Wadarta da'doodu waa  $40 : 35 + 5 = 40$ .

### Laylisyo :

Waxaad qortaa weedho furan oo kaa caawin kara furfuriista masalooyinkan. Dabadeedna furfur weedhaha furan si aad u hesho jawaabaha masalooyinka.

- 1) Laydi baa dherekiisu balladhkiisa saddexlaabkii yahay, wareeggiisuna waa 48 mitir. Raadi dhererka laydigaa.
- 2) Laydi baa balladhkiisu 15 sm. ka yar yahay dhererkiisa. Haddii uu wareeggiisu yahay 70 sm. raadi balladhkiisa.
- 3) Laydi baa dhererkiisu 5 mitir dheer yahay balladhkiisa. Haddii uu bedkiisu yahay 150 mitir, raadi balladhka.
- 4) Laba tiro oo dhaban ah oo isku xiga ayay wadartoodu 74 tahay. Raadi labada tiro.
- 5) Nin baa iibsaday 20 buug oo ay qaar ku joogeen min 8 shillin, kuwa kalena ay ku joogeen min 3 shillin. Woxoo dhammi hadday 110 shillin ku joogeen, imisa buug oo min 3 shillin ah buu gatay?
- 6) Oday bay imika da'diisu ta inankiisa afar laabkeed tahay. Haddii ay wadarta da'doodu 10 sannadood ka hor ahayd 60, intee bay imika jiraan?
- 7) Laba tiro ayay wadartoodu tahay 15, faraqooduna yahay 3. Raadi labada tiro.
- 8) Cabdi 6 sannadood buu Caasha ka weyn yahay. 12 sannadood ka hor da'da Caashaad waxay ahayd ta Cabdi badhkeed. Iminka labadooduba waa imisa jiro?
- 9) Laba tiro oo kisi ah oo isku xiga ayay wadartoodu tahay 100. Waa kuwee labada tiro?
- 10) Laba nin buu miisaankoodu isku yahay 106 kg. Haddii uu midkood ka kale 6 kg. ka culus yahay, mid walba waa intee miisaankiisu?

## C U T U B VII

### Isleegyo laba Doorsoome leh

Cabdi iyo Jaamac baa, marka la isugeeyo, haysta 6 buug. Weedhan waxa ku jira laba tiro oo aynaan garanayn oo kala ah tirada buugagga Cabdi haysto iyo tirada buugagga Jaamac haysto. Ka dhig tirada buugagga Cabdi haystaa inay tahay  $x$ , kuwa Jaamac haystana tiradooda ka dhig  $y$ . Innaga oo adeegsaneyna labadaa doorsoome waxaan weedhaa u tarjimi karnaa

$$x + y = 6$$

Haddaba, waa maxay tirooyinka ay weedhani run ku noqonaysaa?

Haddii ay  $x = 1$  oo ay  $y = 5$ , isleegtii waxay noqonaysaa  $1 + 5 = 6$  oo run ah. Ma heli kartaa qindiyo kale oo tirooyin idil ah oo ay weedhaasi ku rumoobeyso? Waxaad samaysaa tuse aad ku muujinayso tirooyinka.

x	y
1	5
2	4
3	3
4	2
5	1
6	0
0	6

Qindiyadaa tirooyinka idil ah haddii tiro u taagan  $x$  iyo mid u taagan  $y$  aynu isugeyno, waxaynu heli wadar ah 6. Sidaa daraaddeed, weedha  $x + y = 6$  waxay ku rumoobeysaa dhawr qindi oo tirooyin ah.

Kol haddii aanay isku mid ahayn 4 buug oo uu Cabdi haysto iyo laba uu Jaamac haysto, iyo 2 buug oo uu Cabdi haysto iyo 4 Jaamac haystaa, waxaynu u baahan inaynu muujino inay kala geddisan yihiin.

Tusaha ayaa muujinaya inay (4,2) iyo (2,4) ay yihiin laba asto oo kala geddisan oo kala tilmaamaya labada arrimood. (4,2) waa lammaane horsan oo tirooyin ah (2,4) na waa lammaane horsan kale oo ka geddisan kii hore.

Imisa lammaane horsan oo sheegaya buugagga ay Cabdi iyo Jaamac kala haysan karaan ayaa jira? Lammaanaha horsan ee (4,2) tiradiisa hore waxay u taagan tahay doorsoomaha koo-waad, ta dambena waxay u taagan tahay doorsoomaha labaad.

Haddii ay labada doorsome yihiin  $x$  iyo  $y$ , waxa caado ah in  $x$  loo qaato doorsoomaha koo-waad, doorsoomaha labaad-na  $y$  loo qaato. Metelan, isleegta  $2y + 3x = 12$ ,  $x$  baa ah doorsoomaha koo-waad inkasta oo ay  $y$  soo horrayso.

### Tusaale :

Sheeg dhowr lammaane horsan oo ay ku rumoobeyso isleegta  $2x - y = 2$ .

### Furfurid :

(1, 0), (2, 2), (3, 4), (4, 6), (5, 8)

iyo (6, 10) waa lammaanayaal horsan oo ku jira urur rumeedka isleegta. Raadi shan lammaane horsan kale oo ku jira urur rumeedka. Xasuusnow inaynu isticmaali karno tirooyin

lakab ay isleegtani ku rumoobeyso, markaa  $(1\frac{1}{4}, \frac{1}{2})$  iyo

$(2\frac{1}{3}, 2\frac{2}{3})$  waa ka mid urur rumeedka  $2x - y = 2$ .

### Layli :

- 1) Muuji inay (12, 1), (9, 2), (6, 3), (3, 4) iyo (0, 5) ka mid yihiin urur rumeedka  $x + 3y = 15$ .
  - 2) Muuji inaanay (1, 9), (2, 8), (6, 5), (3, 7), (10, 5) iyo (4, 8) ku jirin urur rumeedka  $2x + 2y = 18$ .
  - 3) Qor shan lammaane horsan oo ku jira urur rumeedka  $4x + 5y = 40$ .
  - 4) Dhammaystir lammaanayaashan horan si ay uga mid noqdaan urur rumeedka  $2x + 3y = 28$ .
- (1,   ); (3,   ); (4,   ), (5,   ), ( $\frac{1}{4}$    )
- 5) Qiimayaal u door  $x$  oo muuji inuu qiime kasta  $y$  kuu siinayo qiime gaar ah oo ay ku rumowdo isleegta  $2x + 3y = 28$ .

### Isleegyo Wadajira

2. Laba tiro ayay wadartoodu 8 tahay, faraqoduna uu yahay 2. Waa kuwee labada tiro?

Masaladan sideed u furfuri lahayd? Labada tiro midna ma naqaan, waxase la inna siiyey laba xaqiiqo oo ku lug leh labada tiro. Haddaba, ma kula tahay inaynu adeegsan karno isleegyo laba doorsome qaba? Ka dhig inay labada tiro ta weyni tahay  $x$ , ta yarina ay tahay  $y$ . Markaa labadii xaqiiqo waxaa loo qori karaa

$$x + y = 8 \text{ iyo } x - y = 2$$

Haddii aynu heli karno lammaane horsan tirooyin ah oo ay labada isleegba ku rumoobaan, lammaanaha horsani wuxuu ku jiraa urur rumeedka **dhiskan isleegyada wadajir** ah. Haddaba si labadii tiro ee la inna warsaday aynu u helno, waa inaynu raadinaa  $x$  iyo  $y$  haddii ay  $x + y = 8$  oo ay  $x - y = 2$ . Marka ay  $x = 6$  ee ay  $y = 2$ , isleegta hore ayaa run ah maxaa yee-lay  $6 + 2 = 8$  baa run ah, isleegta dambena waa been maxaa



yeelay  $6 - 2 = 2$  ayaa been ah. Markaa (6,2) wuxuu dhabeeyaa isleegta hore oo qudh ah laakiin ma dhabeeyo habdhiskan isleegyada wadajira ah. Marka ay  $x = 3$  ee ay  $y = 1$ , isleegta dambe ayaa run ah waayo  $3 - 1 = 2$  ayaa run ah, isleegta horase waa been maxaa yeelay  $3 + 1 = 8$  ayaa been ah. Markaa (3, 1) wuxuu dhabeeyaa isleegta dambe, mase dhabeeyo habdhiskan isleegyada wadajira ah.

Si aad u furfuri karto habdhiskan isleegyada wadajira ah, waxaad samaysaa laba tax oo kala ah lammaanayaal horsan dhabeeya isleegta hore iyo qaar dhabeeya ta dambe.

Hubi inay lammaanayaashan horsani ku jiraan urur rumeedka	Hubi inay lammaanayaashan horsani ku jiraan urur rumeedka
$x + y = 8$	$x - y = 2$
(1,7)	(11,9)
(7,1)	(10,8)
(6,2)	(9,7)
(2,6)	(8,6)
(5,3)	(6,4)
(3,5)	(5,3)
(4,4)	(4,2)
(0,8)	(3,1)
(8,0)	

Lammaanaha horsan ee (5,3) ayaa ku jira labada taxba oo dhabeeya labada isleegba. Taa macneheedu wuxuu yahay inay (5,3) labada isleegba ku rumoobaan.

$$5 + 3 = 8 \text{ iyo } 5 - 3 = 2$$

Labaduba waa run. Markaa masaladii aynu ku bilownay jawaabteedu waxay tahay inay labada tiro midina 5 tahay ta kalena 3 tahay. Bal hadda waxaad isku daydaa inaad furfurto habdhiskan isleegyada wadajira ah, adigoo adeegsanaya hilinkii aynu haddeer isticmaalnay.

$$\begin{aligned} 3x + 4y &= 18 \\ \text{iyo } 2x + 3y &= 13 \end{aligned}$$

Habkan aynu ku isticmaalnay furfurista isleegyada wadajira waa mid ku xiran hadba sida uu qofka masalada furfurayaa uu u samayn karo male sax ah; waa hab aan la isku halayn karin.

Haddaba innaga oo isticmaalayna astaamaha tirooyinka, sideen u furfuri karnaa habdhis isleegyo wadajira ah. Bal hadda u fiirso habdhiskan:

$$\begin{aligned} x + y &= 4 \\ 2x - y &= 5 \end{aligned}$$

Waxaynu rabnaa inaynu helno habdhis kan ka fudud oo ay isku urur rumeed yihiin laakiin qaba isleeg hal doorsome leh. Waxaynu adeegsan karnaa dhawr hab midkood :

- 1) Habka isugeynta iyo kala goynta.
- 2) Habka isku beddelka.
- 3) Habka isgarabdhigga.

Aynu ku horrayno habka isugeynta iyo kala goynta.

1. **Habka isugeynta iyo kala goynta**  
Inoo soo qaad habdhiskii

$$\begin{aligned} x + y &= 4 \\ 2x - y &= 5 \end{aligned}$$

$x + y$  iyo 4 waa laba magac oo ay tiro keli ihi leedahay,  $2x - y$  iyo 5 waa laba magac oo ay tiro kale leedahay. Markaa  $(x + y) + (2x - y) = 4 + 5$ . Isleegtan dambe marka aynu fududayno waxaynu heli

$$\begin{aligned} (x + y) + (2x - y) &= 4 + 5 \\ 3x &= 9 \\ x &= 3 \end{aligned}$$

Isleegtan fudud ee  $x = 3$  ayaynu ku beddeli labadii isleeg ee aynu ku bilownay midkood (hadba taan doono).

Markaa, waxaynu heli habdhiskan cusub

$$\begin{aligned} x + y &= 4 \\ x &= 3 \end{aligned}$$



Habdhiskan cusub ee isleegyada wadajira ah macnihiisu wuxuu yahay  $x + y = 4$ ,  $x$  qiimaheeduna waa 3. Markaa isleegta hore ayaynu doorsoomaha  $x$  ku beddeli 3. Markaa

$$\begin{aligned} 3 + y &= 4 \\ y &= 4 - 3 = 1 \end{aligned}$$

Sidaa daraaddeed  $x = 3$

$$y = 1$$

Kolkaa lammaanaha horsan ee (3,1) ayaa dhabeeya labadii isleeg

$$\begin{aligned} x + y &= 4 \\ 2x - y &= 5 \end{aligned}$$

Bal hadda hubi.

Aynu qaadanno tusaale kale. Markan waxaynu isticmaali kala goyn si aynu u helno isleeg hal doorsoome qabta. Tal-laaba walba sababta loo qaaday sheeg.

$$\begin{aligned} 4x + 2y &= 26 \\ 2x + 2y &= 16 \end{aligned}$$

$$\begin{aligned} (4x + 2y) - (2x + 2y) &= 26 - 16 \\ (4x - 2x) + (2y - 2y) &= 10 \\ 2x + 0 &= 10 \\ x &= 5 \end{aligned}$$

$$\begin{aligned} 2x + 2y &= 16; \quad x = 5 \\ 2 \times 5 + 2y &= 16 \\ 2y &= 16 - 10 \\ 2y &= 6 \\ y &= 3 \end{aligned}$$

### Hubsiimo

$$\begin{aligned} (4 \times 5) + (2 \times 3) &= 26 \text{ waa rur.} \\ (2 \times 5) + (2 \times 3) &= 16 \text{ waa run} \end{aligned}$$

Markaa (5,3) baa dhabeeya labada isleegba.

### Layli :

Furfur isleegyadan wadajira.

$$\begin{array}{ll} 1) & \begin{aligned} 5x + 2y &= 23 \\ 3x - 2y &= 1 \end{aligned} & 3) & \begin{aligned} x + 6y &= 18 \\ x + 3y &= 12 \end{aligned} \\ 2) & \begin{aligned} 6x + 7y &= 72 \\ -6x + 9y &= 24 \end{aligned} & 4) & \begin{aligned} 10x + 4y &= 56 \\ 3x + 4y &= 42 \end{aligned} \end{array}$$

Ilaa iyo hadda, innaga oo isugeyn ama kala goyn adeegsaneyna ayaynu labada doorsoome ee labada isleeg ku jira midkood bixin karnaa haddii ay weheliyeyaashiisu isku mid yihiin ama ay isku lid yihiin.

Sidee baynu u furfuri karnaa isleegyadan wadajira :-

$$\begin{aligned} 6x + 4y &= 24 \\ 3x - y &= 3 \end{aligned}$$

Labada doosoomaba weheliyeyaashoodu way kala geddisan yihiin. Markaa, si aynu u furfuri karno isleegyadan wadajira waxaynu isleekaysiin labada doorsoome midkood weheliyeyaashiisa. Kaba dhig inaynu rabno inaynu isleekaysiino weheliyeyaasha  $y$ , isleegta dambe ayaynu ku beddeli mid u dhiganta oo weheliyaha  $y$  uu yahay  $-4$ . Taasina waxay inoogu suurageli innaga oo isleegta dambe 4 ku dhufana. Isleegta aynu helnaa waa :

$$12x - 4y = 12$$

Markaa habdhiskan baa innoo soo bixi;

$$\begin{aligned} 6x + 4y &= 24 \\ 12x - 4y &= 12 \end{aligned}$$

Isku day inaad furfurto habdhiskan. Waa maxay lammaanaha horsan ee dhabeeya labada isleeg ee wadajira?

Isla isleegyada wadajira ee

$$\begin{aligned} 6x + 4y &= 24 \\ 3x - y &= 3 \end{aligned}$$

haddii aynu rabi lahayn weheliyeyaasha tibxaha  $x$  inaynu isleekaysiino ama isku lid ka dhigno maxaynu yeeli lahayn?

### Tusaale :-

Furfur isleegyadan wadajira ee

$$\begin{aligned} 7x + 3y &= 56 \\ 4x + 5y &= 55 \end{aligned}$$

Aynu isleekaysiino weheliyeyaasha tibxaha x. Haddii aynu isleegta hore 4 ku dhufano ta danbena 7 ku dhufano, waxaynu heli habdhis kii hore ay isudhigmaan oo aynu tibxaha x kala goyn ku saari karno. Habdhiskaasi wuxuu yahay :

$$\begin{aligned} 28x + 12y &= 224 \\ 28x + 35y &= 385 \end{aligned}$$

Aynu isleegta dambe ka goyno ta hore

$$\begin{array}{r} 28x + 12y = 224 \\ -28x - 35y = -385 \\ \hline -23y = -161 \end{array}$$

Isleegta  $-23y = -161$  labadeeda dhinacba aynu ku dhufano  $(-1)$ . Markaa, waxaynu heli  $23y = 161$  oo la mid ah  $y = 7$ . Dabadeed labadii isleeg ee aynu ku bilownay midkood aynu ku beddelno qiimaha y, si aynu u helno qiimaha x. Ta hore aynu qaadano.

$$\begin{aligned} 7x + 3y &= 56 \\ 7x + 3(7) &= 56 \\ 7x + 21 &= 56 \\ 7x &= 35 \end{aligned}$$

$$\begin{aligned} x &= 5 \\ \text{Markaa, } x &= 5; y = 7. \end{aligned}$$

### Hubsiimo .

Labadii isleeg ee aynu ku bilownay tii aynu qiimaha y ku beddelnay maahee tii kale ayaynu isticmaali marka aynu hubinayno.

$$\begin{aligned} 4x + 5y &= 55 \\ (4x5) + (5x7) &= 55 \end{aligned}$$

$20 + 35 = 55$  waa run. Markaa lammaanaha horsan ee  $(5,7)$  ayaa dhabeeya habdhiskii.

### Layli :

Raadi lammaanayaasha horsan ee dhabeeya isleegyadan wadajira. Masalada hore iyo ta labaad marna tibxaha y saar marna kuwa x, inta kale kolba hilinka kuu fudud raac.

- |    |                                    |    |                  |
|----|------------------------------------|----|------------------|
| 1) | $4x + 3y = 41$                     | 2) | $2x - 7y = 1$    |
|    | $2x - 5y = 1$                      |    | $5x + 17y = 37$  |
| 3) | $8x + 2y = 13$                     | 4) | $6x - 5y = 5$    |
|    | $16x + y = 14$                     |    | $3x + 11y = -39$ |
| 5) | $6x + 5y = 81$                     | 6) | $12x + 8y = 7$   |
|    | $27x - 5y = 117$                   |    | $4x + 6y = 4$    |
| 7) | $\frac{2x}{-3} + \frac{3y}{5} = 0$ | 8) | $15x + 24y = 21$ |
|    | $10x + 2y = 8$                     |    | $9x - 6y = 1$    |
| 9) | $3x + 7y = 11$                     |    |                  |
|    | $11x + 3y = 35$                    |    |                  |

### 11. Habka Isku Beddelka

Waxaad ka soo qaaddaa inaynu rabno inaynu furfurno habdhisan isleegyada wadajira ah :

$$x + 4y = 3 \quad \text{iyo} \quad 2x - 3y = 17$$

Waxaynu qaadi tallaabooyinkan.

- Innaga oo isleegta hore oo keli ah isticmaalayna ayaynu raadin qiimaha x.

$$\begin{aligned} x + 4y &= 3 \\ x &= 3 - 4y \end{aligned}$$

2. Isleegta dambena x baynu ku beddeli qiimaha aynu u helnay. Markaa waxaa innoo soo bixi isleeg sadde-xaad oo hal doorsoome qabta.

$$\begin{aligned} 2x - 3y &= 17 \\ 2(3 - 4y) - 3y &= 17 \\ 6 - 8y - 3y &= 17 \\ 6 - 11y &= 17 \\ -11y &= 11 \\ y &= -1 \end{aligned}$$

3. Waxaynu raadin qiimaha x

$$\begin{aligned} x &= 3 - 4y \\ x &= 3 - 4(-1) \\ x &= 3 + 4 \\ \therefore x &= 7 \end{aligned}$$

Markaa, (7, -1) baa dhabeeya habdhiskan isleegyada wadajira ah.

4. **Hubsiiimo** : Lammaanaha horsan ee tirooyinka ah aayaynu ku hubin isleegtii labaad.

$$\begin{aligned} 2x - 3y &= 17 \\ 2(7) - 3(-1) &= 17 \\ 14 + 3 &= 17 \quad \text{waa run.} \end{aligned}$$

**Layli** :

Furfur qindi wal oo isleegyo ahba adigoo habka isku beddelka adeegsanaya.

1)  $x + 2y = 5$   
 $x = 3y$

2)  $y = 5x$   
 $2x + y = 7$

3)  $2r + s = 7$   
 $r - s = 1$

4)  $2x + 3y = 19$   
 $x - y = 12$

5)  $3r + 2s = 5$   
 $r - s = 5$

6)  $2m - 2n = 5$   
 $m - n = 18$

7)  $3x - 2y = 11$   
 $2x - y = 8$

8)  $x + y = 10$   
 $2x + 3y = 23$

9)  $5x + 3y = 24$   
 $6x + 7y = 39$

i0)  $3x - 4y = 0$   
 $2x - y = 5$

### III. Habka Isgarabdhigga

Habkan marka aynu adeegsaneyno, si aynu u furfurno habdhis isleegyo wadajira ah, waxaynu yeeli :

- 1) Labada isleeg ee wadajira ayaynu mid walba labada doorsoome midkood qiimihiisa ku raadin ka kale.
- 2) Labada tibaaxood ee ay inna kala siiyaan labada isleeg, ee uu dhigma doorsoomaha gaarka ah qiimihiisa, ayaynu isgarab dhigi. Markaa waxaynu heli isleeg hal doorsoome qabta.

**Tusaale (1)**

Furfur  $x + 4y = 3$  iyo  $2x - 3y = 17$

**Furfuris** : Labada isleegba aan ka raadino qiimaha x. Waxaynu heli

$$x = 3 - 4y \quad \text{iyo} \quad x = \frac{3y + 17}{2}$$

- 2) Kol haddii  $x = 3 - 4y$  iyo  $x = \frac{3y + 17}{2}$  ay labaduba run yihiin, waxaa dhab ah in

$$3 - 4y = \frac{3y + 17}{2}$$

Labada dhinac ee isleegtanba aan ku dhufano 2.

Markaa,  $6 - 8y = 3y + 17$   
 $- 11y = 11$   
 $y = -1$

Raadinta qiimaha x iyo hubintaba adaa lagu dhaafay.

**Tusaale : (2)**

$$\text{Furfur} \quad 5x - y = 7 \quad \text{iyo} \quad 3x - y = 5$$

**Furfuris :** Markan horta labada isleegba aynu ka raadino qiimaha y.

$$1) \quad \begin{aligned} y &= 5x - 7 \\ y &= 5x - 5 \end{aligned}$$

$$2) \quad \begin{aligned} 5x - 7 &= 5x - 5 \\ 2x &= 2 \\ x &= 1 \end{aligned}$$

$$3) \quad \begin{aligned} y &= 5x - 5 \\ y &= 3(1) - 5 \\ \therefore y &= -2. \end{aligned}$$

- 4) Markaa lammaanaha horsan ee tirooyinka ah ee dha-beeya habdhiskan isleegyada wadajira ahi waxa weeye (1, -2).

**Layli :**

- b) Layligii hore masalooyinkiisa mid walba habkan isgarabdhigga kaga sheeqee.
- 1) Adeegso laba doorsoome iyo laba isleeg si aad masalooyinkan u furfurto.
- 1) Guri uu wareeggiisu yahay 48 mitir ayaa dhererkiisu 4 mitir ka dheer yahay balladhkiisa. Waa intee dhererka dhinacyada gurigu?
- 2) Marka 5 buug iyo 2 qalin qiimahoodu yahay  $\frac{1}{15}$  ee 4 buug iyo 5 qalinna ay joogaan  $\frac{2}{100}$ , waa intee qiimaha buuggu?
- 3) Laba tiro wadartood ayaa badhkeed yahay  $\frac{1}{2}$ , faraqooda badhkiina waa  $\frac{3}{2}$ . Raadi labada tiro.

- 4) Wiil iyo gabar baa miisaankoodu marka la isku da-

ro uu yahay 106 kg. Haddii ay gabadhu wiilka ka culus tahay 6 kg waa intee miisaanka wiilka iyo ka gabadhu?

- 5) Fasal bay wiilasha ku jiraa gabdhaha 10 dheer yihiin. Haddii gabdhaha mid lagu soo daro tirada wiilashu waxay noqon ta gabdhaha labanlaabkeed. Imisa wiil iyo imisa gabdhood baa ku jira fasalkaa?
- 6) 12 laabis iyo 10 mastaradood baan ku iibsan karaa 21 shilin, isla markaa 20 laabis iyo 4 mastaradood baan 16 shilin ku iibsan karaa. Waa intee qiimaha laabbisku?
- 7) Xarig baa laba gobol loo kala jaray. Labada gobol midkood baa ka kale 6 mitir ka dheer, saddex laabkiina ah Gobol walba dhererkiisu waa intee?
- 8) Laydi baa labanlaabka dhererkiisu la mid yahay saddex laabka balladhkiisa. Haddii uu wareegga laydi-gaasi yahay 160 sm, waa intee dhererkiisa iyo balladhkiisu?
- 9) Laba tiroo idil oo isku xiga ayay wadartoodu 113 tahay. Waa kuwee labada tiro?
- 10) Saddex sac iyo afar wan baa seyladda ka jooga 1250/— marka ay laba sac iyo saddex wan joogaan 850/—. Raadi qiimaha saca iyo ka wanka.
- 11) Lacag dhan 710 — ayaa la isku siiyey 13 wiil iyo 15 gabdhood, isla qaddarkaas waxaa la siin kari lahaa 22 wiil iyo 9 gabdhood. Raadi inta uu wiil waliba helay?



CUTUB IV

JIBBAARRADA

b iyo x haddii la isku dhufto waxaa loo qoraa bx. Laba ba' haddii la isku dhuftana waxaa loo qori karaa b · b; marka la soo gaabiyana b<sup>2</sup> (u akhri ba' laba jibaaran). Lambarka 2da ah ee korka midigta ba'da kaga yaalaa wuxuu muujinayaa inta jeer ee ba'da la isku dhuftay. b<sup>5</sup> waxaa loo akhriyaa «ba' shan jibaaran». 5 tu waxay muujinaysaa in ba'da shan jeer la isku dhuftay, (b · b · b · b · b = b<sup>5</sup>). Asto-tirooyinka 2 iyo 5 waxaa la yiraahdaa «jibbaarro», ba'dana «sal». b<sup>5</sup> ama b<sup>2</sup> oo is-wadatana waxa la yiraahdaa tibaax aljebre.

Laba tibaaxood iyo wixii ka badanba ee isku sal ah iskuna jibbaar ah waa la isu geyn, qaybin iyo dhufan karaa, waana kuwa aynuu qaybaha cutubkan kaga hadli doonno. Kuwase kala salka iyo kala jibbaarka ah, cutub dambe ayaynu kaga hadli doonnaa.

Isku dhufashada Jibbaarrada :

$$\begin{aligned}
 k^4 &= k.k.k.k. \\
 k^3 &= k.k.k. \\
 \text{haddaba } k^4 \cdot k^3 &= (k.k.k.k.) (k.k.k.) \\
 &\quad 4 \quad + \quad 3 \\
 &= (k.k.k.k.k.k.k.) \\
 &\quad 7
 \end{aligned}$$

Markaa k<sup>4</sup> · k<sup>3</sup> = k<sup>4+3</sup> = k<sup>7</sup> (u akhri ka' todoba jibbaaran)  
 $x^6 \cdot x^8 = x^{6+8} = x^{14}$   
 x<sup>4</sup> · b<sup>3</sup> looma qori karo x<sup>7</sup>b waayo salka ayaa kala duwan.

Labada sal ee isku midka ah uunbaa jibbaarradooda la isugeyn karaa.

Xeerka Koowaad ee Jibbaarrada:

$$b^m \cdot b^n = b^{m+n}$$

b ≠ 0, m & n waa tirooyin togan

Layli :

Tibxahan Tarantooda Qor :-

- 1) f<sup>3</sup> · f<sup>5</sup>
- 2) g<sup>2</sup> · g<sup>4</sup>
- 3) k<sup>6</sup> · k<sup>6</sup>
- 4) b<sup>5</sup> · b<sup>9</sup>
- 5) s<sup>8</sup> · s<sup>8</sup>
- 6) a<sup>w</sup> · a<sup>w</sup>
- 7) x<sup>s</sup> · x<sup>3s</sup>
- 8) r<sup>n</sup> · r<sup>4n</sup>
- 9) m<sup>6</sup> · m<sup>t</sup>
- 10) t<sup>a</sup> · t<sup>a</sup>

Waynu soo sheegnay in jibbaaranayaasha la isku dhufan karo, markanna waxaynu u gelaynaa isuqaybintooda.

Ga' (g) haddii aynuu ga' kale u qaybino waxaa inoo soo ba-

xaya 1, sida marka aynuu  $\frac{\cancel{4}}{\cancel{4}} = 1$  ama  $\frac{\cancel{1}}{\cancel{1}} = 1$  ama  $\frac{\cancel{xxx}}{\cancel{xxx}} = 1$

Waxa markaa muuqata in marka laba wax oo isle'eg la isuqaybiyo aynu helayno tiro-madoorshaha isku dhufashada oo ah kow (1).

Maxaa dhacaya haddii la qaybiyuhu ka jibbaar badan yahay qaybiyaha iyadoo salku isku mid yahay sida  $\frac{g^4}{g^2}$ . Taasu wa-

xay la mid tahay  $\frac{\cancel{g} \cdot \cancel{g} \cdot \cancel{g} \cdot \cancel{g}}{\cancel{g} \cdot \cancel{g}}$  ama g.g. = g<sup>2</sup>.

Waxa halkaa ka muuqda jibbaarka la qaybiyuhu laba inuu dheer yahay ka qaybiyaha sidaa aawadeed labaa u soo hadhaya la qaybiyaha  $\frac{g^4}{g^2} = g^{4-2} = g^2$  sida tallaabada hore ku muujisan.

Sharaxa aan kor ku soo sheegnay wuxuu ina gaarsiinayaa xeerka labaad ee jibbaarada oo ah :



$$\frac{x^n}{x^m} = x^{m-n} \text{ m arka } m > n,$$

m iyo n oo ah abyoonyaal;  $x \neq 0$

Tusaale : (1)  $\frac{k^6}{k^4}$

Furfurid :  $\frac{k^6}{k^4} = k^{6-4} = k^2$  Jawaab

Tusaale : (2)  $\frac{d^7}{d^3}$

Furfurid :  $\frac{d^7}{d^3} = d^4$  jawaab

Layli :

Korka ka sheeg qaybaha so'aalahan hoos ko qoran :

1)  $\frac{r^5}{r^2}$

5)  $\frac{j^7}{j^7}$

2)  $\frac{s^7}{s^3}$

6)  $\frac{b^{71}}{b^8}$

3)  $\frac{k^6}{k^5}$

7)  $\frac{r^3 \cdot r^4}{r^6}$

4)  $\frac{w^{11}}{w^6}$

8)  $\frac{n^2 \cdot n^3 \cdot n^5}{n^3 \cdot n^4}$

Qaybtan saddexaad ee jibbaarrada waxaynu ku faallaynaynaa jibbaarrada jibbaaran, sida  $(x^m)^n$ . Matalan haddii  $x^2$  aynu haddana saddex jibbaarro waxaynu u qoraynaa  $(x^2)^3$ . Waxa

sidaa la mid ah  $(x^2) \cdot (x^2) \cdot (x^2)$ . Jibbaarrada xa'da oo dhammi markaa waxay noqonayaan saddex meelood oo min laba ah  $(3 \times 2)$ . Ama waa la isugeyn karaa sidan hoos ku cad :

$$(x \cdot x) (x \cdot x) (x \cdot x) = x \cdot x \cdot x \cdot x \cdot x \cdot x \\ = x^6$$

Waxa kor ku cad in marka tibix aljebra oo jibbaar leh la sii jibbaaro ay furfuriddeedu tahay in la isku dhufto labada jibbaar. Matalan  $(d^3)^4 = d^{3 \cdot 4} = d^{12}$ .

Sharaxanu wuxu markaa inoo horseeday xeerka saddexaad ee jibbaarrada oo ah :

$$(x^m)^n = x^{mn} \text{ m iyo n waa abyoonyaal} \\ x \neq 0$$

Xeerkan saddexaad waa lagu shaqayn karaa. Marka tibixda weheliye la soodana, sida  $(2w^2)^3$ , waxay noqonaysaa :

$$(2^1 w^2)^3 = 2^{1 \cdot 3} \cdot w^{2 \cdot 3} = 8w^6$$

### Jibbaarro Taban

Xeerkaa labaad haddii aynnu dib ugu noqonno wuxuu ahaa  $\frac{x^m}{x^n} = x^{m-n}$  wuxuuna ku koobnaa marka  $m > n$ . Hadda-

ba maxaa dhacayaa marka  $n > m$  sida  $\frac{g^3}{g^4}$ .

Haddii aynnu isu qaybinno labadan jibaarane waxaa inoo soo baxaya  $\frac{1}{g}$  sida hoos ku muujisan :

$$\frac{\begin{matrix} 1 & 1 & 1 \\ \cancel{g} & \cancel{g} & \cancel{g} \end{matrix}}{\begin{matrix} \cancel{g} & \cancel{g} & \cancel{g} & g \\ 1 & 1 & 1 \end{matrix}} = \frac{1}{g}$$

Haddii ayntu xeerka labaad raacnana waa inay sidan noqotaa :

$$\frac{g^3}{g^4} = g^{3-4} = g^{-1}$$

Waxaa markaa cad in  $g^{-1} = \frac{1}{g}$

Waxa aynu halkan ku aragnaa jibbaarro abyoonayaal taaban (-m) leh.

**Tusaale :**

1)  $\frac{b^3}{b^5} = b^{3-5} = b^{-2}$  ama  $\frac{1}{b^2}$

2)  $\frac{m^4}{m^7} = m^{4-7} = m^{-3}$  ama  $\frac{1}{m^3}$

3)  $\frac{k^2}{k^{-3}} = k^{2-(-3)} = k^{2+3} = k^5$

**Layli :**

Furfur su'aalahan :

1)  $\frac{k}{k^5}$

2)  $\frac{t^7}{t^9}$

3)  $\frac{b^5}{b^3}$

6)  $\frac{m^3}{m^{-3}}$

7)  $\frac{r^{-2}}{r^4}$

8)  $\frac{g}{g^{-1}}$

4)  $\frac{b^{-3}}{b^4}$

5)  $\frac{x^{-4}}{x^{-5}}$

9)  $\frac{f^{-4}}{f}$

10)  $\frac{s^{-5}}{s^{-4}}$

**Eber oo jibbaar ah :**

Xeerkaa labaad waxaynu ku baranay in tibxaha la isu qaybinaayo jibbaarradooda la kala jaro kii doonaa ha weynaadee

sida  $\frac{b^4}{b^2}$  oo ah  $b^{4-2} = b^2$  ama  $\frac{b^3}{b^5}$  oo ah  $b^{3-5} = b^{-2}$ .

Haddaba maxaa dhacaaya marka labada jibbaar ay isle'eg

yihiin, sida :  $\frac{r^2}{r^2}$ . Hore waataynu u niri «Haddii laba wax oo

isle'eg oo eber ka duwan la isu qaybiyo, jawaabtu waa tiro-ma-doorshaha isku dhufashada: ama waa kow», sida

$$\frac{5}{5} = 1 \text{ ama } \frac{b}{b} = 1 \text{ ama } \frac{t^2}{t^2} = 1$$

Sidaasaa  $\frac{r^2}{r^2} = 1$ . Waayo waxay la mid tahay  $\frac{r \cdot r}{r \cdot r} = 1$ .

haddiise aynu xeerkaa labaad raacno,  $\frac{r^2}{r^2}$  waxay noqonaysaa

$r^{2-2}$  ama  $r^0$ . Waxaa markaa cad in  $\frac{r^2}{r^2} = 1$ .

Waxaynu markaa gaadhaynaa go'aan ah in  $r^0$  iyo 1 ay yihiin isla wax keli ah. Haddaba ayntu qaynuun ahaan u dhigno:

$$x^0 = 1 \text{ marka } x \neq 0$$

TIBIXAALĀYAASHA

Layli :

Fududee su'aalahan hoos ku qoran :

- |                                    |                                     |                                |
|------------------------------------|-------------------------------------|--------------------------------|
| 1) $b^2 \cdot b^4$                 | 2) $3^2 \cdot 3^3$                  | 3) $\frac{x^4 \cdot x^2}{x^5}$ |
| 4) $\frac{k}{k^2}$                 | 5) $\frac{s^3}{s^2}$                | 6) $ab^2 \cdot a^2b^2$         |
| 7) $(m^3n)(m^2n^2)$                | 8) $\frac{4 dr^3 w^2}{2 dr^2 w}$    | 9) $\frac{f^2 gx^2}{f gx}$     |
| 10) $b^2 t^0 \cdot b^3 t$          | 11) $\frac{w^{-2}}{w^{-2}}$         | 12) $\frac{k^3}{k^{-3}}$       |
| 13) $n^{-2}m^2 \cdot n^2n^{-2}$    | 14) $\frac{n^2 w^{-2}}{n^{-2} w^2}$ | 15) $(a^2 b^4)^3$              |
| 16) $\frac{(j^3)^4}{j^{-2}}$       | 17) $(t^0 b^4)^5$                   | 18) $(5^0)^2$                  |
| 19) $\left[ \frac{1}{4} \right]^0$ | 20) $\left[ \frac{-2^2}{5} \right]$ |                                |

Tibix xisaabeedyadan 6, x, 3y, 7y<sup>2</sup> waxaa la yiraahdaa haltibixyo. Haltibixu wuxuu had iyo jeer ka kooban yahay tiro keliya sida (6), doorsoome, sida (x), ama taranta labadooda sida (3y) ama 7y<sup>2</sup>. Wuxuu kale oo noqon karaa taran doorsoomayaal. Haltibix, ama wadarta dhawr haltibix waxaa la yiraahdaa tibixaale. Matalan 3x<sup>2</sup> + 7 waa tibixaale ka kooban laba tibix xisaabeed, waxana la yiraahdaa labatibix.

Heerka doorsoomaha ee haltibixu waa inta jeer ee isir ahaan loo isticmaalo doorsoomaha; ama waxaa la oran karaa «waa jibbaarrada doorsoomaha». Matalan 4 a<sup>2</sup>b<sup>4</sup>x waa haltibix heerkiisu yahay 2 salka a, 4 salka b iyo 1 salka x. Heerka haltibixu markaa, waa wadarta jibbaarrada doorsoomayaasha ku jira haltibixa. Heerka haltibixa 4m<sup>2</sup>n<sup>3</sup>y<sup>5</sup> waa 10, waayo 2 + 3 + 5 = 10. Haddii haltibix ka duwan eber aanu lahayn doorsoome, heerkiisu waa eber; haltibix 0, ma laha heer.

Heerka tibixaaluhu wuxu la mid yahay heerka hal tibixyadiisa ka ugu weyn. Matalan 4x<sup>2</sup>y<sup>3</sup> + 3km<sup>3</sup> - 16b<sup>3</sup>t<sup>3</sup> waa tibixaale ka kooban 3 haltibix oo heerarkoodu yihiin 5, 4, iyo 6 siday u kala horreeyaan. Haddaba, heerka tibixaalaha 4x<sup>2</sup>y<sup>3</sup> + 3km<sup>3</sup> - 16b<sup>3</sup>t<sup>3</sup> waa 6. Waayo 6 waa heerka haltibixa ugu heer weyn.

Isugeynta tibixaalayaasha :

Isugeynta tibixaalayaasha, sida isku darka tirooyinka ayaa xeerarka isugeynta loogu isticmaali karaa. Xeerarkaasoo ay ka mid ahaayeen hormagelinta iwm., dabadeed waxa la isugeynayaa tibxaha isle matalan :

$$(6b^2 + 8) + (5b^2 - 2x + 4) = 11b^2 - 2x + 12$$

ama waa la isku hoos qori karaa sida:

$$\begin{array}{r} 6b^2 \quad + \quad 8 \\ 5b^2 - 2x + 4 \\ \hline 11b^2 - 2x + 12 \end{array}$$

Layli :

Soo saar wadarta tibixlayaasha isku hoos qoran :

$$1) \frac{4a - 6}{3a + 4}$$

$$2) \frac{k^2 + 2x^2 - g}{2k^2 + x^2 - g}$$

$$3) \frac{4b^3 - b + k}{2b^3 - b - 2k}$$

$$4) \frac{4d^2 - 3t}{4d^2 + 2t - 5}$$

$$5) \frac{\frac{1}{4}k^3 + \frac{1}{2}r^2 - h}{\frac{1}{4}k^3 - \frac{1}{2}r^2 + h}$$

$$6) \frac{3n - 0.6k + 0.7}{2n - 0.6k + 0.7}$$

$$7) \frac{6g^3y^2 + 2ty^2 - 4d + j}{4g^3y^2 - ty^2 + 2d - 2j}$$

$$8) \frac{dy^2 - 3y - 2d + 5}{+2dy^2 - 4y - 4d - 4}$$

$$9) \frac{2x - y + t}{-5x + 2y - 2t} + \frac{2x - y - t}{-5x + 2y - 2t}$$

$$10) \frac{nm - 2j + 3h}{n - j + 4h^2}$$

Kala goynta tibixaalayaasha :

Marka aynnu kala jarayno laba tibixaale waa inaynu jaraha ku dhufannaa - 1 oo dabeed isugeynaa tibxaha isle :

$$\begin{aligned} & (h^2 + k + m) - (h^2 - 2k - m + 5) \\ & = h^2 + k + m - h^2 + 2k + m - 5 \\ & = 3k + 2m - 5 \end{aligned}$$

ama waa la isku hoos dhigi karaa dabadeedna summadda jaraha ayaa isbeddeleysa intaan la isugeyn sida :

$$\frac{h^2 + k + m}{-h^2 + 2k + m - 5}$$

$$\frac{0h^2 + 3k + 2m - 5}{= 3k + 2m - 5}$$

Xeer :

Si aad u kala jartid laba tibixaale, lagajaraha u gee lidka tibxaha jaraha.

Layli :

Tibixaalaha hoose ka jar ka sare :

$$1) \frac{3a - 2e}{2a + e}$$

$$2) \frac{4t^2 - j + 6}{2t - j - 4}$$

$$3) \frac{5x^3 - 4k^2 - 3d}{2x^2 - 3k^2 + 2y}$$

$$4) \frac{6 - g^2 + 2y}{5 - g^2 + 3y}$$

$$5) \frac{0.6m^2 + 1.2r - 0.8}{-0.7m + 0.8r + 0.6}$$

Samee kala goynta soo socota

- 6)  $7n - (n^2 - n + 6m - 3)$
- 7)  $(3x - 2y - 4) - (2x + 4y + 2)$
- 8)  $(56 - 3r) - (2b + 4r - 3r^2)$
- 9)  $(w^2 - 2s) - (2w^2 + w - 3s)$
- 10)  $6 - (2a + b) - (3a - b)$



## Isku dhufashada Tibixaalayaasha

Waad xasuusan tahay haddii laba jibbaarane oo isku sal ah la isku dhufsto in jibbaaraada la isugeeyo sida  $x^4 x^2 = x^{4+2} = x^6$  haddiise salalku kala jaad yihiin sal waliba jibaarradiisa ayuu gaar ahaan u haysanayaa. Sida :-  $a^3 b^4 = a^3 b^4$ . Markase aynu isku dhufanayno haltibixyo (jibbaaranayaal) isku dhafan labadii isku sal ahba jibbaaradoodaynu isugaynaynaa sida :-

$$(m^2 n^3) (m^5 n^2) = m^{2+5} n^{3+2} = m^7 n^5$$

### Tusaale :

$$\begin{aligned} & (2k^3 r^4) (-5k^2 r m^2) \\ &= (2 \cdot -5) (k^3 r^4 \cdot k^2 r m^2) \\ &= (-10) (k^{3+2} r^{4+1} m^2) \\ &= -10 k^5 r^5 m^2 \end{aligned}$$

Soo saar taranta tibixaalayaasha soo socda :

1.  $(-2hy^2) (4hy^3) (b^4)$
2.  $(wy^2) (wy^2 t^2)$
3.  $(-6bt^3) (4b^4 k^2) r^3$
4.  $(-5xs) (-4x^2 s^5) (2x^2 s)$
5.  $b(-d) db$
6.  $-3(r^2 m) (km^3)$
7.  $2(jf^2) (0.4jf)$
8.  $(-w)^3 (.3a)^2$
9.  $(0.2a)^3 (.3a)^2$
10.  $(-k)^3 (k^3 r^3) (-r)^2$

Soo saar taranta dabbedna wadarta adigoo isugeynaaya tibxaha isle :

11.  $(-n) (-7b^2) (4n) + (3bn) (-3bn)$
12.  $(2kw) (3k^2w) - (k) (5k^2w^2)$
13.  $(rsy) (2rsy^2) + (rs^2) (r^2sy^4)$
14.  $(4b^3nx^2) (-3b^4n^4x^5) - (-b^3n^2x^3) (6b^4nx^3)$
15.  $-(2t^2c^3j^2) (3t^3c^3j^3) (h) - (3tc^5j^4h^5)$

## Isku dhufasho haltibix iyo tibixaaale

Xeerka kaladhigga ee isku dhufashada iyo xeerka isku dhufashada jibbaaranayaasha ayaa kuu oggolaanaya isku dhufashada tibixaalayaasha.

Matalan :-

$$\begin{aligned} 4a(2a + 5) &= (4a)(2a) + (4a)(5) \\ &= (4)(2)(a)(a) + (4)(5)(a) \\ &= 8a^2 + 20a \end{aligned}$$

Joogna waa la isugu dhufan karaa sida :-

$$\begin{array}{r} 2a + 5 \\ \times 4a \\ \hline 8a^2 + 20a \end{array}$$

### Tusaale :

$$\begin{aligned} (1) \quad x^2(2x^3 + 3xy + y + 4) \\ = 2x^5 + 3x^3y + x^2y + 4x^2 \end{aligned}$$

Haltibixiyada kor inoogu soo baxay waa kuwo kala duwan. Sidaa awgeed la isuma geyn karo oo waa inaynu sidooda ku dhaafno.

$$\begin{array}{r} (2) \quad a^2(2a + ab + 3b) \\ = 2a^3 + a^2b + 3a^2b \\ \times a^2 \\ \hline 2a^3 + a^3b + 3a^2b \end{array}$$

### Layli :

Qor taranta tibixaalayaasha hoos ku qoran :

1.  $4(b + 3)$
2.  $2(x - 4y)$
3.  $-3(b^2 + 2t + n^3)$
4.  $g^2(m^2 - 2ng^2 + 3mng)$
5.  $k(k2wr + kwr^2 - wr + 5)$

6.  $rs^2 (wrs + wrs - 2rs)$
7.  $-2dk^2 (d^3k + fdk^2 - d + k^2)$
8.  $4^2cb (c^3b^4 - 2^2cb + 4)$

### Isku dhufashada laba tibixaale

Si loo furfuro  $(2a + 3)(3a + 2)$

Waa in marka hore  $(2a + 3)$  loo qaataa tiro keliya, dabbeedna lagu dhufaa labatibixa  $(3a + 2)$  iyadoo la cuskanayo xeerka kaladhigga ee isku dhufashada sida :-

$$\begin{aligned} 2a(3a + 2) + 3(3a + 2) \\ (6a^2 + 4a) + (9a + 6) \\ 6a^2 + 13a + 6 \end{aligned}$$

**Xeer :-**

Si la isugu dhufto laba tibixaale, waa in haltibix walba haltibixa kale lagu dhufto, dabbeedna tixaha isle la isugeeyo.

**Tusaale :**

$$(x^2 + b)(2x + 3b)$$

**Furfurid :**

$$\begin{array}{ccccccc} & & \begin{array}{c} \text{---} \\ | \quad \downarrow \quad \downarrow \\ (x^2 + b) \quad (2x + 3b) \\ | \quad \uparrow \quad \uparrow \\ \text{---} \end{array} & & & & \\ 2x^3 & + & 3x^2b & + & 2xb & + & 3b^2 \\ \uparrow & & \uparrow & & \uparrow & & \uparrow \\ \text{labada tib-} & & \text{tibixda hore} & & \text{tibixda dam-} & & \text{labada tib-} \\ \text{xood ee} & & \text{iyo ta} & & \text{be iyo ta} & & \text{xood ee} \\ \text{hore} & & \text{dambe} & & \text{hore} & & \text{dambe} \end{array}$$

**Layli :**

**Taran kasta u qor sida ugu sahlan**

1.  $(k + 2)(w - 5)$
2.  $(b + 3)(b^2 + 4)$

3.  $(t + 6)(j + 4)$
4.  $(2g + t)(3g + t)$
5.  $(m^2 + n)(2m + n^2)$
6.  $(w^3 + 3)(4w + y)$
7.  $(3^3 + 2)(f^2 + j + 2)$
8.  $(2r^2 + a)(r^3 + 2a^2 + a)$
9.  $(3k^3 + k)(2k^3 + 3k + n)$
10.  $(w^4 + b^2)(2k + b^3 + b + 2)$

### Qaybinta Tibixaalaha

Si loo fududeeyo tibaax tiradan  $(24 + 36) \div 12$  waxaynu cuskanaynaa xeerka kaladhigga.

$$\begin{aligned} (24 + 36) \div 12 &= \frac{24 + 36}{12} \\ &= \frac{1}{12} (24 + 36) \\ &= \frac{1}{12} (24) + \frac{1}{12} (36) \\ &= 2 + 3 \\ &= 5 \end{aligned}$$

Hubinteeduna waa tan

$$\frac{24 + 36}{12} = \frac{60}{12} = 5$$

Sidaas oo kale ayaynu u fududaynaynaa tibaax aljabreedkanna.

$$\begin{aligned} & \frac{(bx + by) \div b}{bx + by} \\ &= \frac{b}{b} \\ &= \frac{1}{b} (bx) + \frac{1}{b} (by) \end{aligned}$$

$$\begin{aligned}
&= \left[ \frac{1}{b} \cdot b \right] x + \left[ \frac{1}{b} \cdot b \right] y \\
&= (1)x + (1)y \\
&= 1x + 1y \\
&= x + y
\end{aligned}$$

**Xeer :-**

Si tibixaaie haltibix loogu qaybiyo waa in la cuskadaa xeerka kala dhigga oo tibix kasta oo ka mid ah tibi-xaalaha loo qaybiyaa haltibixa qaybiyaha ah.

**Tusaale :**

$$1. \frac{9x^2 + 6x^2 + 3x}{3x}$$

**Furfurid :**

$$\begin{aligned}
&\frac{9x^3 + 6x^2 + 3x}{3x} \\
&= \frac{9x^3}{3x} + \frac{6x^2}{3x} + \frac{3x}{3x} \\
&= \frac{3x \cdot 3x^2}{3x} + \frac{2x \cdot 3x}{3x} + \frac{1 \cdot 3x}{3x} = 3x^2 + 2x + 1
\end{aligned}$$

ama

$$\begin{array}{r}
3x^2 + 2x + 1 \\
3x \overline{) 9x^3 + 6x^2 + 3x} \\
\underline{9x^3 + 6x^2 + 3x} \\
0 \quad 0 \quad 0
\end{array}$$

**Tusaale :**

$$2. \frac{4w^2 + 8w - 16}{4}$$

**Furfurid :**

$$\begin{aligned}
&\frac{4w^2 + 8w - 16}{4} \\
&= \frac{4w^2}{4} + \frac{8w}{4} - \frac{16}{4} \\
&= w^2 + 2w - 4
\end{aligned}$$

**Lavli :**

Soo saar qaybaha hoos ku muujisan :-

1.  $\frac{ab + 2a}{a}$
2.  $\frac{2g^2 - g}{g}$
3.  $\frac{16x^2 + 4x}{2x}$
4.  $\frac{25n^3 - 10n^2 + 5n}{5n}$
5.  $\frac{12w^2 - 6w}{-w}$
6.  $\frac{-18m^3 + 9m^2 + 6m}{m}$
7.  $\frac{2 \cdot 1g - 1 \cdot 4g^3 + 3 \cdot 5g^2 - 7g}{0.7g}$

$$8. \frac{16r^2s^2 + 8rs^2 - 4rs^2 + 12rs}{4rs}$$

$$9. \frac{-s^4t^4 + s^3t^4 + s^3t^3 + s^2t^2}{s^2t^2}$$

$$10. \frac{8k^3m^2 - 16k^2m + 4k^3m}{8km}$$

**Isuqaybinta laba tibixaale**

$$\begin{array}{r} 7 \\ 10 \\ 9 \overline{) 156} \\ \underline{90} \\ 66 \\ \underline{63} \\ 3 \end{array}$$

Isuqaybinta waxaynu ka arki karnaa :-

1. In qaybintu ay tahay kala goyn noqnoqotay .  
156 dii marna waxaynu ka goynay 90 oo ka yimid  $9 \times 10$ , marna 63 oo ka yimi  $6 \times 7$ , hadhaaguna waa 3.
2. Xeerka kala dhiguna wuu inoo hawl yareeyay tallaabooyinka kala goynta; haddii kale 17 jeer ayaynu 9 ka jari lahayn 156da.
4. Hubintuna waa lidka tallaabooyinka kor ku yaalla.

$$\begin{aligned} 156 &= 90 + 63 + 3 \\ 156 &= 153 + 3 \\ 156 &= 156. \end{aligned}$$

Qodobbada aan kor ku sheegnay waxaan kusoo gaabin naa saddexda isleeg ee ku muujisan :-

**Tusaale :**

$$\begin{array}{r} 2 \text{ qayb} \\ \text{qaybshe } \diamond 4 \left| \begin{array}{l} 9 \text{ la qaybshe} \\ 8 \end{array} \right. \\ \hline 1 \text{ hadhaa} \end{array}$$

1. (La qaybshe) - (Qayb  $\times$  qaybshe) = hadhaa.
2. La qaybshe = (qayb  $\times$  qaybshe) + hadhaa.

$$3. \frac{\text{La qaybshe}}{\text{qaybshe}} = \text{qayb} + \frac{\text{hadhaa}}{\text{qaybshe}}$$

Tusaalaha kor ku yaal haddaan saddexda isleeg ku dabiqnona waxay noqonaysaa sidan :-

1.  $(9) - (2 \times 4) = 1$
2.  $(9) = (2 \times 4) + 1$
3.  $\frac{9}{4} = 2 \frac{1}{4}$

Haddaba markaynu laba tibixaale isuqaybinaynona waxaynu raacaynaa habkaan soo sheegnay oo kale. Laakiin inta aynaan qaybinin waxa loo baahan yahay in tibxaha tibixaala-yaasha loo qoro siday u kala jibbaara sarreeyaan, iyadoo loogu soo horraysiinayo ka ugu jibbaar weyn.

Matalan :-  $x^2 - 2x^3 + 4 - x$

Waa in loo qoro  $-2x^3 + x^2 - x + 4$ .  $2 + x$  na waa in loo qoro  $x + 2$ .

**Tusaale :**

$$\frac{2a - 5 + a^2 + 2a^3}{a + 2}$$



**Furfurid :**

$$\frac{2a - 5 + a^2 + 2a^3}{a + 2} = \frac{2a^3 + a^2 + 2a - 5}{a + 2}$$

$$a + 2 \overline{) 2a^3 + a^2 + 2a - 5}$$

$$\underline{2a^3 + 4a^2}$$

$$0 - 3a^2 + 2a$$

$$\underline{- 3a^2 - 6a}$$

$$0 \quad 8a - 5$$

$$\underline{8a + 16}$$

$$0 - 21$$

Jawaabta :  $2a^2 - 3a + 8$ , hadhaa :  $- 21$

Markee la joojinayaa qaybinta? Marka heerka hadhaagu ka yar yahay heerka tibixaalaha qaybshaha ah. Heerka qaybshaha  $(a + 2)$  waa 1, heerka hadhaaguna  $(- 21)$  waa 0.

**Tusaale :**

$$n^2 + 2n + 4 \overline{) n^4 + 8}$$

**Furfurid :**

$$n^2 + 2n + 4 \overline{) n^4 + 0n^3 + 0n^2 + 0n + 8}$$

$$\underline{n^4 + 2n^3 + 4n^2}$$

$$0 - 2n^3 - 4n^2 + 0n$$

$$\underline{- 2n^3 - 4n^2 - 8n}$$

$$0 \quad 0 + 8n + 8$$

**Jawaab :**  $n^2 - 2n$ , hadhaa :  $8n + 8$

$$\text{ama } n^2 - 2n + \frac{8n + 8}{n^2 + 2n + 4}$$

**Hubin**

$$n^4 + 8 = (n^2 + 2n + 4)(n^2 - 2n) + 8n + 8$$

$$= n^4 - 2n^3 + 2n^3 - 4n^2 + 4n^2 - 8n + 8n + 8$$

$$= n^4 - 8n + 8n + 8$$

$$= n^4 + 8$$

**Layli :**

Isuqaybi tibixaalayaasha hoos ku muujisan: dabadeedna hubi qaybintaada sida tusaalaha hore.

$$1. \frac{b^2 + 3b + 2}{b + 1}$$

$$2. \frac{w^2 - 2w + 5}{w - 2}$$

$$3. \frac{4x^3 + 2x^2 + x - 6}{x^2 + 3}$$

$$4. \frac{2t^3 + t^2 - t + 3}{t^2 + 2}$$

$$5. \frac{-k^3 + k^2 + 5}{k^2 + 4}$$

$$6. \frac{a^3 + 2a^2 - a + 7}{a^2 + a + 2}$$

$$7. d - 2d + 3 \overline{) d^4 - 4d^3 + 10d^2 - 12d}$$

$$8. m^2 + n \overline{) m^4 + 3m^2 + 2mn^2 + n^2 + 3n}$$

9. Haddii 59 loo qaybiyo tiro kale qaybtuna ay noqoto 4, haraaguna 11, waa maxay tirada loo qaybiyay?

10. Haddii isirrada  $s^4 + s^3 - 4s - 4$  uu mid yahay  $s + 1$ , waa maxay isirka kale?

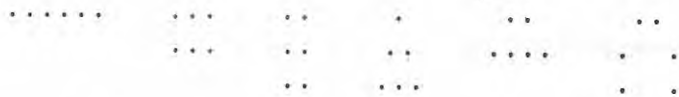
## CUTUB VI

### ISIREYN

Ururka tirsiiimo waxan badanaaba ku muujin karnaa sidan :

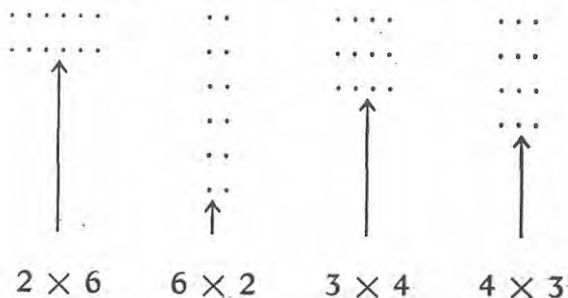
$$T = \{1, 2, 3, 4, 5, \dots\}$$

Tiro kasta oo idil waxaynu muujin karnaa innaga oo adeegsaneyna dhibco. Tilmaan ahaan 6 waxaan ku muujin karnaa siyaabaha soo socda :



Sida tilmaanta aynnu ku aragno, waxay mararka qaarkood dhibcuhu sameeyeen laydi marmarna saddexagal, qaarna saddexagal iyo laydi midna ma ay samayn.

Tirooyinka u dhigmi kara laydi ahaan ayaa ah tirooyin leh isirro. Metelan, tirada  $12 = 2 \times 6 = 3 \times 4$ . 12 waa tiro sidan loo muujin karo :



Tirada hal (1) isir bay u tahay tiro kasta.

### Tusaale :

$$\begin{aligned} 3 &= 1 \times 3 \\ 10 &= 1 \times 10 \\ 219 &= 1 \times 219 \\ 0 &= 1 \times 0 \end{aligned}$$

Waxaan tiro kasta u dhigi karnaa taranta laba tiro ama ka badan (taranta isirradeeda) Tilmaan ahaan haddii aan qaadano 56, waxaa loo kala saari karaa :

$$\begin{aligned} 56 &= 7 \times 8 \\ 56 &= 28 \times 2 \\ 56 &= 14 \times 4 \\ 56 &= 1 \times 56 \end{aligned}$$

Tirooyinka 1, 2, 4, 7, 8, 14 iyo 56 waxay yihiin isirrada 56.

Ururka ka koobma tirooyinka  $7 \times 8$ ,  $4 \times 14$ ,  $28 \times 2$  iyo  $1 \times 56$  waxay u qaybsamaan tirooyin laba laba ah (qindiyo) oo labadii la isku dhuftaaba ay inna siiyaan 56. Labada tiro ee tarantoodu tahay 56 isirray u yihiin tirada 56, isla markaas tirada 56 dhufsane ayay u tahay labada tiraba.

Marka aynu tiro gaar ah isirradeeda raadineyno waxaa loo baahan yahay inaynu sheegno ururka aan ka qaadanayno isirrada. Markii aynu, haddeer, 56 isirradeeda raadineyney waxaynu isku koobnay ururka tirooyinka idil. Haddaba bal aan eegno ururka abyoonaayaasha.

$$\begin{aligned} 56 &= 2 \times 28 \\ 56 &= (-2) (-28) \\ 56 &= 4 \times 14 \\ 56 &= (-4) \times (-14) \\ 56 &= 7 \times 8 \\ 56 &= (-7) (-8) \\ 56 &= 1 \times 56 \\ 56 &= (-1) (-56) \end{aligned}$$

Haddaba, had iyo jeer, si isirrada tiro loo helo waa inaynu caddaynaa ururka aan ka dooneyno.

Tiro mutuxan waa tirada nafteeda iyo hal uun u qaybsanta. Markaa tiro kasta oo mutuxan waxa isirro u ah iyada ke-ligeed iyo hal.

**Tusaale :**

Raadi isirrada mutuxan ee 648

$$\begin{aligned} 648 &= 2 \times 324 \\ &= 2 \times 2 \times 162 \\ &= 2 \times 2 \times 2 \times 81 \\ &= 2 \times 2 \times 2 \times 3 \times 27 \\ &= 2 \times 2 \times 2 \times 3 \times 3 \times 9 \\ &= 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \\ &= 2^3 \times 3^4 \end{aligned}$$

**Tusaale 2**

Raadi isirrada mutuxan ee 56

$$\begin{aligned} 56 &= 2 \times 28 \\ &= 2 \times 2 \times 14 \\ &= 2 \times 2 \times 2 \times 7 \\ &= 2^3 \times 7 \end{aligned}$$

Kol haddii 7 ay tahay tiro mutuxan, isireynta lama sii wadi karo.

**Layli:**

b) Raadi isirrada mutuxan :

- |         |         |        |       |         |
|---------|---------|--------|-------|---------|
| 1) 126  | 2) 343  | 3) 156 | 4) 52 | 5) 2475 |
| 6) 1638 | 7) 9975 | 8) 174 | 9) 25 | 10) 0   |

t) Sheeg sababta weedhaha soo socda ay u yihiin run ama been :

- 1) 6 waa u isir mutuxan 42
- 2) 7 waa u isir mutuxan 42
- 3) 7 waa u isir 12
- 4) 15 waa u isir 220

- 5) 7 waa u isir mutuxan 84
- 6) 13 waa u isir mutuxan 104
- 7) 2 isir mutuxan uma aha 6
- 8) 10 waa u isir 10
- 9) 0 waa u isir 20
- 10) 5 waa u isir 0

**Isir weynaha ay wadaagaan laba tiro iyo dhufsane yaraha ay wadaagaan :**

Hore waxaad u soo qaadatay sida loo raadiyo isir weynaha ay wadaagaan laba tiro iyo dhufsane yaraha ay wadaagaan. Haatan, waxaynu u fiirsan waxa looga jeeday I. W. W. iyo DH. Y. W. laba tiro. Isir weynaha ay laba tiro wadaagaani wuxuu yahay tirada ugu weyn ee labada tiraba u ah isir. Dhufsane u yaraha ay wadaagaan laba tiro waxa weeye tirada ugu yar ee labadoodaba u ah dhufsane.

Kaba soo qaad inaynu rabno I. W. W. iyo DH. Y. W. tirooyinka 56 iyo 72. Waxaa habboon inaynu labada tiroba raadino isirradooda mutuxan.

$$\begin{aligned} 56 &= 2 \times 28 \\ &= 2 \times 2 \times 14 \\ &= 2 \times 2 \times 2 \times 7 \\ &= 2^3 \times 7 \end{aligned}$$

$$\begin{aligned} 72 &= 2 \times 36 \\ &= 2 \times 2 \times 18 \\ &= 2 \times 2 \times 2 \times 3 \times 3 \\ &= 2^3 \times 3^2 \end{aligned}$$

I.W.W. labada tiro wuxuu yahay  $2^3$ , maxaa yeelay iyada oo qudh ah ayaa ah isirka ay labada tiro wadaagaan ee u weyn. Tiro ka weyn  $2^3$  uma noqon karto isir 56 iyo 72.

DH.Y.W. laba tiro waxaan niri waa tirada ugu yar ee ay labadoodaba u yihiin isirro. Sidaas awgeed, ta keliya ee ay u noqdaani waxay tahay  $2^3 \times 3^2 \times 7 = 504$ .

**Isir Haltibixa Tibixaalayaasha :**

Haddii aan rabno inaynu helno isirrada haltibix weheliye wata waxaan raadinaa haltibixyo kale oo weheliyeyaashoodu yihiin abyoonaal, tarantooduna tahay haltibixii la inna siiyay.

**Tusaale :**

$$24x^2y^3 = 8xy \cdot 3x^2y^2$$

$$15x^2y^2t = 5x^2y^2 \cdot 3t$$

**Raadinta I.W.W. iyo DH.Y.W. haltibixiyo :**

Si aan u barano raadinta I.W.W. haltibixiyo, bal aynu aad u derisno tusaalahan.

**Tusaale :**

Raadi I.W.W. haltibixiyada  $52x^2y^2$  iyo  $36x^3y$ .

**Furfuris :**

- 1) Raadi I. W. W. weheliyeyaashu  
 $52 = 2^2 \times 1^3$ ;  $36 = 2^2 \times 3^2$   
 I.W.W. horgalayaashu wuxuu yahay  $2^2 = 4$
- 2) Raadi I.W.W. doorsoomayaasha ku jira haltibixiyada.  
 Doorsoomayaasha ku jira haltibixiyada kolba mid soo qaado, jibbaarradooda isku qiyaas. Jibbaarranaha ugu jibbaar yar qaado waayo kaasaa ah I.W.W.  
 Isku qiyaas  $x^2$  iyo  $x^3$ . Waxa u ah I.W.W.  $x^2$ .  
 Isku qiyaas  $y^2$  iyo  $y$ . Waxa u ah I.W.W.  $y$ .  
 Marka I.W.W. doorsoomayaashu wuxuu yahay  $x^2y$ .
- 3) I. W. W labada haltibix wuxuu noqonayaa taranta I.W.W. weheliyeyaasha iyo I.W.W. doorsoomayaashu, taasina waxa weeye  $4x^2y - 4x^2y$ .

Kolkaa, haltibixa wata horgalaha ugu weyn iyo heerka ugu weyn una ah isir dhowr haltibix ayaa ah isir weynaha ay wadaagaan (I.W.W.) haltibixiyadu.

**Laylisyo :**

b) Waxaad raadisaa I.W.W. haltibixiyada soo socdaa :

- |                         |                               |
|-------------------------|-------------------------------|
| 1) 125 iyo 55           | 6) $144x^2y^2$ iyo $128xyt$   |
| 2) 56 iyo 49            | 7) $3x$ iyo $4y$ iyo $5t$     |
| 3) $-100$ iyo $125$     | 8) $-4rs^2$ iyo $-6rt^3$      |
| 4) $2x^2y$ iyo $10xy^3$ | 9) $12x^2y^3$ iyo $108x^3y^2$ |
| 5) $3y$ iyo $18xy$      | 10) $72$ iyo $42d^2$          |

t) Adigoo isirradooda mutuxan adeegsanaya, raadi xiddid labajibbaarka tirooyinka :

- |          |         |         |
|----------|---------|---------|
| 1) 225   | 2) 441  | 3) 3600 |
| 4) 3600  | 5) 1600 | 6) 2401 |
| 7) 676   | 8) 324  | 9) 576  |
| 10) 1521 |         |         |

j) Haltibixiyadan mid walba isirkiisa labaad sheeg :

- 1)  $4x^2y = 4x ( \quad )$
- 2)  $4xy = 4y ( \quad )$
- 3)  $30xy = 30x ( \quad )$
- 4)  $24d^2j^3 = 8dj^2 ( \quad )$
- 5)  $39x^4y^4t = 3x^4y ( \quad )$
- 6)  $36mn^3 = 18n^2 ( \quad )$
- 7)  $104j^3x^4 = 13x^3 ( \quad )$
- 8)  $-\frac{2}{3}xy^4 = 2xy^2 ( \quad )$
- 9)  $15xr^3 = 3xr^3 ( \quad )$
- 10)  $135y^3t^2 = 5yl^2 ( \quad )$

**Isirrada Labatibixiyada ah ee Tibixaalayaasha :**

Bal hadda u fiirso tibixaalahan  $x(x+7) + 8(x+7)$ . Waxa inoo muuqata inuu labatibixa  $x+7$  isir u yahay tibixaalaha labadiisa tibxoodba. Kol haddii ay  $x+7$  isir u tahay labada tibxood sidan baynu u isireyn karnaa innagoo adeegsanayna xeerka kala dhigga :

$$x(x+7) + 8(x+7) = (x+7)(x+8)$$

Tani waxay inno caddaynaysaa in xeerka kala dhigga isku dhufashadu uu innoo fududaynayo sidaynu isirrada tibxaha ee tibixaalaha aan u heli lahayn. Si aynu u fududayno u qaado  $x+7$  inay tahay A. Tibixaalihii wuxuu isku beddeli  $xA + 8A$ . Markaa aan adeegsano xeerka kala dhigga isku dhufashada.  $xA + 8A = A(x+8)$ .

Hase yeeshee A waxay u taagneyd labatibixa  $x+7$ . Markaa weedha  $xA + 8A = A(x+8)$  waxay u dhigantaa

$$x(x+7) + 8(x+7) = (x+7)(x+8)$$



Xeerka kala dhigga marka aan adeegsano waxaynu laba-tibix kan hoos ku qoran oo kale ah ka saari karnaa haltibix ay wadaagaan.

$$6xy + 4y = 2y(3x + 2).$$

2y waxay tahay haltibixa u ah isir ee ay wadaagaan tibxaha tibixaaluhu. Marka tibxaha tibixaale ay ka badan yihiin laba waxa la isticmaali karaa xeerka kala dhigga iyo xeerka hormagelinta isugeynta si tibixaalaha loogu qoro sansaan ay isku xigaan wixii doorsoomayaal isku mid ihi ay ku jiraan. Marka aad sansaantaa u qortid, waxaad adeegsan xeerka kala dhigga isku dhufashada, dabadeedna waxaad raadin isirrada.  $ab + ac - b^2 - bc$  waa tibixaale labada tibxood ee hore ay leeyihiin a, labada dambena -b. a waa isir ay wadaagaan ab iyo ac, -b waa isirka ay wadaagaan  $-b^2$  iyo -bc. Waxaynu u qori laba tibxood oo keli ah:

$$\begin{aligned} ab + ac - b^2 - bc \\ = a(b + c) - b(b + c). \end{aligned}$$

b + c waa isir ay wadaagaan labada tibxood ee tibixaaluhu. Innaga oo isticmaalayna xeerka kala dhigga isku dhufashada waxaan u qori karnaa

$$a(b + c) - b(b + c) = (a - b)(b + c).$$

Si kale ma u kala hormarin karnaa tibxaha tibixaalaha? Haa, waayo ab iyo  $-b^2$  waxa ay wadaagaan b, ac iyo -bc waxay wadaagaan c.

$$\begin{aligned} ab + ac - b^2 - bc &= ab - b^2 + ac - bc \\ &= b(a - b) + c(a - b) \\ &= (a - b)(b + c). \end{aligned}$$

### Tusaale :

$$\text{Raadi isirrada } 5(y + 7) + x(y + 7)$$

### Furfuris :

$$\begin{aligned} 5(y + 7) + x(y + 7) \\ = (y + 7)(5 + x). \end{aligned}$$

### Tusaale :

$$\text{Raadi isirrada } ax + ay - 3x - 3y + x^2 + xy$$

### Furfuris :

$$\begin{aligned} ax + ay - 3x - 3y + x^2 + xy \\ = a(x + y) - 3(x + y) + x(x + y) \\ = (x + y)(a - 3 + x). \end{aligned}$$

Si kale waa loo samayn karaa:

$$\begin{aligned} ax - 3x + x^2 + ay - 3y + xy \\ = x(a - 3 + x) + y(a - 3 + x) \\ = (a - 3 + x)(x + y) \end{aligned}$$

### Layli:

Raadi isirrada haddii ay suurtoowdo :

- 1)  $3x + 3y$
- 2)  $4x - 4y$
- 3)  $ax + by$
- 4)  $2x^2 + 12x^3$
- 5)  $2(ax + b) + t(ax + b)$
- 6)  $a(x - 3) - b(x - 3)$
- 7)  $m^2n + q^2n$
- 8)  $2(a + b) - (a - b)(a + b)$
- 9)  $(a + b)(a - b) + (a + b)^2$
- 10)  $9a^2 + 81ab$
- 11)  $x(m - 1) + y(m - 1)$
- 12)  $y^2 + 10xy + 25x^2$
- 13)  $(a + b)(x - y) + 3(x - y)$
- 14)  $x^2 + 3x + ax + 3a$
- 15)  $m^2n + m^2 + 5n + 5m$
- 16)  $m^2 - n^2 + am - n$
- 17)  $x^2y^2 + x^2y - 3^2x + y^3 + y^2 - y^3$
- 18)  $(x - 3)x^2 + (x - y)y^2$
- 19)  $4y + 20 + y^3 + 5y^2$
- 20)  $4(m + n) + (m + n)^2$
- 21)  $3y^3 - 8y^2 + 6y - 16$
- 22)  $xy + xz + y^2 + z^2$
- 23)  $16 - 8x + 4b - 2bx$
- 24)  $(x - 2)(x - 3) + (x - 3)(x + 5)$



- 25)  $a + b + a^2 - 3ab - 4b^2$   
 26)  $9k^2 - 81$   
 27)  $6x^5 - 9y^4 + 3y^2$   
 28)  $s^3 - s + 3s + 3$   
 29)  $d^2 - ad + db - ab - d + a$   
 30)  $ax^2 + 3ax^3$

**Iskudhufashada Wadarta iyo Faraqa Laba Tiro :**

Ilaa iyo hadda isireynta waxaynu u adeegsanaynay xeerka kala dhigga isku dhufashada, kala hormarinta iyo hormagelinta isugeynta. Haddii aan haysano labatibixa  $x^2 - 4$ , innooma suurtoowdo inaynu raadino isirradeeda innagoo isticmaalayna dariiqooyinkii aan soo baranay. Sidaas awgeed ayaa loogu baahan yahay inaynu hab cusub oo isireyneed la soo baxno.

Xeerarka Aljebraada innagoo adeegsanayna, waxaynu naqaan in  $x^2 - 4 = x^2 + 2x - 2x - 4$ . Haddaba, tibixaalaha  $x^2 + 2x - 2x - 4$  isirradiisa dariiqaddii hore waan ku heli karnaa:

$$\begin{aligned} x^2 + 2x - 2x - 4 \\ = x(x + 2) - 2(x + 2) \\ = (x + 2)(x - 2) \end{aligned}$$

**H u b i n :**

Isku dhufo labada tibaaxood.

$$\begin{array}{r} x + 2 \\ x - 2 \\ \hline x^2 + 2x \\ - 2x - 4 \\ \hline x^2 + 0 - 4 \end{array}$$

Tani waxay inoo caddaynaysaa in taranta wadarta iyo faraqa laba tiro ay le'eg tahay labajibbaarka ka hore oo laga gooyo labajibbaarka ka labaad. Ta guud ahaan tirooyinka oo dhan ka dhaxaysaa waxay tahay  $(a + b)(a - b) = a^2 - b^2$ .

**H u b i n :**

$$\begin{array}{r} a + b \\ a - b \\ \hline a^2 + ab \\ - ab - b^2 \\ \hline a^2 + 0 - b^2 \end{array}$$

**T u s a a l e :**

Raadi isirrada  $4x^2 - y^2$  adoo isticmaalaya xeerka kala dhigga isku dhufashada.

**F u r f u r i s :**

$$\begin{aligned} 4x^2 - y^2 &= 4x^2 + 2xy - 2xy - y^2 \\ &= 2x(2x + y) - y(2x + y) \\ &= (2x + y)(2x - y) \end{aligned}$$

**T u s a a l e :**

Raadi isirrada kuwa soo socda adigoo aragti keliya isticmaalaya.

b)  $x^2 - 25 = (x + 5)(x - 5)$

t)  $y^2 - 3 = (y + \sqrt{3})(y - \sqrt{3})$

j)  $(x + 1)^2 - 16 = \left[ (x + 1) + 4 \right] \left[ (x + 1) - 4 \right]$

Faraqa laba labajibbaar waxay aad innooga anfacdaa isku dhufashada tirooyinka sidan oo kale.

b) Isku dhufo (94) (106)

**F u r f u r i s :**

$$\begin{aligned} 94 &= 100 - 6 \\ 106 &= 100 + 6 \end{aligned}$$

$$(94) (106) = (100 - 6) (100 + 6) = (100)^2 - (6)^2 \\ = 10,000 - 36 = 9964.$$

t) Isku dhufo : (45) (55)

**Furfuris :**

$$45 = 50 - 5 \\ 55 = 50 + 5$$

$$(45) (55) = (50 - 5) (50 + 5) \\ = 2500 - 25 = 2475$$

**Layli:**

- |   |  |
|---|--|
| 1. $(x + y) (x - y)$  | 2. $(10 + 1) (10 - 1)$   |
| 3. $(y + 9) (y - 9)$  | 4. $(d + 3m) (d - 3m)$   |
| 5. $(3m + d) (d - 3m)$  | 6. $\left[ r + \frac{3}{4} \right] \left[ r - \frac{3}{4} \right]$ |
| 7. $(nm + y) (nm - y)$  | 8. $(y - nm) (y + nm)$   |
| 9. $(10 + 1) (10 - 1)$  | 10. $46 \times 34$   |
| 11. $\left[ \frac{1}{6} - \frac{1}{4} \right] \left[ \frac{3}{5} - \frac{1}{4} \right]$ | 12. $(22) (18)$  |
| 13. $(y^2 + h^2) (y^2 - h^2)$   | 14. $(3x^3 + y^2) (3x^3 - y^2)$                                    |
| 15. $\left[ \frac{3}{-4} \right] \left[ 1 - \frac{1}{4} \right]$                        |  |

**Isireynta faraqa laba labajibbaar**

Waxaan soo baranay taranta faraqa iyo wadarta laba tiro amba doorsoome in ay tahay labajibbaarka ka hore oo laga gooyo labajibbaarka ka dambe, sidan oo kale:

$$(a + b) (a - b) = a^2 - b^2$$

Sida aynu ku helnayna waxay ahayd innagoo isticmaalnay

xeerka kala dhigga laba jeer.

$$(a + b) (a - b) = a (a - b) + b (a - b) \dots\dots\dots (1) \\ = a^2 - ab + ba - b^2 \dots\dots\dots (2) \\ = a^2 - ab + ab - b^2 \dots\dots\dots (3) \\ = a^2 + 0 - b^2 \dots\dots\dots (4) \\ = a^2 - b^2 \dots\dots\dots (5)$$

Tallaabada (3) waxaan ku haysanaa  $ab$  iyo  $-ab$ , waxaan naqaan inay  $-ab$  tahay isweydaarka isugeynta ee  $ab$ . Sidaas awgeed ayay  $ab - ab = 0$ . Tani waxay innoo caddaynaysaa sida aynu u raadino isirrada faraqa laba tiro ama doorsoome oo labajibbaaran.

**Tusaale :**

$$x^2 - 4 = (x + 2) (x - 2) \\ x^2 - 9 = (x + 3) (x - 3) \\ m^2 - 16 = (m + 4) (m - 4) \\ 36x^2 - 4y^2 = (6x + 2y) (6x - 2y) \\ -81x^2 + 25y^2 = 25y^2 - 81x^2 = (5y + 9x) (5y - 9x)$$

**Layli:**

b) Sheeg inay tibaaxaha soo socdaa yihiin faraqa laba labajibbaar iyo in kale. Haddii ay yihiin sheeg isirradooda.

- |                       |                       |
|-----------------------|-----------------------|
| 1) $x^2 - 81$         | 2) $n^2 - m^2$        |
| 3) $144 - a^2$        | 4) $d^2 - 36$         |
| 5) $y^2 - x^2$        | 6) $t^2 - 1$          |
| 7) $w^2 - 100$        | 8) $16 - 4y^2$        |
| 9) $57 - y^2$         | 10) $64x^2 - 15y^2$   |
| 11) $-t^2 + y^2$      | 12) $-1 + m^2$        |
| 13) $-12y^2 + x^2$    | 14) $50t^2 - 25r^2$   |
| 15) $r^2 - 9d^2$      | 16) $u^2n^2 - r^2s^2$ |
| 17) $-r^2s^2 + y^2$   | 18) $-c^2 + c^2d^2$   |
| 19) $x^2y^2 - b^4$    | 20) $-a^2b - ct^3$    |
| 21) $-x^2 + 1$        | 22) $-1 + x^2$        |
| 23) $x^6y^4 - x^8y^6$ | 24) $a^4b^4 - a^2b^2$ |
| 25) $a^8 - y^{10}$    |                       |

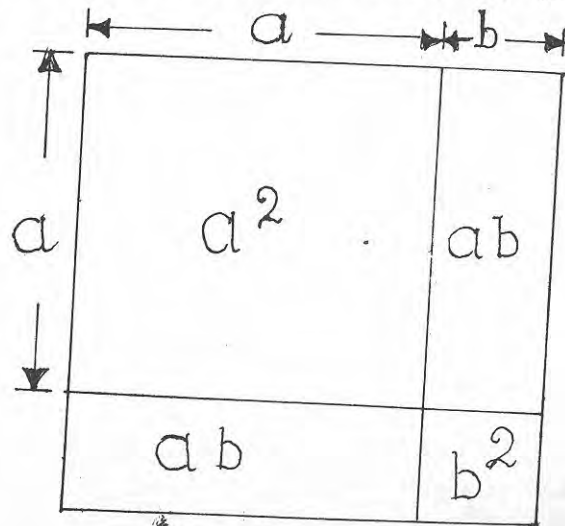
t) Raadi isirrada, hubi adoo isku dhufanaya

- |                       |                          |
|-----------------------|--------------------------|
| 1) $y^2 - 9$          | 17) $.04a^2 - 4$         |
| 2) $m^2 - 16$         | 18) $.09a^2 - 49$        |
| 3) $x^2 - 9y^2$       | 19) $x^2 - 81$           |
| 4) $m^2 - n^2$        | 20) $x^2 - \frac{1}{36}$ |
| 5) $t^2 - t^2$        | 21) $s^4 - 16a^2$        |
| 6) $a^2 - by^{24}$    | 22) $-x^4 + 49x^6$       |
| 7) $16a^2 - b^6$      | 23) $x^2y^2$             |
| 8) $169x^2 - y^2$     | 24) $r^3 - r^5$          |
| 9) $4x^4 - t^2$       | 25) $(3 + 4b)^2 - y^2$   |
| 10) $y^2 - 16h^2$     | 26) $(4a - 1)^2 - x^2$   |
| 11) $196m^2 - 225n^2$ | 27) $3a - 27a^3$         |
| 12) $49x^2 - 64y^2$   | 28) $24x - 96x^4t^2$     |
| 13) $-81 + 48^2t^2$   | 29) $m - m^5$            |
| 14) $-400 + d^2r^2$   | 30) $8a^4 - 32$          |
| 15) $4 - 4n^2$        |                          |
| 16) $36y^2 - 1$       |                          |

### Labajibaarniinka labatibix

Haddii aynu rabno inaynu helno  $(4 + 2)^2$  waxaynu isticmaali karnaa warqad labajibaaran oo balladhkeedu yahay  $(4 + 2)$  dhererkeeduna yahay  $(4 + 2)$ . Dabadeedna waxaynu fiirin inta labajibbaarane ee ku yaal bedka.

Sidaas oo kale ayaa  $(a + b)^2$  loo heli karaa. Waxaynu raadin bedka labajibbaarane dhinaciisu yahay  $(a + b)$ .



$$(a + b)^2 = a^2 + 2ab + b^2$$

Qiimaha  $(a + b)^2$  waxaynu ku heli karnaa iskudhufasho

$$\begin{array}{r} a + b \\ a + b \\ \hline a^2 + ab \\ \quad ab + b^2 \\ \hline a^2 + 2ab + b^2 \end{array}$$

$(a - b)^2$  waxaynu iyana ku heli karnaa isku dhufasho

$$\begin{array}{r} a - b \\ a - b \\ \hline a^2 - ab \\ \quad - ab + b^2 \\ \hline a^2 - 2ab + b^2 \end{array}$$

Marka aad labajibbaarayso labatibix waxaa fiican in aad baratid sansaanta guud — mar kasta waxaynu helnaa labajibbaar saddextibix.

Sansaanta Guud :

$$\begin{aligned} (a + b)^2 &= a^2 + 2ab + b^2 \\ (a - b)^2 &= a^2 - 2ab + b^2 \end{aligned}$$

Innaga oo adeegsanayna labadan sansaanood waxaan arki karnaa in :

$$\begin{aligned} (x + 2)^2 &= x^2 + 4x + 4 \\ (y - 2)^2 &= y^2 - 4y + 4 \\ (2m + 1)^2 &= 4m^2 + 4m + 1 \\ (3n^2 + m^3)^2 &= 9n^4 + 6n^2m^3 + m^6 \\ (-b^2 + a^3)^2 &= (a^3 - b^2)^2 = a^6 - 2a^3b^2 + b^4 \end{aligned}$$

L a y l i :

b) Labajibbaar Labatibixyadan :

- |            |              |
|------------|--------------|
| 1. $x + y$ | 9. $y - 5$   |
| 2. $r + s$ | 10. $3b + 2$ |
| 3. $x + 4$ | 11. $3x + 4$ |
| 4. $x + 8$ | 12. $3m + 3$ |

5.  $x - y$
6.  $2a + 2$
7.  $m - n$
8.  $r - 4$
13.  $5x + t$
14.  $2b - 3$
15.  $4m + n$
16.  $r^2 - 5$

t) Sawir ku muuji inay  $(a - b)^2 = a^2 - 2ab + b^2$ .

### Isireynta labajibbaar saddextibix

Si loo raadiyo isirrada labajibbaar saddextibix waxaynu is-ticmaali labada jid ee :-

$$a^2 + 2ab + b^2 = (a + b)^2$$

$$a^2 - 2ab + b^2 = (a - b)^2$$

Inta aanad adeegsan jidadkan; waxa habboon in aad hubisid inay tibaaxdu tahay labajibbaar saddextibix.

### Tilmaan :-

Bal u fiirso tibaaxda  $x^2 + 16x + 64$ . Tibixda hore ma tahay labajibbaar? Haa, waayo  $x^2$  waa labajibbaarka  $x$ . Tibixda saddexaad ma tahay labajibbaar? Haa, maxaa yeelay 64 waa labajibbaarka 8. Tibixda dhexdu ma tahay labanlaabka taranta 8 iyo  $x$ ? Haa, waayo  $16x = 2(x)(8)$ . Markaa, saddextibixani waa labajibbaarka wadarta labada tibxood ee  $x$  iyo 8.

$$x^2 + 16x + 64 = (x + 8)^2$$

### Tusaale 1

Raadi isirrada  $25m^2 - 60mn + 36n^2$

### Furfuris :

$$25m^2 - 60mn + 36n^2$$

$$= 5m \cdot 5m - 2(5m)(6n) + 6n \cdot 6n$$

$$= (5m - 6n)^2$$

$$\text{Markaa } 25m^2 - 60mn + 36n^2 = (5m - 6n)^2$$

### Tusaale :

Raadi isirrada  $x^2 + 18x + 81$

### Furfuris :

$$x^2 + 18x + 81$$

$$= x \cdot x + 2(x)(9) + 9 \cdot 9$$

$$= (x + 9)^2$$

$$\text{Markaa } x^2 + 18x + 81 = (x + 9)^2$$

### Layli :

b) Saddextibixyadan mid waliba ma yahay labajibbaar-ka labatibix. Jawaabtaada hubi.

- |                      |                           |
|----------------------|---------------------------|
| 1. $x^2 + 2x + y^2$  | 9. $t^2 - 20t + 100$      |
| 2. $a^2 + 2ab - b^2$ | 10. $a^2 - 2a - 1$        |
| 3. $m^2 + 4m + y$    | 11. $9r^2 - 18r + 1$      |
| 4. $d^2 + 2d + 4$    | 12. $4y^2 - 24y + 9$      |
| 5. $x^2 + 2x + 1$    | 13. $4s^2 - 24s + 9$      |
| 6. $4x^2 + 8x + 4$   | 14. $y^2x^2 + 2xyt + t^2$ |
| 7. $25x^2 - 20x + 1$ | 15. $x^2y^2 - 2xyt + t^2$ |
| 8. $36y^2 - 25y + 4$ |                           |

t) Raadi isirrada, hubina :

- |                        |                            |
|------------------------|----------------------------|
| 1. $y^2 + 2ty + t^2$   | 11. $n^4 - 2n^2 + 1$       |
| 2. $d^2 - 2dr + r^2$   | 12. $x^4 - 18x + 81$       |
| 3. $x^2 - 12x + 36$    | 13. $36x^2 + 60xy + 25y^2$ |
| 4. $x^2 + 16x + 64$    | 14. $n^6 - 6m^5 + 9$       |
| 5. $m^2 + 14m + 49$    | 15. $8m + 8m^2 + 2m^3$     |
| 6. $16x^2 + 8x + 1$    | 16. $y^2 - 4xy + 4x^2 - 9$ |
| 7. $m^2 + 14m + 49$    | 17. $y^2 - x^2 + 2x - 1$   |
| 8. $4a^2 - 4ab + b^2$  | 18. $m^4 + 2mn + n^2$      |
| 9. $49y^2 - 28y + 4$   | 19. $4m^2 + 8n + 16$       |
| 10. $144x^2 - 24x + 1$ | 20. $25 - 15x + 9x^2$      |

### Isku dhufashada Labatibixyada

Marka aynu laba labatibix isku dhufanayno waxaynu dhawr jeer adeegsan xeerka kala dhigga isku dhufashada. Bal aad ugu fiirso oo baro sida loogu shaqeeyo xeerka kala dhigga isku dhufashada si la isugu dhufsto laba labatibix.

### Tusaale :

$$(2x + 4)(3x + 5)$$



**Furfuris :**

$$\begin{array}{r} 2x + 4 \\ 3x + 5 \\ \hline 6x^2 + 12x \\ + 10x + 20 \\ \hline 6x^2 + 22x + 20 \end{array}$$

Tusaalahan  $(2x + 4)(3x + 5)$  sida loo isticmaalay xeer-ka kala dhigga isku dhufashadu waxay tahay :

$$\begin{aligned} & (2x + 4)(3x + 5) \\ = & (2x + 4)(3x) + (2x + 4)(5) \text{ xeerka kala dhigga.} \\ = & (2x)(3x) + (4)(3x) + (2x)(5) + (4)(5) \text{ xeerka kala} \\ & \text{dhigga.} \\ = & 6x^2 + 12x + 10x + 20 \\ = & 6x^2 + 22x + 20 \end{aligned}$$

Saddextibix kasta tibixihiisu magacyo kala duwan ayay leeyihiin. Ka soo qaad,  $16x^2 + 13x - 3$ .  $16x^2$  oo tibixda koowaad ah waxaa loo yaqaan tibix saabley, ta labaad oo ah  $13x$  waa tibix toosan,  $-3$  oo ta saddexaad ahina waa tibix madoorsoonto ah. Tibix saabley ahi waa tibix heerkeedu uu yahay laba. Tibix toosani waa mid uu heerkeedu yahay hal. Tibix madoorsoonto ahina waa tu aan lahayn doorsoome ee tiro ah. Saddextibix jaadkan oo kale ahna waxaa lagu magacaabaa tibixaale saabley ah maxaa yeelay tibixda heerka ugu weyn leh ayaa saabley ah.

**Layli :**

U qor sansaan saddextibix saabley ah. Dabadeedna sheeg tibixda b) Saabley ah (t) toosan (j) Madoorsoome ah.

- |                     |                      |
|---------------------|----------------------|
| 1. $(a + 2)(a + 3)$ | 9. $(n - 4)(n - 6)$  |
| 2. $(x + 4)(x + 2)$ | 10. $(w - 6)(w - 8)$ |
| 3. $(y + 3)(y + 7)$ | 11. $(x - 6)(x - 3)$ |
| 4. $(y + 5)(y + 7)$ | 12. $(x + 2)(x - 1)$ |

- |                     |                        |
|---------------------|------------------------|
| 5. $(t + 6)(t + 3)$ | 13. $(x + 8)(x - 5)$   |
| 6. $(t + 8)(t + 2)$ | 14. $(x - 10)(x + 9)$  |
| 7. $(m - 5)(m - 4)$ | 15. $(x - 12)(x + 11)$ |
| 8. $(n - 3)(n - 5)$ |                        |

**Isireynta taranta ka timi wadarta ama faraaqa labatibixiyada**

Waxaad ka soo qaaddaa inaynu rabno inaynu raadino isir-rada saddextibix  $x^2 + 15x + 56$ . Isirrada tibixaalahaani waxay yeelanayaan sansaanta  $(x + r)(x + s)$  iyadoo ay r iyo s tirooyin u taagan yihiin. Haddaba waxaad ka soo qaaddaa inay isleeg yihiin  $x^2 + 15x + 56$  iyo  $(x + r)(x + s)$ .

Markaa :-

$$\begin{aligned} (x + r)(x + s) &= x^2 + rx + sx + rs \\ &= x^2 + (r + s)x + rs. \end{aligned}$$

Marka waxaa isudhigma

$$x^2 + 15x + 56 \text{ iyo } x^2 + (r + s)x + rs$$

Sidaa daraaddeed waxaa dhab ah in  $r + s = 15$  iyo in  $rs = 56$ . Kolkaa, waxa habboon inaynu raadino labada tiro ee r iyo s. Taasi waxay tahay inaynu raadino laba tiro oo wadartoodu tahay 15 tarantooduna tahay 56. Labada tiro ee tarantoodu tahay tiro togan waa inay labadooduba noqdaan tirooyin togan ama labaduba tirooyin taban. Si aynu u helno labada tiro ee s iyo r waxaynu qori inta siyood ee labada tiro la isugu dhuf-to si loo helo 56.

$$1) \quad 56 = 7 \cdot 8$$

$$\begin{array}{c} \downarrow \downarrow \\ r \quad s \end{array}$$

$$3) \quad 56 = 28 \cdot 2$$

$$\begin{array}{c} \downarrow \downarrow \\ r \quad s \end{array}$$

$$2) \quad 56 = 14 \cdot 4$$

$$\begin{array}{c} \downarrow \downarrow \\ r \quad s \end{array}$$

$$4) \quad 56 = 56 \cdot 1$$

$$\begin{array}{c} \downarrow \downarrow \\ r \quad s \end{array}$$

1.  $r + s = 7 + 8 = 15$
2.  $r + s = 14 + 4 = 18$
3.  $r + s = 28 + 2 = 30$
4.  $r + s = 56 + 1 = 57$



Kolkaas ta ugu horraysa ayaa buuxineysa labadii shardi ee ahaa in  $r + s = 15$  iyo  $rs = 56$ .

Sidaas awgeed  $x^2 + 15x + 56 = (x + 7)(x + 8)$ .

Had iyo jeer qorimayno inta siyood ee laba tiro la isugu dhufto si tiro gaar ah loo helo; haddii ay ta ugu horraysaa ina siiso labada tiro waxaa habboon inaynu halkaa ku joojino.

**Tusaale :**

Raadi isirrada  $x^2 - 9x + 20$

**Furfuris :**

$$\begin{aligned} x^2 - 9x + 20 &= (x \quad ) (x \quad ) \\ &= (x - \quad ) (x - \quad ) \\ &= (x - 4) (x - 5) \end{aligned}$$

**Hubin :**

$$\begin{aligned} (x - 4) (x - 5) &= x^2 - 4x - 5x + 20 \\ &= x^2 - 9x + 20 \end{aligned}$$

Labada tibixaale ee saableyda ah ee aynu ku soo marnay labada tusaale ee kore mid waliba wuxuu leeyahay madoorsoome togan.  $x^2 + 15x + 56$  waxay leedahay tibix toosan oo togan. Sidaas awgeed ayaa tibixaalaha loogu qori karaa taran laba labatibix. Tusaalaha labaad oo ah  $x^2 - 9x + 20$  wuxuu leeyahay tibix toosan oo taban. Sidaas awgeed ayaa loogu qori karaa taranta faraqa laba labatibix.

Marka aan raadineyno isirrada  $x^2 + 4x - 12$ , waxaynu raaci hilinkii hore oo kale innaga oo raadineyna  $r$  iyo  $s$ .

**Markaa :**

$$x^2 + 4x - 12 = (x + r) (x + s) = x^2 + (r + s) x + rs$$

Taas waxaynu ka aragnaa in  $r + s = 4$  iyo  $rs = -12$ . Taranta laba tiro waxay taban tahay haddii labada tiro midkood ay taban tahay, ta kalena togan tahay. Markaa  $r$  iyo  $s$  midkood ayaa taban. Waxa kale oon ognahay in  $r + s = 4$ . Taa-sina waxay caddaynaysaa in labada tiro ta weyni ay togan tahay.

Inaga oo intaa madaxa ku haynna, aynu raadino labada tiro ee  $r$  iyo  $s$ .

$$\begin{array}{ccc} 12 \quad (-1), & 4 \quad (-3), & 6 \quad (-2) \\ \downarrow \quad \downarrow & \downarrow \quad \downarrow & \downarrow \quad \downarrow \\ r \quad s & r \quad s & r \quad s \end{array}$$

$$r + s = 11 \quad r + s = 1 \quad r + s = 4$$

$$\therefore x^2 + 4x - 12 = (x + 6) (x - 2)$$

**Tusaale :**

Raadi isirrada  $x^2 - 3x - 40$

**Furfuris :**

Markanna waxaa inno cad in labada tiro ee  $r$  iyo  $s$  ka weyni uu togan yahay.

$$\begin{aligned} x^2 - 3x - 40 &= (x + r) (x + s) = x^2 + (r + s) x + rs \\ rs &= -40 \\ r + s &= -3 \end{aligned}$$

$$\begin{array}{ccc} (-40) \quad (1) & & (-20) \quad (2) \\ \downarrow \quad \downarrow & & \downarrow \quad \downarrow \\ s \quad r & & s \quad r \end{array}$$

$$r + s = 39 \quad r + s = 18$$

$$\begin{array}{ccc} (-10) \quad (4) & & (-8) \quad (5) \\ \downarrow \quad \downarrow & & \downarrow \quad \downarrow \\ s \quad r & & s \quad r \end{array}$$

$$r + s = 6 \quad r + s = -3$$

$$\therefore x^2 - 3x - 40 = (x - 8) (x + 5)$$

**Layli :**

- I. Saddextibix kasta waxaad raadisaa labada isir ee tibixda madoorsoontada ah ee ay wadartoodu leeg tahay weheliyaha tibixda toosan.

- |                     |                         |
|---------------------|-------------------------|
| 1. $x^2 + 5x + 6$   | 11. $y^2 + 15y + 26$    |
| 2. $x^2 + 7x + 10$  | 12. $x^2 - 17x + 42$    |
| 3. $y^2 + 3y + 2$   | 13. $x^2 - 24x + 144$   |
| 4. $y^2 + 12y + 27$ | 14. $x^2 - 16x + 15$    |
| 5. $n^2 - 4n + 4$   | 15. $m^2 + 8m + 7$      |
| 6. $m^2 - 6m + 8$   | 16. $s^2 + 13s + 12$    |
| 7. $y^2 - 11y + 18$ | 17. $r^2 + 8r + 12$     |
| 8. $h^2 - 15h + 54$ | 18. $k^2 - 8k + 7$      |
| 9. $k^2 + 18k + 32$ | 19. $m^2 - 20m + 36$    |
| 10. $d^2 + 10d + 9$ | 20. $x^2 - 100m + 2100$ |

II. Raadi Isirrada tibixaalayaashan. Hubi adoo adeegsanaya isku dhufasho.

- |                     |                           |
|---------------------|---------------------------|
| 1. $x^2 - 18x + 36$ | 11. $t^2 + 17t + 42$      |
| 2. $x^2 + 15x + 54$ | 12. $t^2 + 17t + 30$      |
| 3. $m^2 - 47m + 90$ | 13. $t^2 + 17t + 70$      |
| 4. $y^2 - 19y + 90$ | 14. $t^2 + 17t + 52$      |
| 5. $x^2 - 21x + 90$ | 15. $t^2 - 29tb + 120b^2$ |
| 6. $n^2 + 33n + 90$ | 16. $t^2 - 23tb + 120b^2$ |
| 7. $64 - 16m + m^2$ | 17. $a^2 - 22ab + 57b^2$  |
| 8. $72 - 18m + m^2$ | 18. $b^2 - 23bd + 76d^2$  |
| 9. $96 + 22y + y^2$ | 19. $y^2 - 22mn + 72n^2$  |
| 10. $t + 17t + 16$  | 20. $x^2 + 100x + 99$     |

III. Raadi qiimaha b ee ay saddextibixiyadani ku yeelan karaan isirro adigoo isku soo koobaya ururka abyoonayaasha.

Tilmaan :

$$x^2 + bx + 16$$

Furfuris :

Isirrada 16 waxay noqon karaan

$$16 \cdot 1, 2 \cdot 8, 4 \cdot 4, (-1) (-16), (-2) (-8), (4) (-4)$$

Markaa qiimaha b waa wadarta qindiyada oo ah:

$$1 + 16 = 17$$

$$2 + 8 = 10$$

$$4 + 4 = 8$$

$$(-1) + (-16) = -17$$

$$(-2) + (-8) = -10$$

$$(-4) + (-4) = -8$$

Markaa b waxay u taagnaan kartaa tirooyinka 17, 10, 8, -17, -10, -8 mid wal oo ka mid ah.

- |                     |                     |
|---------------------|---------------------|
| 1. $x + bx$         | 6. $x + bx - 18$    |
| 2. $y^2 + by + 24$  | 7. $y^2 + 2by - 28$ |
| 3. $m^2 + bm + 30$  | 8. $n^2 - bn - 44$  |
| 4. $n^2 + bn + 36$  | 9. $m^2 + bm - 54$  |
| 5. $x^2 + 2bx + 36$ | 10. $x^2 + bx - 16$ |

IV. Raadi abyoonaha t ee saddextibix kastaa uu ku yeelan karo isirro.

- |                   |                   |
|-------------------|-------------------|
| 1. $x^2 + 5x + t$ | 4. $y^2 + 8y + t$ |
| 2. $x^2 + 7x + t$ | 5. $m^2 - 5m + t$ |
| 3. $y^2 - 6y + t$ |                   |

V. Raadi isirrada tibixaalayaashan

- |                      |                        |
|----------------------|------------------------|
| 1. $x^2 + 4x - 252$  | 11. $t^2 - 6t - 16$    |
| 2. $y^2 + 6x - 27$   | 12. $y^2 - y - 30$     |
| 3. $x^2 - 8x - 20$   | 13. $x^2 + 9x - 36$    |
| 4. $m^2 - 5x - 50$   | 14. $a^2 + 18a - 40$   |
| 5. $n^2 - 12x - 66$  | 15. $-x^2 - xy + 6y^2$ |
| 6. $y^2 + 7x - 18$   | 16. $a^2 - 5a - 36$    |
| 7. $x^2 + 2x - 120$  | 17. $x^2 - 7x + 838$   |
| 8. $t^2 + 3t - 270$  | 18. $y^2 + 100 - 101$  |
| 9. $d^2 - 14d - 224$ | 19. $x^2 + 4x - 45$    |
| 10. $y^2 - 11y - 12$ | 20. $x^2 - 15x - 54$   |

## C U T U B XI ,

### FUDUDAYNTA JAJABYADA ALJABRA

Waad ogtahay in haddii tiro-madoorshaha iskudhufashada lagu dhufto tiro aanay tiradu is beddelayn matalan:

$$\begin{aligned} 5 \times 1 &= 5 \\ m \cdot 1 &= m \\ \frac{2}{3} \cdot 1 &= \frac{2}{3} \end{aligned}$$

Waxaa kale oo aad taqaan in laba tiro oo isku mid ah haddii la isu qaybsho ay qaybtu tahay 1.

$$\begin{aligned} \frac{6}{6} &= 1 \\ \frac{-4}{-4} &= 1 \\ \frac{a}{a} &= 1, \quad a \neq 0 \\ \frac{\frac{4}{5}}{\frac{4}{5}} &= 1 \end{aligned}$$

Iyana waxaa kale oo jirta, in haddii 1 loo qaybsho tiro, aanay tiradu isbeddelaynin sida :

$$\begin{aligned} \frac{6}{1} &= 6 \\ \frac{b}{1} &= b \\ 4 \div \frac{3}{3} &= 4 \end{aligned}$$

$$a \div \frac{n}{n} = a \left\{ \frac{3}{3} \text{ iyo } \frac{n}{n} \text{ waa } 1 \right\}$$

### H a d d a b a

$$\frac{2}{5} \cdot \frac{6}{6} = \frac{2 \cdot 6}{5 \cdot 6} = \frac{12}{30}; \text{ laakiin } \frac{6}{6} = 1$$

$$\frac{2}{5} \cdot \frac{6}{6} \text{ na waa } \frac{2}{5} \text{ markaa waxa cad in}$$

$$\frac{2}{5} = \frac{12}{30} \text{ Waxaana la yiraahdaa laba jajab oo isudhigma}$$

sida :

$$\frac{1}{2}, \frac{5}{10}, \frac{10}{20}, \text{ iyo } \frac{9}{18} \text{ iwm}$$

Kulligoodna way isudhigmaan. Sidaana waxaad ku ogaanaysaa marka sarreeyaha iyo hooseeyaha aad u qaybiso isir isku mid ah.

### T u s a a l e :

$$\frac{1}{3} = \frac{2}{6} = \frac{10}{30} = \frac{8}{24}$$

Waayo

$$\begin{aligned} \frac{2}{6} &= \frac{2 \div 2}{6 \div 2} = \frac{1}{3} \\ \frac{10}{30} &= \frac{10 \div 10}{30 \div 10} = \frac{1}{3} \end{aligned}$$

$$\frac{8}{30} = \frac{8 \div 8}{24 \div 8} = \frac{1}{3}$$

Sidaas oo kale :-

$$\frac{2x}{y} = \frac{4x}{2y} = \frac{4x^2}{2yx}$$

Waayo

$$\frac{4x}{2y} = \frac{4x \div 2}{2y \div 2} = \frac{2x}{y}$$

$$\frac{4x^2}{2xy} = \frac{4x^2 \div 2x}{2yx \div 2x} = \frac{2x}{y}$$

ama

$$\frac{4x^2}{2yx} = \frac{\cancel{4x^2}^{2x}}{\cancel{2yx}^y} = \frac{2x}{y}$$

Marka ayntu isir isku mid ah u qaybino sarreeyaha iyo hooseeyaha, waxa la yidhaahdaa «jajabkiibaa laysu jarjaray». Ama «la soo gaabiyay» matalan :

$$\frac{4m^2 n}{2 m n} = \frac{\cancel{4}^{2} \cancel{m^2}^1}{\cancel{2}^1 \cancel{m}^1 \cancel{n}^1} = 2m$$

**Q e e x i d**

Haddii sarreeyaha iyo hooseeyaha jajabka lagu dhuf-to ama loo qaybiyo tiro eber ka duwan waxaa kuu soo baxayaa jajab kii hore leeg.

$$\frac{a \cdot c}{b \cdot c} = \frac{a}{b} \text{ Haddii } C \neq 0$$

Si uu micno u sameeyo jajabku waa in aanu hooseeyuhu noqonin eber. Hoos waxa ku cad qiimaha doorsoomaha ee aan la oggolayn, waayo waa qiimaha hooseeyaha eber ka dhi-gaya.

Jajabka	$\frac{2}{x}$	$\frac{1}{n-2}$	$\frac{2n+b}{n+4}$	$\frac{3h-2}{2h+2}$	$\frac{4a+2}{5}$
Qiimaha aan la oggolayn	0	2	-4	-1	Ma leh

**L a y l i :**

So saar qiimayaasha doorsoomayaasha ee aan la oggolayn.

1)  $\frac{b}{b-1}$

2)  $\frac{t}{4t-8}$

3)  $\frac{x}{5-x}$

4)  $\frac{4k+8}{k^2+9}$

5)  $\frac{2x+1}{x^2-4}$

6)  $\frac{b-3}{b^2-9}$

7)  $\frac{1}{m(m+2)}$

8)  $\frac{k-4}{33k-11}$

9)  $\frac{1}{b^2+8b+n}$

10)  $\frac{1}{s(s-t)}$



### Soo gaabinta ama soo yaraynta Jajabka

Jajabku marka uu gaaban yahay waa marka sareeyaha iyo hooseeyaha jajabku aanay isir wadaagin (1 iyo -1 mooyaane). Soo gaabinta jajabkuna waa marka hooseeyaha iyo sarreeyaha loo qaybiyo isir weynaha ay labadu wadaagaan.

Matalan :

$$\frac{16}{40} = \frac{2 \cdot 8}{5 \cdot 8} = \frac{2}{5}$$

$$\frac{35x}{7x^2} = \frac{5 \cdot 7x}{x \cdot 7x} = \frac{5}{x}$$

### Tusaale 1 :

Soo gaabi

$$\frac{4k + 12}{k^2 - k - 12}$$

### Furfurid :

Isir raadinta sarreeyaha iyo hooseeyaha

$$\frac{4k + 12}{k^2 - k - 12} = \frac{4(k + 3)}{(k - 4)(k + 3)}$$

U qaybinta sarreeyaha iyo hooseeyaha I.W.W.;  $k + 3$

$$= \frac{4(k + 3) \div (k + 3)}{(k - 4)(k + 3) \div (k + 3)}$$

### Fududayn :

$$\frac{4}{k - 4} \text{ Haddii } k \neq 4$$

Xusuusnow haddii  $k = 4$  inaan jajabku macna samaynayn.

### Tusaale 2 :

Soo gaabi

$$\frac{4 - m}{m^2 - 16}$$

### Furfurid :

Si aad u hesho isir weynaha ay wadaagaan, waa in aad sarreeyaha ka dhigtaa taran isirka - 1 leh

$$\frac{4 - m}{m - 16} = \frac{4 - m}{(m + 4)(m - 4)}$$

$$= \frac{-(m - 4)}{(m + 4)(m - 4)}$$

$$= \frac{-1}{m + 4}$$

Jajabkan waxaa kale oo loo qori karaa :

$$= \frac{1}{m + 4}$$

Waayo :

$$\frac{-1}{m + 4} = (-1) \frac{1}{m + 4} = - \frac{1}{m + 4}$$

Jajabka waxa la soo gaabin karaa marka hooseeyaha iyo sarreeyuhu ay isir wadaagaan oo keliya.

Isu eeg labada jajib ee hoos ku qoran:

$\frac{2 \cdot 5}{2} = \frac{5}{1}$	$\frac{2 + 5}{2}$
$\frac{xy}{x} = \frac{y}{1}, \text{ Haddii } x \neq 0$	$\frac{x + y}{x}, \text{ Haddii } x \neq 0$
<p>x iyo y waa labada isir ee sarreeyaha. Markaa waa la soo gaabin karaa jajibka, waayo x waa isirka sarreeyaha iyo hooseeyuhu wadaagaan.</p>	<p>x iyo y ma aha isirrada sarreeyaha. Markaa jajibka lama soo gaabin karo waayo sarreeyaha iyo hooseeyuhu ma wadaagaan isir aan 1 iyo -1 ahayn.</p>

Layli :

Soo gaabi jajibyan adoo mid walba sheegaaya qiimaha doorsoomaha ee aan la oggolayn.

- |  |  |
|--|--|
| 1) $\frac{10k}{5k}$                    | 6) $\frac{m^2 - 2m - 8}{m^2 - m - 6}$  |
| 2) $\frac{4wt^2}{2wt}$                 | 7) $\frac{a^2 + 5a - 6}{a^2 - 2a + 1}$ |
| 3) $\frac{b + 4}{b^2 - 16}$            | 8) $\frac{r^2 - 4r + 4}{4 - r^2}$      |
| 4) $\frac{k^2 + 4k + 4}{k^2 + 2k + 1}$ | 9) $\frac{3w^2 - 27}{24 - 11 + w^2}$   |
| 5) $\frac{r^2 - 3r}{r^2 - 4r + 3}$     | 10) $\frac{(t + 1)^2}{4t^2 + 8t + 4}$  |

### Isku dhufashada iyo isuqaybinta jajabyada

- Marka laba jajib la isku dhufto tarantu waa jajib sarreeyihiisu ka koobmo taranta labada sarreeye ee labada jajib, hooseeyihiisua ka kooban yahay taranta labada hooseeye.

$$\frac{x}{y} \cdot \frac{b}{d} = \frac{xb}{yd}$$

- Marka laba jajib la isu qaybiyo, qaybtu waxay noqonaysaa jajibka la qaybshaha ah oo lagu dhufatay rogaalka jajibka qaybshaha.

$$\frac{x}{y} \div \frac{b}{d} = \frac{xd}{yb}$$

Tusaale 1 :

Soo gaabi

$$\frac{x + 2}{x} \cdot \frac{x - 3}{x - 1}$$

Furfurid :

$$\begin{aligned} \frac{x + 2}{x} \cdot \frac{x - 3}{x - 1} &= \frac{(x + 2)(x - 3)}{x(x - 1)} \\ &= \frac{x^2 - x - 6}{x^2 - x} \end{aligned}$$

**Tusaale 2 :**

Isku dhufo :-

$$\frac{m+2}{m-1} \cdot \frac{m}{m+2}$$

**Furfurid :**

$$\begin{aligned} & \frac{m+2}{m-1} \cdot \frac{m}{m+2} \\ &= \frac{(m+2)(m)}{(m-1)(m+2)} \\ &= \frac{m}{m-1} \end{aligned}$$

Waa in jjabka la sii qaybiyaa haddii sarreeyaha iyo hoo-seeyuhu ay isirro wadaagaan.

$$= \frac{m}{m-1}$$

(Labada m la isuma jari karo, waayo?)

**Tusaale 3 :**

Soo gaabi

$$\frac{2x-1}{x+3} \div \frac{2x-1}{x^2+7x+12}$$

**Furfurid :-**

Isireyn :-

$$\begin{aligned} & \frac{2x-1}{x+3} \div \frac{2x-1}{x^2+7x+12} \\ &= \frac{2x-1}{x+3} \cdot \frac{x^2+7x+12}{2x-1} \end{aligned}$$

$$\text{Isu jarjarka Isirrada} = \frac{x+4}{1} = x+4$$

**I ayli :**

Raadi taranta iyo qaybaha jajabyada adigoo isu jarjaraya isirrada isku midka ah.

$$1) \frac{4b}{3a} \cdot \frac{6a}{b}$$

$$2) \frac{5wh^2}{4-t} \cdot \frac{16t^2}{10wh}$$

$$3) \frac{4d-2a}{d+a} \cdot \frac{2d+2a}{4(2d-a)}$$

$$4) \frac{9-x}{4} \cdot \frac{2y}{3+x}$$

$$5) \frac{k^2+5k+4}{k^2+4} \cdot \frac{k+5}{k^2+6k+5}$$

$$6) \frac{3y}{4c^2} \div \frac{15y^2}{16c^2}$$

$$7) \frac{m^2+2mn+n^2}{mn} \div (2m+n)$$

$$8) \frac{w}{w^2-2w+1} \div \frac{2w}{w-1}$$

$$9) \frac{a+2a^2}{9-a^2} \div \frac{1-4a^2}{3a+a^2}$$

$$10) \frac{3f^2+7f+2}{1-9f^2} \div \frac{3f^2-7f+2}{4-f^2}$$

## Isugeynta iyo kala goynta jajabyada

Eeg wadartan

$$\frac{m}{t} + \frac{n}{t}$$

mar haddii

$$\frac{m}{t} = \frac{m \cdot 1}{t \cdot 1} \text{ oo } \frac{n}{t} = \frac{n \cdot 1}{t \cdot 1}$$

waxaa dhab ah in

$$\frac{m}{t} + \frac{n}{t} = \frac{m}{t} + \frac{n}{t}$$

Xeerka kala dhigga

$$= (m + n) \frac{1}{t}$$

$$= \frac{(m + n) 1}{t}$$

$$= \frac{M + n}{t}$$

**Qeexid :**

Wadarta laba jajab oo labadooda hooseeye isku mid yihiin waa wadarta labada sarreeye oo loo qaybshay hooseeyaha ay wadaagaan,

$$\frac{a}{b} + \frac{c}{b} = \frac{a + c}{b}$$

Haddiise aanay hooseeye wadaagin sida  $\frac{5}{21}$  iyo  $\frac{3}{14}$  waa

inaynu labada hooseeye isku mid ka dhignaa. Haddaba waxaynu u baahan nahay dufsanaha ay wadaagaan.

Dhufsanayaasha : Kuwa 21 waa 21, 42, 63, 84, ...

Kuwa 14 waa 14, 28, 42, 56, 70, 84, ...

Halkan waxa ka muuqata in 42 iyo 84 ay yihiin laba dhufsane oo 14 iyo 21 ay wadaagaan. Inagu waxaynu qaadanaynaa labada ka yar, 42, oo ah Dhufsane yaraha ay wadaagaan dh.y.w.

Haddaba

$$\frac{5}{21} = \frac{5 \cdot 2}{21 \cdot 2} = \frac{10}{42}$$

$$\frac{3}{14} = \frac{3 \cdot 3}{14 \cdot 3} = \frac{9}{42}$$

Adigoo tixraacaya xeerka aynu kor ku sheegnay :

$$\frac{10}{42} + \frac{9}{42} = \frac{10 + 9}{42} = \frac{19}{42}$$

ama

$$\frac{5}{12} + \frac{3}{14} = \frac{10 + 9}{42}$$

Sidaas oo kale ayeynu jajabyada aljebradana isugu geynaynaa, ama u kala goyneynaa.

Matalan :-

$$\frac{x + 1}{x^2 - 2x - 3} - \frac{1}{x^2 + x} - \frac{3}{x^2 - 3x}$$

**Furfurid :**

1) Soo saaridda dhufsanayaasha ay wadaagaan

Raadinta isirrada  
hooseeyayaasha

$$x^2 - 2x - 3 = (x - 3)(x + 1)$$

$$x^2 + x = x(x + 1)$$

$$x^2 - 3x = x(x - 3)$$

Isir kasta qaado inta ugu badan ee uu ka muuqdo hoosee-  
yayaasha isiraysan

$$(x - 3) (x + 1) (x)$$

2) Qor jajabyadii oo hooseyeyaashoodu isiraysan yihiin

$$= \frac{x + 1}{(x - 3) (x + 1)} - \frac{1}{x(x + 1)} - \frac{3}{x(x - 3)}$$

3) Jajab kasta ku beddel jajab la gudboon

$$= \frac{(x+1) (x)}{x (x-3) (x+1)} - \frac{1 \cdot (x-3)}{x (x+1) (x-3)} - \frac{3 \cdot (x+1)}{x (x-3) (x+1)}$$

4) Isugee jajabyada oo fudfudee

$$= \frac{x (x + 1) - 1 (x - 3) - 3 (x + 1)}{x (x + 1) (x - 3)}$$

$$= \frac{x^2 + x - x + 3 - 3x - 3}{x (x + 1) (x - 3)}$$

$$= \frac{x^2 - 3x}{x (x + 1) (x - 3)}$$

$$= \frac{x (x - 3)}{x (x + 1) (x - 3)}$$

$$= \frac{x (x - 3)}{x (x + 1) (x - 3)}$$

$$= \frac{1}{x + 1} \text{ Jawaab}$$

**Layli :**

Raadi dhufsane u yaraha ay wadaagaan

1. 6, 3
2. 5, 10
3. 3, a
4.  $x^2y^2, xy$

5.  $ab, b, ac$
6.  $k^2 - m^2, k + m$
7.  $m + 4, m + 3$
8.  $a^2 - 2ab + b^2, a - b$
9.  $w^2 + 2w + 1, w + 1$
10.  $n^2 - 4, n + 2, n - 2$

Jajab keliya iskaga dhig dabadeedna fududee

$$11. \frac{1}{3} + \frac{1}{4}$$

$$12. \frac{1}{5a} - \frac{2}{a^2}$$

$$13. \frac{2x}{x + 2} - \frac{3}{x + 2}$$

$$14. \frac{3}{rs} - \frac{2 - t}{rt}$$

$$15. \frac{1}{b} + \frac{b}{x} - \frac{1}{b^2}$$

$$16. \frac{1}{6} + \frac{3x - 1}{4} - \frac{x + 2}{2}$$

$$17. \frac{3r}{2r + 6} - \frac{r - 1}{r + 3}$$

$$18. \frac{y}{y^2 - 25} - \frac{1}{2y + 10}$$



$$19. \frac{a + 2}{a^2 + 4a + 4} + \frac{a}{a^2 - 4}$$

$$20. \frac{b + 1}{(b - 1)^2} - \frac{b}{b^2 - 1} + \frac{1}{b - 1}$$

## C U T U B VII

### SAAMI IYO SAAMIGAL

#### S a a m i

Badanaa waxa dhacda in loo baahdo in laysu qiyaaso laba wax ama laba tiro. Ka soo qaad inaynu damacnay inaynu isu qiyaasno lacagta Cali haysto iyo tuu Maxamed haysto. Ka dhig inuu Cali haysto 24 shilin, Maxamadna uu haysto 12 shilin. Markaad isu eegto labada lacagood, waxaad arkaysaa inuu Cali dheer yahay Maxamed 12 shilin. Waad aragtaa in toban iyo labada shilin lagu helay iyadoo 24 laga gooyey ( $24 - 12 = 12$ ). Taasu waxay ku tusaysaa inta labada lacagood isdheer yihiin. Ha yeeshee waxa suurtoowda inaynu doonayno in la ogaado lacagta Cali inta jeer ee ay ka badan tahay ta Maxamed. Haddii lacagta Cali loo qaybiyo ta Maxamed, waxaad helaysaa inta jeer ee lacagta hore ay ka badan tahay ta dambe.

Haddaba,  $24 \div 12 = 2$  waxa weeye inta jeer ee lacagta Cali ay ku laabanto ta Maxamed.

Hadalkaa kor ku yaal waxu kuu sheegayaa inay jirto laba siyood oo laba wax laysugu qiyaasi karo. Midi waxay ku tusaysaa inta labada wax ay isdheer yihiin; midina waxay kuu sheegaysaa inta jeer ee labada wax kala weyn yihiin. Marka laba wax laysu qiyaasayo, haddaba, waxa jira laba siyood.

1. Tirada yar haddii laga gooyo tirada weyn, waxaynu heleynaa inta labada tiro ay is dheer yihiin.
2. Tirada weyn haddii loo qaybiyo tirada yar waxaynu heleynaa inta jeer ee tirada weyni ay ka weyn tahay tirada yar.

In kastoo ay jiraan labadaa siyood ee laba wax laysugu qiyaasaa, haddana ta dambe ayaa aad u muhiim ah; iyadaana aad loo isticmaalaa. Waad aragtaa in habkaa labaad uu yahay tiro

loo qaybiyey tiro kale. Halkii laga oran lahaa tiraa loo qaybiyey tiro kale, waxaa la yiraahdaa waxaa la soo saaray **Saamiga** labada tiro. Tusaaladeena hore haddaad ku noqotid, waxaynu oranaynaa «**Saamiga 24 ka 12**». Saamiga waxa lagu muujiyaa laba dhibcood (:) sida  $24 : 12$ , waxaana loo akhriyaa «**24 ka 12**».

Waa taynu niri Saami waa laba tiro oo laysu qaybiyey. Kolkaa,  $24 : 12$  waxay tahay  $24 \div 12$ .

Ha yeeshe,  $24 \div 12$  waxay la mid tahay  $\frac{24}{12}$ , iyadoo jajab ahaan loo qoray.

$$\underbrace{24}_{\text{Saami}} : \underbrace{12}_{\text{Qayb}} = \underbrace{24 \div 12}_{\text{Jajab}} = \frac{24}{12}$$

Jajabka u danbeeya markaad isku jarjarto waxaad heleysaa :

$$\frac{24}{12} = \frac{2}{1} = 2$$

Taasu waxay ku tusaysaa inta jeer ay tirada weyni ka roon tahay ama ku laabanto tirada yar.

Runtii waad aragtaa in  $\frac{24}{12} = 2$ . Si loo adkeeyo in mee-

sha qaybi soo gashay, go'aanka u dambeeya waxa loo qoraa jajab ahaan sida  $2 = \frac{2}{1}$ .

$$\text{Kolkaa, } 24 : 12 = \frac{24}{12} = \frac{2}{1} \text{ ama } 24 : 12 = 2 : 1.$$

Waxaynu markaa oranaynaa  $24 : 12$  waa  $2 : 1$ .

$$\text{Sidoo kale } 21 : 14 = \frac{21}{14} = \frac{3}{2} \text{ ama } 21 : 14 = 3 : 2.$$

## Saamiga waxyaabo isku jaad ah

Waa taynu aragnay **Saami** wuxuu yahay. Laba tiro saamigooda waynu naqaanaa wuxuu yahay. Hadda waxaynu ee- gi doonaa saamiga laba wax oo isku jaad ah.

Waxyaabo isku jaad ah waxa ka mid ah 15 sentimitir iyo 7 sentimitir. 19 sentimitir iyo 5 mitir iyana waa isku jaad. Sidoo kale, 30 rodol iyo 15 wiqiyadood waa isku jaad. Waxa kaloo isku jaad ah 3 saacadood iyo 4 mirir. Waa taynu aragnay in laba tiro laysu qiyaasi karo. Sida badanaa laysugu qiyaasaa- na waxa weeye saamiga labada tiro oo la soo saaro. Haddii laba wax ay isku jaad yihiin, iyana waa laysu qiyaasi karaa. Marka laba wax oo isku jaad ah laysu qiyaasayo ugu horaynta waxa loo baahan yahay in labada wax cabbiraadoodu ay ahaato wax isku jaad ah. Masalan, waxa loo baahan yahay in labada waxba cabbiraadoodu ay ahaato sentimitir ama hiish ama mitir iwm.

Waxa halka looga jeedaa inaan labada wax midna, masala- lan, lagu cabbirin mitir midna hiish. Haddii caynkaa la samee- yo waa in ugu dambaynta cabbiraadda labada wax loo roгаа qiyaas isku jaad ah.

Haddaba, haddii aynu damacnay in laba wax oo isku jaad ah laysu qiyaaso, sida laysugu qiyaasayaa waxay la mid tahay tii tirooyinkii kale. Ka dhig in aynu ogaanay in xariiq dherer- keedu yahay 49 sm, mid kalena dherekeedu yahay 21 sm.

$$\text{Kolka, } 49 : 21 = \frac{49}{21} = \frac{7}{3} = 7 : 3.$$

Markaa xariiqda dheer iyo ta gaaban dhererradooda saamigoodu waa  $49 : 21 = 7 : 3$ .

$$\text{Sidoo kale, } 14 \text{ kg.} : 4 \text{ kg.} = \frac{14}{4} = \frac{7}{2} = 7 : 2.$$

Labadaa tusaale, waxay ahaayeen qaar qiyaastoodu ay isku jaad tahay. Ka dhig imminka inaynu damacnay inaynu isu qiyaasno 12 wiqiyadood iyo 3 rodol. Inkasta oo aynu haysano

laba wax oo isku jaad ah, haddana midna waxa lagu cabbiray wiiqiyado midna rodaal. Kolka, waxa loo baahan yahay in laba-daba loo bedelo wiiqiyado ama rodaal, sida 3 rodol =  $3 \times 16$  wiiqiyadood.

Kolka 12 wiiqiyadood: 3 rodol = 12 wiiqiyadood:  $3 \times 16$  wiiqiyadood =  $\frac{12}{16 \times 3} = \frac{1}{4} = 1 : 4$ .

Haddaynu u rogi lahayn rodaalna, waxaynu ogaan lahayn in 12 wiiqiyadood =  $\frac{12}{16} = \frac{3}{4}$  rodol.

$\therefore$  12 wiiqiyadood: 3 rodol =  $\frac{3 \times 1}{4 \times 3} = \frac{1}{4} = 1 : 4$

Tusaale labaad ahaan waxaad ka dhigtaa in la damcay in laysu qiyaaso 4 miridh iyo saacad. Waad ogtahay in

$\therefore$  4 miridh : 1 saacad =  $\frac{4}{60}$  saacadood : 1 saacad

$\therefore$  4 miridh : 1 saacad =  $\frac{4}{60}$  saacadood: 1 saacad

$$= \frac{4 \times 1}{60} = \frac{1}{15} = 1 : 15$$

Tusaalooyinkaasi waxay ku tusayaan sida laba wax oo isku jaad ah saamigooda loo raadiyo. Waad aragtaa in haddii labada wax cabiraadoodu ay kala jaad tahay in loo baahan yahay in laysugu rogo xaddi isku jaad ah. Waxa kaloo kaaga muuqanaya tusaalooyinka, in jawaabta u dambaysaa ay tahay tiro khalli ah oo anay lahayn cabbiraad.

### Astaamaha Saamiga.

Ilaa iyo hadda waxaynu soo saareyneey laba tiro saamigooda. Waa taynu aragnayna in saamigu yahay laba tiro oo laysu qaybiyey. Mar haddii qaybis yahay jajab oo saamina yahay

qayb, waxaynu filaynaa in waxyaabo u gaar ah jajabka uu saamiguna u hogaansan yahay.

Ugu horayntii, waxaad taqaan in haddii tiro lagu dhufto hooseeyaha iyo sareeyaha jajab, aanu jajabku is bedelayn sida:

$$\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8} = \frac{3}{4}$$

Ta labaad, waxaad og tahay in wax loo qaybin karo tiro aan ahayn eber. Kolka hooseeyaha iyo sareeyaha jajab waa loo

qaybin karaa tiro ka duwan eber, sida  $\frac{3}{5} = \frac{3}{4}$

Saamigu, haddaba, waxuu leeyahay astaamahan:

1. Saami waxuu noqon karaa laba tiroo kasta maa daama aanu ka danbe ahayn eber.
2. Saami isma bedelo haddii tiro, eber ka geddisan, lagu dhufto saamiga. Tan macnaheedu waxay tahay, haddii aad haysato  $a : b$ , kolka  $ca : cb = a : b$ ,  $c \neq 0$ .

Arintaa kor ku qoran hawl yaraan ayaa lagu hubin karaa, haddii aad xusuusnaato in

$$ca : cb = \frac{ca}{cb} = \frac{a}{b} = a : b.$$

Kolka,  $ca : cb = a : b$

Markaad u sii fiirsatid hadalkeena, waxaad oran kartaa; haddii saami uu leeyahay isir ay wadaagaan labada tiro ee saamiga, isirka waa laga isirayn karaa saamiga sida:

$$6 : 8 = 3 : 4$$

3. Saami isma beddelo haddii tiro eber ka geddisan loo qaybiyo; ujeddadu waxay tahay:

$$\frac{a}{c} : \frac{b}{c} = a : b; \quad c \neq 0$$

Hubinta tanuna waa hawl yar tahay haddii aad ogsoonaato in

$$\frac{a}{c} : \frac{b}{c} = \frac{a}{c} = \frac{a}{c} \cdot \frac{c}{b} = \frac{a}{b}$$

Kolka,  $\frac{a}{c} : \frac{b}{c} = a : b$ , sida

$$\frac{5}{7} : \frac{3}{7} = 5 : 3$$

**Tusaale 1 :**

$$\text{Saamiga } \frac{3}{5} : \frac{4}{9} = \frac{3}{5} \times 45 : \frac{4}{9} \times 45 = 27 : 20$$

**Xasuus:** Saamiga waxaynu ku dhufanay  $5 \times 9 = 45$ .

**Tusaale 2 :**

$$\text{Saamiga } 20 : 15 = \frac{20}{5} : \frac{15}{5} = 4 : 3$$

**Xasuus:** Saamiga waxaynu u qaybinay 5 oo ah isir ay wadaagaan 20 iyo 15.

$$\text{Haddii aad sii fiirisid tusaalahan oo ah } 20 : 15 = \frac{20}{5} = \frac{4}{3}$$

waxaad oran kartaa:

$$\left. \begin{array}{l} \text{ku jiraha hore ee saamiga} \\ \text{oo loo qaybshey} \\ \text{ku jiraha labaad ee saamiga} \end{array} \right\} = \frac{20}{15} = \frac{4}{3} \text{ (qiimaha saamiga)}$$

$$\text{Arrinta ah } \frac{20}{15} = \frac{3}{4} \text{ waxaynu oran karnaa 20 waa la qayb-}$$

she, 15 waa qaybshe,  $\frac{4}{3}$  na waa qayb.

Mar haddii taranta qaybta iyo qaybshuhu ay tahay la qaybshaha,

$$\begin{array}{ccc} \frac{4}{3} & \times & 15 = 20 \\ \downarrow & & \downarrow \\ \text{qiimaha} & & \text{ku jiraha la-} \\ \text{saamiga} & & \text{baad ee saamiga} \end{array} \quad \begin{array}{c} \downarrow \\ \text{ku jiraha ho-} \\ \text{re ee saamiga} \end{array}$$

Waxaynu marka heleynaa:

4. Haddii saami lagu dhufto tirada labaad ee saamiga, waxaad heleysaa tirada hore ee saamiga, sida :

$$\text{a) } 2 : 7 = \frac{2}{7}, \text{ Kolka } \frac{2}{7} \times 7 = 2$$

$$\text{b) } 3 : 8 = \frac{3}{8}, \text{ kolka } \frac{3}{8} \times 8 = 3$$







riiqda  $\times \frac{2}{3}$  keed.

Kolka 30 lagu qaybiyey saami ah 1 : 2 waa

$$\frac{1}{3} \times 30 = 10 \text{ iyo } \frac{2}{3} \times 30 = 20$$

U fiirso  $10 + 20 = 30$

### Tusaale 3:

180 kg. Waxaad ku qaybisaa 5 : 7 : 8

### Furfurid :

Waxoo dhan ka dhig  $5 + 7 + 8 = 20$

$$\text{Kolka, } \frac{5}{20} \times 180 = 45 \text{ kg., } \frac{7}{20} \times 180 = 63 \text{ kg}$$

$$\frac{8}{20} \times 180 = 72 \text{ kg.}$$

U fiirso :  $45 + 63 + 72 = 180$ .

Marka tirooyinka laysu geeyo waa inaad heshaa intaad haysatay bilowgii.

### Layli :

1. 400 shilin waxaad ku qaybisaa saami ah 3 : 5
2. 80 rodol waxaad ku qaybisaa saami ah 5 : 1
3. Xariiq dhererkeedu yahay 172 sm waxaad ku qaybisaa saami ah 3 : 7
4. Haddii saddexagal xaglihiisa lagu qaybiyey saami ah 5 : 7 : 8, raadi xaglaha saddexagal

5. Inan iyo aabbihii ayaa da'doodu tahay saami ah 2 : 7. Haddii inanku yahay 14 jir, waa intee da'da aabbihii?
6. Dhaxal 4207/— ayaa Faadumo, Cabdi iyo Cumar loogu qaybiyey saami ah 5 : 6 : 3. Qof waliba intuu helay?
7. Haddii  $3a : b = 2 : 1$  waa intee  $a : b$ ?
8. Haddii  $a : b = 3 : 4$  oo  $b = 2$ , waa intee  $a$ ?
9. 56 waxaad ku qaybisaa saami ah 1 : 2 : 3
10. 128 waxaad ku qaybisaa saami ah 5 : 3
11. 210 waxaad ku qaybisaa saami ah 2 : 9 : 3
12. 3360 shilin waxaad ku qaybisaa 5 : 7
13. Haddii  $a : b = 3 : 5$  waa intee  $a^2 : b^2$ ?
14. Haddii  $2 : b = 4 : 5$ , soo saar  $b$ , dabadeedna raadi  $a : 2$ .

### Saamigal

Waa taynu aragnay saami wuxuu yahay. Waa taynu kaloo aragnay, haddii labada tibixood ee saami tiro lagu dhufto, inaanu saamigu is bedelayn. Runtii sidaa baa lagu ogaan karaa markaa qaarkood laba saami ka weyn. Haddii aynu damacno inaynu ogaano ka weyn 3 : 5 iyo 4 : 7, saamiyada ayaa loo qoraa jabjab ahaan. sida:

$$3 : 5 = \frac{3}{5}, \quad 4 : 7 = \frac{4}{7}$$

$$\text{Ha yeeshee } \frac{3}{5} = \frac{21}{35}, \quad \frac{4}{7} = \frac{20}{35} \quad (\text{ogeysiis } 5 \times 7, \text{ ayaa}$$

lagu dhuftay)

$$\text{Mar haddii } \frac{20}{35} < \frac{21}{35}$$

$$\frac{4}{7} < \frac{3}{5}$$

Sidaa daraadeed  $4 : 7 < 3 : 5$

Tusaalahanu wuxuu kuu sheegayaa sida loo hubiyo laba saami ka weyn. Waxa dhacda mararka qaarkood in laba saami is le'ekaadaan. Ka soo qaad in sawir aqal qiyaastiisu ay tahay  $1 : 100$ . Daaqad ayaa marka sawirka laga cabbiray noqotay  $0.7$  hiish. Run ahaantii daaqaddu waa  $70$  hiish. Sawirka ayaa iyana laga helay inuu qol la seexdo qiyaastiisu tahay  $1.8$  hiish. Runtii qolku waa  $180$  hiish.

Haddii immika aad fiirisid cabbirka daaqadda ee sawirka iyo teeda runta ah, saamigoodu waa

$$0.7 \text{ hiish} : 70 \text{ hiish} = \frac{0.7}{70} = \frac{1}{100}$$

Sidoo kale qiyaasta qolkuna waa

$$1.8 \text{ hiish} : 180 \text{ hiish} = \frac{1.8}{180} = \frac{1}{100}$$

Kolaa,  $0.7 \text{ hiish} : 70 \text{ hiish} = 1.8 \text{ hiish} : 180 \text{ hiish}$ .  
Labada saami waa is le'eg yihiin.

Saamiyada caynkaas ah waxa la yidhaahaa saamigal.

**Saamigalku waa saamiyo is le'eg sida.**

$$2 : 5 = 10 : 25 \text{ iyo } 8 : 7 = 72 : 63$$

Ha yeeshee  $4 : 7 = 3 : 5$  ma aha saamigal waayo saamiya daasi isma le'eka. Sidaynu hore u soo aragnay  $4 : 7 < 3 : 5$ .

Guud ahaan, haddii  $\frac{a}{b} = \frac{m}{n}$ , kolkaa  $a, b, m, n$ , waxa la yi-

dhaahaa waa isu saamigal, weliba  $n$  waxa la yiraahaa saamiga

afaraad. Kolka aad haysatid  $\frac{a}{b} = \frac{m}{n}$ ,  $a$  iyo  $n$  waxa laysku yi-

raahaa cirifyada,  $b$  iyo  $n$  waxa laysku yiraahaa tirosinnada saamigalka.

$$\frac{a}{b} = \frac{m}{n} \text{ waxay ka dhigan tahay } a : b = m : n$$

Waxana loo akhriyaa  $a$  ka  $b$  waa sida  $m$  ka  $n$ . saamigalka waxa ka mid ah

$$5 : 2 = 15 : 6$$

$$4 \text{ hiish} : 3 \text{ hiish} = 28 \text{ hiish} : 21 \text{ hiish}$$

$$4 \text{ sm} : 3 \text{ sm} = 12 \text{ sm} : 9 \text{ sm}$$

$$4 \text{ kg} : 3 \text{ kg} = 20 \text{ kg} : 15 \text{ kg}$$

Haddii imminka aynu qaadano saamigal ah  $3 : 7 = 12 : 28$ ,

$$\text{waxaynu u qori karnaa } \frac{3}{7} = \frac{12}{28}$$

Kolka lagu dhufto  $7 \times 28$  labada saamiba, waxaynu heley-naa

$$\frac{3}{7} \times 7 \times 28 = \frac{12}{28} \times 7 \times 28$$

$$\text{ama } 3 \times 28 = 12 \times 7$$

Sidoo kale,  $2 : 5 = 14 : 35$  waa

$$\frac{2}{5} = \frac{14}{35}$$

$$\text{ama } 2 \times 35 = 14 \times 5$$

Taa macnaheedu waxa weeye, saamigal marka loo qoro jajab ahaan, haddii isweydaar laysugu dhufto sarreeyaasha iyo hooseyayaasha, labada taranood waa is le'eg yihiin. Tarantaa waxa la yiraahdaa **taran-isweydaar**.

$$\frac{3}{5} = \frac{18}{30}$$

Kolkaa,  $3 \times 30 = 18 \times 5 = 90$

Ama, taran-isweydaarkoodu = 90

Haddaba, haddii  $b \neq 0$ ,  $n \neq 0$ , oo  $\frac{a}{b} = \frac{m}{n}$

Kolka  $a.n = b.m$  (Taran-isweydaar).

Taran-isweydaar waa dariiq hawl yar oo lagu hubin karaa in laba saami ay yihiin saamigal.

**Tusaale :**

Hubi in  $\frac{7}{0.971} = \frac{5}{0.565}$  ay tahay saamigal.

Taran-isweydaarku waa,

$$\begin{aligned} 5 \times 0.971 &= 4.855 \\ 7 \times 0.565 &= 3.955 \end{aligned}$$

Labada taran-isweydaar waa kala jaad, kolkaa saamiyadu ma aha saamigal.

**Tusaale :**

Hubi in  $\frac{8}{15} = \frac{9}{16}$  ay tahay saamigal.

Taran-isweydaarku waa,

$$\begin{aligned} 8 \times 16 &= 128 \\ 9 \times 15 &= 135 \end{aligned}$$

Labada taran-isweydaar waa kala jaad, kolkaa saamiyadu ma aha saamigal.

Haddaba,  $\frac{a}{b} = \frac{m}{n}$  waxay ina siinaysaa  $an = bm$ , waxaa-

na laga heli karaa middii la doono mar haddii saddexda kale la garanayo, sida

$$3 : a = 1 : 4 \qquad \text{Ama} \quad \frac{3}{a} = \frac{1}{4}$$

Kolkaa  $3.4 = a.1$

$\therefore a = 12$

**Tusaale :**

Raadi b haddii  $b : 5 = 111 : 185$ .

Ugu horayntii saamiga  $111 : 185$  waa la fududayn karaa haddii loo qaybiyo 37 oo ah isirka ay wadaagaan.

Marka  $b : 4 = 3 : 5$

$$\therefore \frac{b}{4} = \frac{3}{5}$$

$\therefore 5 \times b = 3 \times 4$

$$b = \frac{3 \times 4}{5} = 2.4$$

### Tusaale :

2, 3, 6 saamigalka afraad soo saar, haddii saamigalka af-

raad uu yahay n. Kolka  $\frac{2}{3} = \frac{6}{n}$

$$2n = 3 \times 6, \quad n = \frac{3 \times 6}{2} = 9$$

### Layli :

Saamiyada 1 — 5, kuweebaa saamigal ah?

1.  $3 : 7 = 18 : 42$

2.  $\frac{6}{11} = \frac{7}{9}$

3.  $\frac{5}{21} = \frac{15}{63}$

4.  $\frac{3}{0.785} = \frac{5}{1.08}$

5.  $\frac{6}{0.235} = \frac{7}{0.345}$

6. 3, 5, 6, soo saar saamigalkooda afraad.

7. 2, 7, 10, » » » »

8. 3, 4, 5, » » » »

9. 5, 8, 9, » » » »

Soo saar K haddii,

10.  $K : 4 = 9 : 2$

11.  $6 : K = 22 : 37$

12.  $5 : 4 = K : 24$

13.  $9 : 8 = K : 16$

14.  $116 : K = 19 : 5$

15.  $230 : 322 = K : 12$

## C U T U B XIII

### Saddexagallo sar go'an

Hore waxaynu u aragnay waxyaabo u gaar ah saddexagal-lada. Waxyaabaha waxa ka mid ah in saddexagal kasta marka xaglihiisa cabbiraadooda laysu geeyo ay yihiin  $180^\circ$  Waxa iyana run ah in saddexagal walba xaglihiisa debeddu ay le'eg tahay labada xaglood ee gudaha ee ka soo horjeeda wadartooda. Waxaynu kaloo aragnay in badanaa laba saddexagal xaglahooda iyo dhinacyadoodu aanay is le'ekayn. Ha yeeshee, hadda waxaynu eegi doonaa saddexagallo xaglahooda iyo dhinacyadoodu ay is le'eg yihiin. Haddii laba saddexagal ay isku qaab yihiin (isu eg yihiin) oo ay isku jimidh yihiin waxa la yiraahdaa labada saddexagallo waa isku sar go'an yihiin. Saddexagallo isku sar go'ani, haddaba, waa saddexagallo haddii lays dul saaro isku sar jaran oo midna aanu ka kale ka weynaan karin.

### Isku beegnaan mid mid ah

Waad ogtahay marka laba kooxood ay kubbad cayaaraayan in koox waliba ka kooban tahay toban iyo kow qof oo qofba qof ku beegan yahay. Sidoo kale, haddaba, xisaabta haddii ku jirayaasha laba urur aanay kala badnayn oo mid mid ay isaga hor iman karaan, waxa la yiraahdaa ku jirayaasha labada urur mid mid bay isugu beegan yihiin. Labada urur waxa la oranayaa waxay leeyihiin ama ka dhexeeya isu beegnaan mid mid ah.

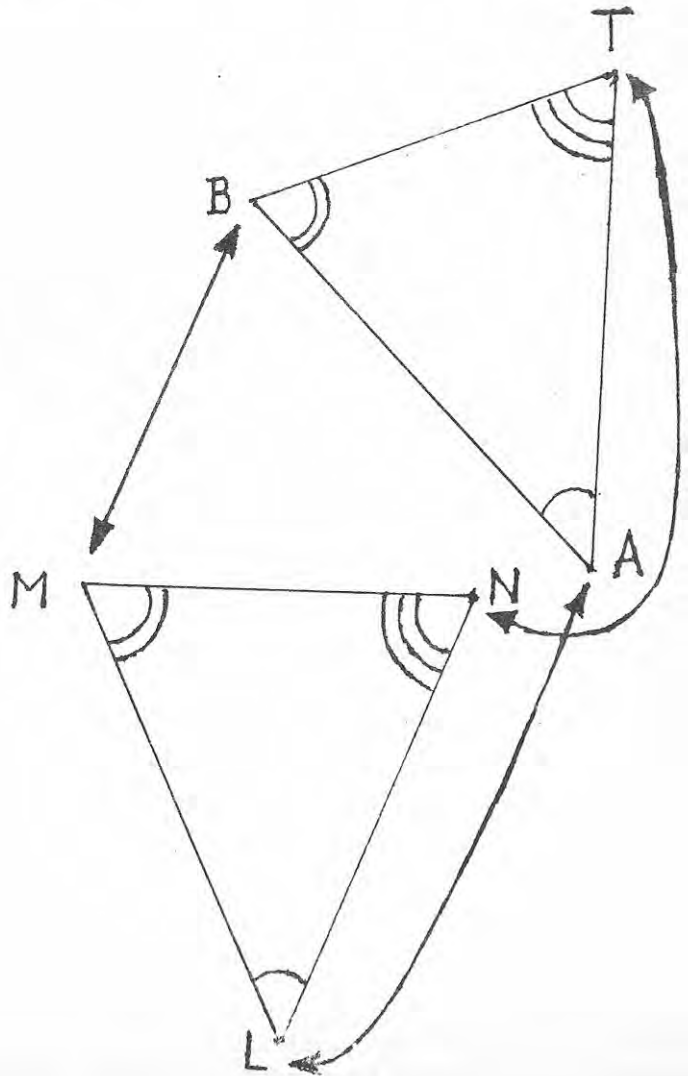
### Tusaale :

Haddii urur uu ka kooban yahay 1, 2, 3 mid kalana uu ka kooban yahay a, b, t, oo labada urur isugu hagaagaan sida  $1 \rightarrow a, 2 \rightarrow b, 3 \rightarrow t$ , waxaynu haysanaa isu beegnaan mid mid ah. Isu beegnaanta badanaa waxa lagu muujiyaa  $\rightarrow$ .

Hadda, aan ku noqdo saddexagallo isku sar go'an. Hore, waa taynu u niri laba saddexagal waxay isku sargo'an yihiin haddii lays dul saari karo iyagoo aan kala weynaanayn. Sidoo



kale, laba xaglood way isku sar go'an yihiin haddii cabbiraa-doodu is le'eg tahay; laba xariiqoodna way isku sargo'an yihiin haddii dhererkoodu is le'eg yahay. Waxaynu, haddaba, oran karaa laba saddexagal way isku sargo'an yihiin haddii xaglaha gudbooni ay isku sargo'an yihiin, oo dhinacyada gudboonina ay isku sargo'an yihiin. Astada sar go'u waxa weeye « $\equiv$ ». Marka aad fiirinayso saddexagallo isku sargo'an waa inaad hubisaa inaad qaadatay dhinacyo gudboon iyo xaglo gudboon. U fiirso jaantuskan.



Waxaynu oranaynaa  $\triangle ABT \equiv \triangle LMN$ .

Isku beegnaantuna waa  $\angle A \rightarrow \angle L$ ,  $\angle B \rightarrow \angle M$ ,  
 $\angle T \rightarrow \angle N$ .

AB  $\longrightarrow$  LM  
 BT  $\longrightarrow$  MN  
 AT  $\longrightarrow$  LN

Ilaa iyo hadda waxaynu ku dhex jirnay waxa looga jeedo saddexagallo isku sargo'an. Waxaynu niri saddexagallo sargo'ani waa qaar is dul fuuli kara iyagoo aan kala weynayn. Waad ogtahay inaanay hawl yarayn in mar walba lays dul saaro saddexagallada si lagu ogaado inay isku sargo'an yihiin iyo in kale.

Sidee haddaba lagu garan karaa inay laba saddexagal isku sargo'an yihiin iyo in kale. Intaynaan jawaab isku deyin, bal aan eegno arrimahan :

- 1) Adoo isticmaalaya mastarad iyo xagal beeg, waxaad samaysaa laba saddexagal oo dhinac yahay 6 sm, dhinacna yahay 5 sm xagasha u dhexaysaana tahay  $50^\circ$ . Goo saddexagal oo dul saar ka kale. Ma is le'eg yihiin? Ku celi adoo isticmaalaya dhinac ah 5 sm, iyo dhinac ah 7 sm xagasha u dhexaysaana iyadoo ah  $80^\circ$ .
- 2) Adoo isticmaalaya mastarad iyo goobeeye, waxaad samaysaa laba saddexagal oo dhinacyadoodu yihiin 5 sm 6 sm iyo 7sm. Soo goo saddexagal oo dul saar ka kale. Ma is le'eg yihiin? Ku celi adoo isticmaalaya dhinacyo ah 3 sm 4 sm iyo 6 sm.
- 3) Adoo isticmaalaya mastarad iyo xagal beeg waxaad samaysaa laba saddexagal, midna yahay ABT midna yahay LMN.

U qaado  $AB = LM = 6$  sm,  $\angle B = \angle M = 50^\circ$ ,  
 $\angle A = \angle L = 65^\circ$ . Goo labada saddexagal midkood oo dul saar ka kale. Ma is le'eg yihiin? Ku celi adoo qaadanaaya  $AB = LM = 8$  sm,  
 $\angle A = \angle L = 25^\circ$ ,  $\angle B = \angle M 120^\circ$ .



- 4) Adoo isticmaalaya mastarad, goobeeye iyo xagal beeg, waxaad samaysaa laba saddexagal oo xagal quman. Ka dhig in mid yahay ABT, midna yahay LMN oo  $\angle A = \angle L = 90^\circ$ ,  $AT = LM = 5$  sm,  $BT = MN = 6$  sm. Goc ka hore oo dul saar ka dambe: maxaa dhacay? Ku cali adoo ka dhigaya  $\angle B = \angle M = 90^\circ$ ,  $BT = MN = 6$  sm,  $AT = LM = 9$  sm.

Tijaabooyinkaas oo dhan waxaad ku aragtay saddexagallo isku sar go'an. Sar go'a saddexagallada haddaba, waxa lagu ogaan karaa :

1. Laba saddexagal way isku sar go'an yihiin haddii mid laba dhinac oo ka mid ah iyo xagasha u dhexaysaa ay le'eg yihiin ka kale laba dhinac oo ka mid ah iyo xagasha u dhexaysa ( $DXD \equiv DXD$ ).
2. Laba saddexagal way isku sar go'an yihiin haddii mid saddexdiisa dhinac ay le'eg yihiin ka kale saddexdiisa dhinac ee la gudboon ( $DDD \equiv DDD$ ).
3. Laba saddexagal way isku sar go'an yihiin haddii mid laba xaglood iyo dhinac ka mid ihi ay le'eg yihiin laba xaglood iyo dhinac ka kale oo la gudboon ( $XXD$ ).
4. Laba saddexagal oo xagal qumani way isku sar go'an yihiin haddii mid shakaalkiisa iyo lugtii ay le'eg yihiin ka kale shakaalkiisa iyo lugtiisa lugta ka hore la gudboon (LS).

Xusuusnow, arrintan afraad waxay ka hadlaysaa laba saddexagal oo qumman.

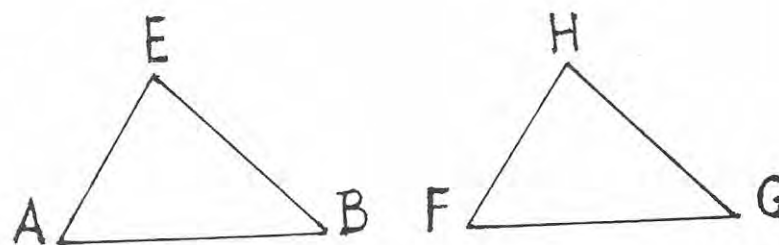
Labada saddexagal ee ABT iyo LMN haddii ay isku sargo'an yihiin waxa loo qoraa  $\triangle ABT \equiv \triangle LMN$ .

Kolkaa, xaglaha iyo dhinacyada isle'egi waa :

$$\begin{array}{ll} \angle A \equiv \angle L & AB \equiv LM \\ \angle B \equiv \angle M & BT \equiv MN \\ \angle T \equiv \angle N & AT \equiv LN \end{array}$$

Layli :

.1.



$$\therefore \triangle ABE \equiv \triangle FGH$$

Buuxi meelaha maran

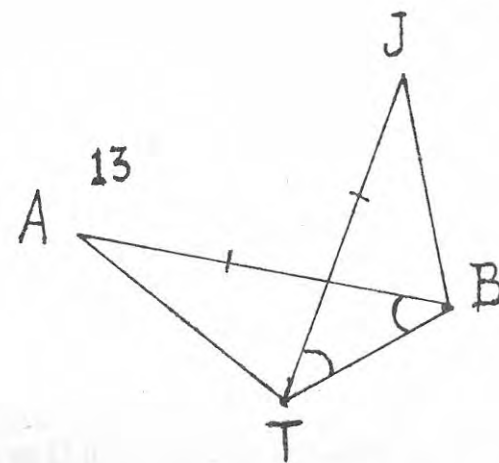
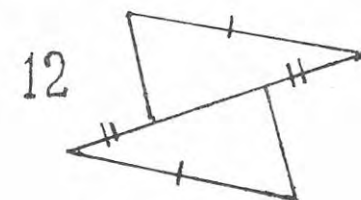
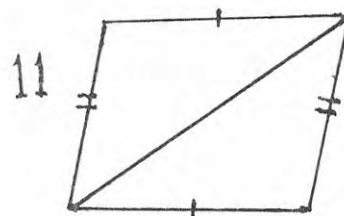
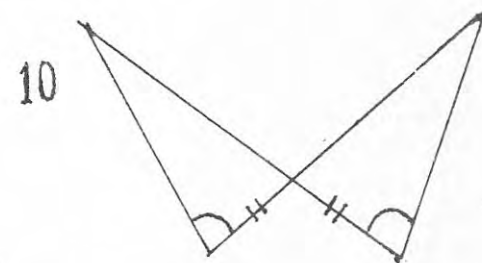
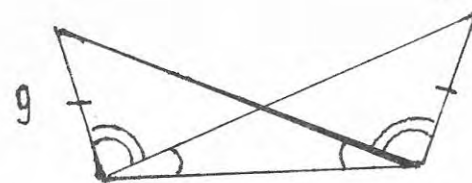
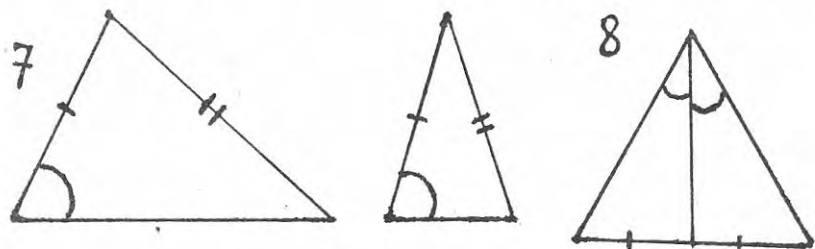
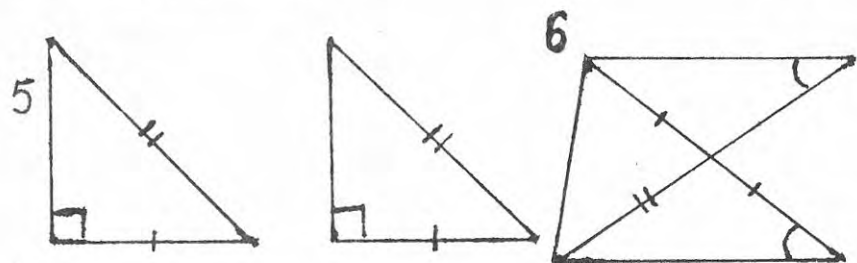
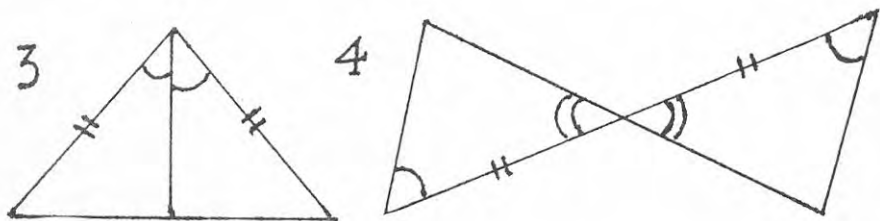
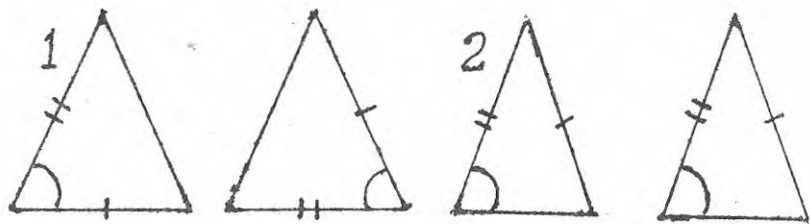
$$\begin{array}{ll} \angle A \equiv \angle F, & AE = \text{-----} \\ \angle B \equiv \text{-----}, & AB = \text{-----} \\ \angle E \equiv \text{-----}, & BE = \text{-----} \end{array}$$

2. Halkan waxa ku qoran laba saddexagal oo isku sargo'an. Lix waxoo ay leeyihiin baa lababa gudboon yihiin. Buuxi meesha maran.

$$\begin{array}{ll} AB \equiv MK & \angle A \equiv \angle M \\ BW \equiv KF & \angle B \equiv \angle K \\ AW \equiv MF & \angle W \equiv \angle F \end{array}$$

$$\therefore \triangle \text{-----} \equiv \triangle \text{-----}$$

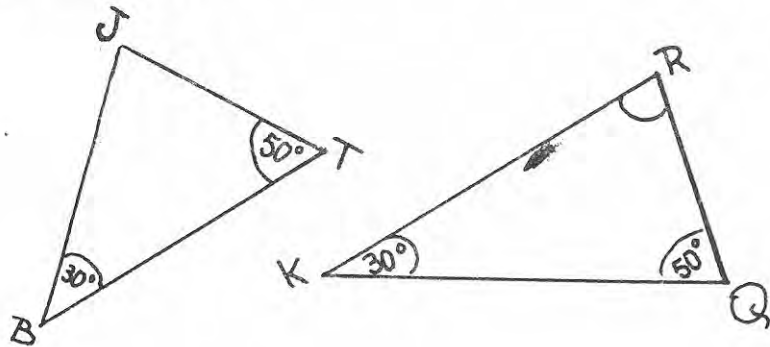
3. Jaantusyadan, saddexagallada wada socdaa ma isku sargo'an yihiin. Haddii haa aad tiraahdid, waayo?



C U T U B XIV

SADDEXAGALLO ISU EG

Hore waxaad u soo baratay saddexagallo sargo'an. Waxaynu isla eegi saddexagallo isu eg. Intaynaan u gelin saddexagallo isu eg, bal aynu ku yara laabano saddexagallo sargo'an. Waxaynu niri laba saddexagal waxay isku sargo'an yihiin haddii xaglaha gudbooni isku sargo'an yihiin oo dhinacyada gudboonina ay isku sargo'an yihiin. Haddaba maxaynu uga jeednaa xaglo gudboon iyo dhinacyo gudboon? Xaglo gudboon waxaynu uga jeednaa laba xaglood oo israaca marka xaglaha saddexagal si go'an loogu aaddiyo kuwa saddexagal kale. Jaantuskan hoose, xagasha B waxay la gudboon tahay xagasha K,  $\angle T$  waxay la gudboon tahay  $\angle Q$  waxay la gudboon tahay  $\angle R$ .

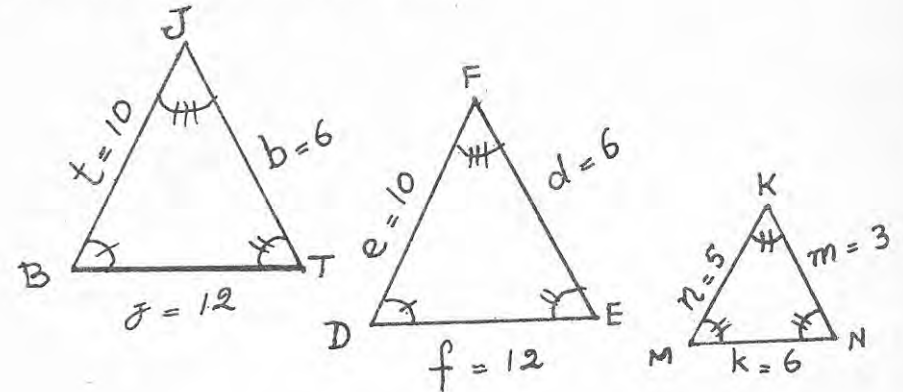


Marka xaglaha gudboon ee saddexagallada la isugu aaddiyo si ay isku leekaadaan qindi waliba, dhinacyada gudbooni waxay yihiin kuwa ka soo horjeeda xaglaha isleeg. Markaa kol hadday  $\angle B = \angle K$ , dhinaca TJ wuxuu la gudboon yahay dhinaca QR.

Haatanna, waxaynu u geli saddexagallo isku eg.

Saddexda saddexagal ee hoose, xaglaha gudbooni way isku wada sargo'an yihiin. Intaa waxaa raaca inay  $\triangle BTJ$  ay isku

sargo'an yihiin  $\triangle DEF$  maxaa yeelay dhinacyada gudbooni way isleeg yihiin. Markaa, waxaynu odhan karnaa  $\triangle BTJ$  iyo  $\triangle BEF$  waa isku qaab waana isku jimidh.



Waad arki kartaa inuu  $\triangle MNK$  la qaab yahay, asuuna la jimidh ahayn, labada saddexagal ee kale.  $\triangle MNK$  kuma sargo'na labadaa saddexagal; hase yeeshee wuu u eg yahay labada saddexagalba. Markaa, **saddexagallada isku qaabka ah aseent isku jimidka ahayni way isu eg yihiin.** Haddii aad isgarab dhigto dhinacyada gudboon ee  $\triangle MNK$  iyo  $\triangle DEF$ , waxaad arki

$$\frac{k}{f} = \frac{16}{12} = \frac{1}{2}$$

$$\frac{n}{e} = \frac{5}{10} = \frac{1}{2}$$

$$\frac{m}{d} = \frac{3}{6} = \frac{1}{2}$$

U fiirso saamiyada dhererrada dhinacyada gudbooni inay wada yihiin tiro qudh ah,  $\frac{1}{2}$ . Markaa dhererrada dhinacyada gudbooni waa saamigal, saamigoodu yahay 1 : 2.

$$\frac{k}{f} = \frac{n}{e} = \frac{m}{d}$$

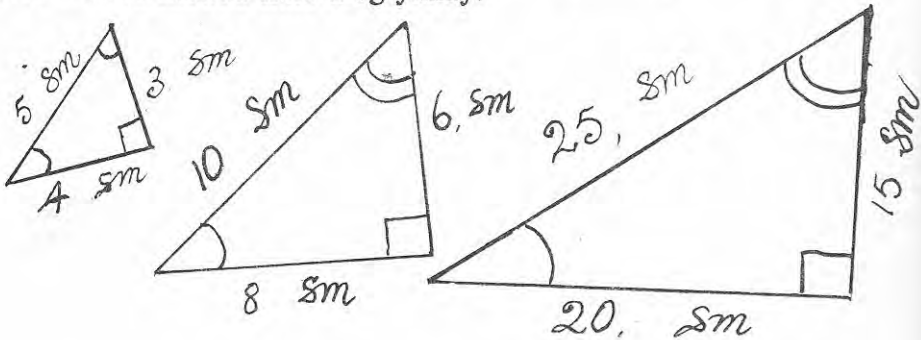
Laba saddexagal way isu eg yihiin haddii xaglaha gudbooni ay isku sargo'an yihiin, dhererrada dhinacyada gudboonina ay saamigal yihiin.

Si aynu u muujino  $\triangle BTJ$  iyo  $\triangle MNK$  inay isu eg yihiin, waxaynu qornaa :

$$\triangle BTJ \sim \triangle MNK$$

**Tusaale 1 :**

U fiirso saddexdan saddexagal ee xaglaha qumman ee uu mid waliba labada kale u eg yahay.



b. Mar kasta saamiga joogga iyo salku waxa weeye :

$$\frac{6}{8} = \frac{3}{4}; \frac{15}{20} = \frac{6}{8} = \frac{3}{4}$$

t. Mar kasta siimiga joogga iyo shakaalku waxa weeye:

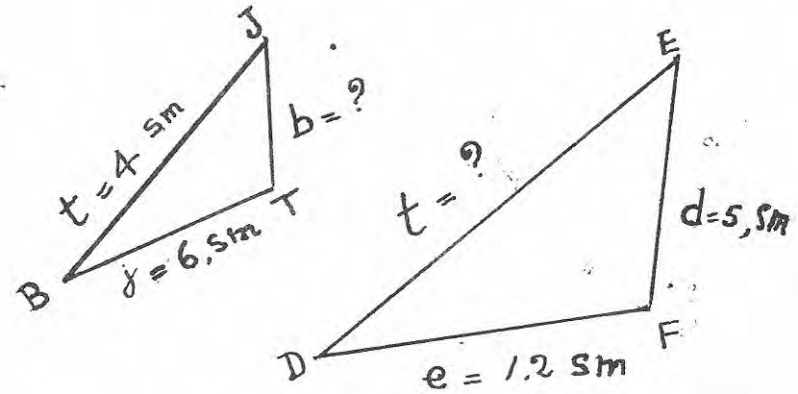
$$\frac{6}{10} = \frac{3}{5}; \frac{15}{25} = \frac{6}{10} = \frac{3}{5}$$

j. Mar kasta saamiga salka iyo shakaalku waxa weeye:

$$\frac{8}{10} = \frac{4}{5}; \frac{20}{25} = \frac{8}{10} = \frac{4}{5}$$

**Tusaale : 2**

Haddii labadan saddexagal ay isku eg yihiin, raadi dhinacyada aan dhererradooda la inna siin.



**Furfuris :**

$$\frac{j}{e} = \frac{b}{d} \text{ ama } \frac{6}{12} = \frac{b}{5}$$

Markaa :

$$12b = 30$$

$$\therefore b = 2 \frac{1}{2} \text{ sm}$$

$$\frac{j}{e} = \frac{t}{f} \text{ ama } \frac{6}{12} = \frac{4}{f}$$

Markaa :

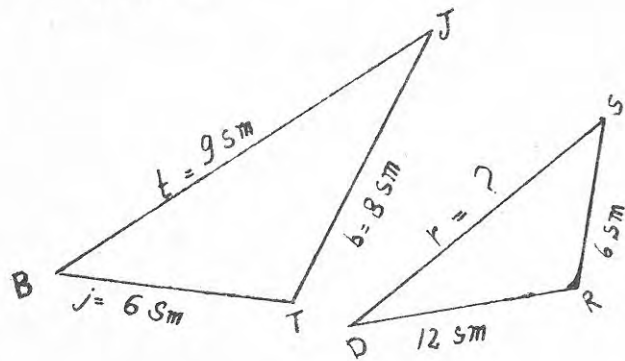
$$6f = 48$$

$$\therefore f = 8 \text{ sm}$$

**Tusaale : 3**

Saddexagalladan isu eg, raadi dhererrada dhinacyada ee aan la sheegni.

**Furfuris :**



$$\frac{t}{r} = \frac{j}{s} \text{ ama } \frac{9}{r} = \frac{6}{4}$$

Markaa :

$$6r = 36$$

$$\therefore r = 6 \text{ sm}$$

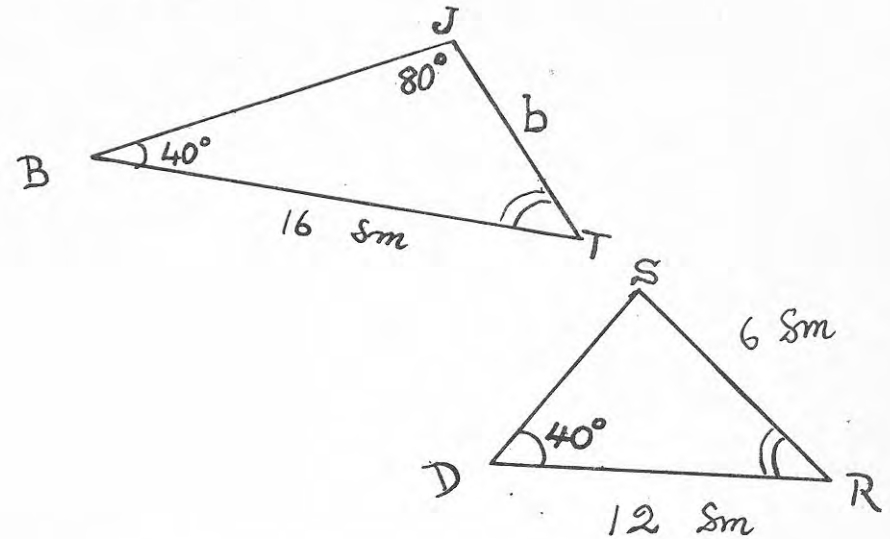
$$\frac{b}{d} = \frac{j}{s} \text{ ama } \frac{8}{d} = \frac{6}{4}$$

Markaa :

$$6d = 32$$

$$\therefore d = 5 \frac{1}{3} \text{ sm.}$$

**Tusaale 4 :**



Iyadoo la inna siiyey in  $\Delta BTJ \sim \Delta DRS$ , soo saar cab biraadda

- b)  $\angle S$
- t)  $\angle R$
- j)  $\overline{TJ}$

**Furfuris :**

- b)  $\angle B = \angle D$ , Calaamadaha shaxannada ka muuqdaana waxay sheegayaan in  $\angle T = \angle R$ . Markaa  $\angle J = \angle S$ . Kol hadduu  $\angle J = 80^\circ$ ,  $\angle S = 80^\circ$ .
- t)  $\angle R = \angle T$ ,  
 $\angle T = 180^\circ - (80^\circ + 40^\circ)$   
 $= 180^\circ - 120^\circ$   
 Markaa,  $\angle R = 60^\circ$
- j) Kol hadday labada saddexagal isu eg yihiin, waxaynu odhan karnaa



$$\frac{b}{6} = \frac{16}{12}$$

$$12b = 96$$

$$b = 8$$

Markaa, TJ = 8 sm

**Xasuus :**

U fiirso in saddexagallada isu eg loo magacaabo si ay qaybaha gudbooni uga muuqdaan. Metelan  $\triangle BTJ \sim \triangle MNK$  waxaynu u akhriyi: saddexagal BTJ wuxuu u eg yahay saddexagal MNK, waayo xagalaha B iyo M, T iyo N, iyo J iyo K ayaa isku sargo'an. Labadan saddexagal xidhiidhkooda uma qori karno sidan oo kale :

$$\triangle BTJ \sim \triangle KMN$$

**Layli :**

1. Buuxi meelaha bannaan.
  - b) Haddii laba xaglood oo saddexagal ay ku sargo'an yihiin laba xaglood oo saddexagal kale, labada saddexagal way \_\_\_\_\_
  - t) Dhererrada dhinacyada gudboon ee saddexagal-lada isku egi waa isku \_\_\_\_\_
2. Raadi qiimayaasha doorsoomayaasha saamigalyadan ku kala jira.

$$b) \frac{3}{4} = \frac{a}{16}$$

$$j) \frac{y}{60} = \frac{4}{5}$$

$$kh) \frac{n}{4} = \frac{6}{7}$$

$$t) \frac{15}{x} = \frac{5}{9}$$

$$x) \frac{3}{20} = \frac{90}{f}$$

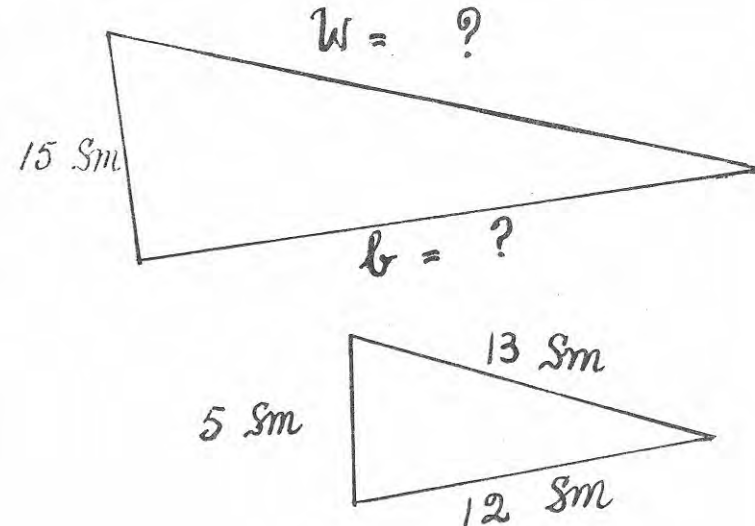
$$d) \frac{2}{3} = \frac{k}{5}$$

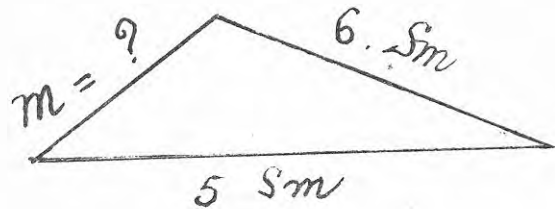
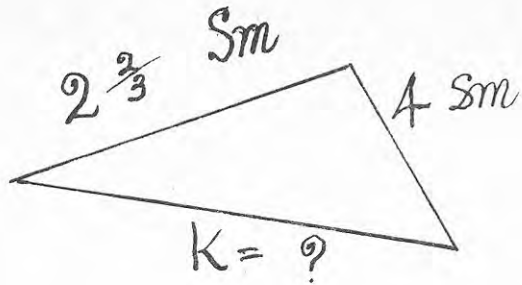
$$r) \frac{3.5}{b} = \frac{5}{9}$$

$$s) \frac{4}{1/2} = \frac{20}{m}$$

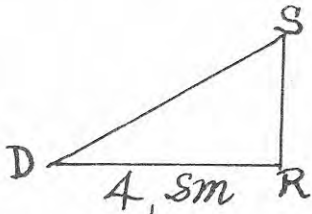
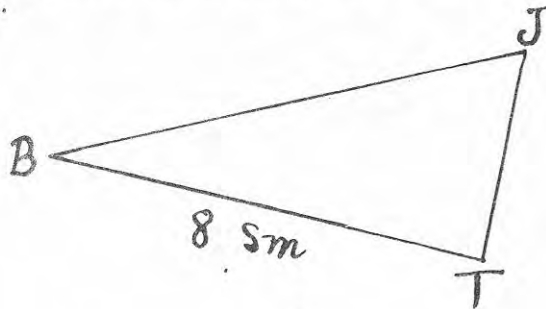
$$sh) \frac{9}{12} = \frac{0.12}{8}$$

3. Qindiyadan saddexagallada isu eg ah, raadi dhererrada dhinacyadooda aan la sheegin.



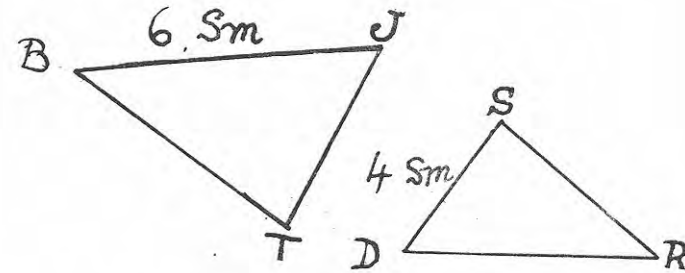


4. Saddexagallada soo socda qindi waliba waa isu eg yahay.



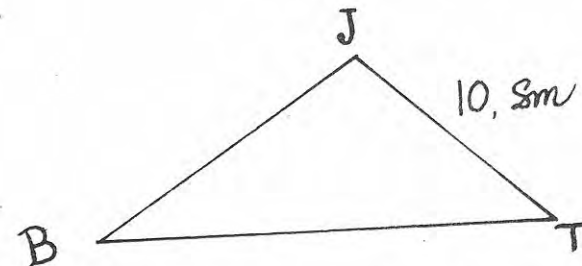
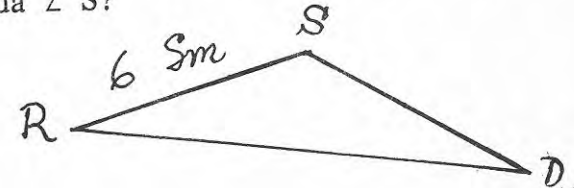
b) Haddii  $\angle B = 30^\circ$  waa intte cabbiraadda  $\angle D$ ?

t) Waa maxay saamiga dhererrada dhinacyada gudboon ee labada saddexagal?



j). Haddii  $BJ = 6 \text{ sm}$ , waa intee dhererka  $RS$ ?

x) Haddii  $\angle B = 50^\circ$  oo  $\angle T = 30^\circ$  waa intee cabbiraadda  $\angle S$ ?



kh) Waa maxay saamiga cabbiraadda dhinacyada gudboon ee labadan saddexagal?

d)  $RS = 6.1 \text{ sm}$ . Waa intee dhererka  $TJ$ ?

r)  $\angle J = 120^\circ$ ,  $\angle B = 30^\circ$ . Raadi  $\angle R$ ?

s) Haddii  $DR = 8 \text{ sm}$ . Raadi  $BT$ ?

5. Masalooyinkan furfur adigoo adeegsanaya shaxano.
- b) Marka inan jooggiisu yahay 5 fuudh uu dhererka hadhkiisu yahay 8 fuudh, waa intee joogga tiir agtiisa ah oo dhererka hadhkiisu yahay 34 fuudh?
  - t) Geed jooggiisu yahay 30 fuudh ayaa dhererka hadhkiisu yahay 20 fuudh. Isla waqtigaa ayaa sar u dhow dhererka hadhkeedu yahay 50 fuudh Waa intee joogga sartu?
  - j) Waqtiga inan joogyiisu yahay 1.75 mitir uu dhererka hadhkiisu yahay 2 mitir, waa intee dhererka harka tiir uu garab taagan yahay oo uu jooggiisu yahay 45 mitir?