220

JAMHUURIYADDA DIMOQRAADIGA SOOMAALIYA

WASAARADDA WAXBARASHADA IYO BARBARINTA
XAFIISKA MANAAHIJTA

XISAAB

FASALKA LIXAAD

F.A.

XISAAB

FASALKA LIXAAD

6

WASAARADDA WAXBARASHADA IYO BARBARINTA
XAFIISKA MANAAHIJTA

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

DAABACADDII SADDEXAAD

Waxaa lagu daabacay
Wakaaladda Madbacadda Qaranka
XAMAR 1977

HORDHAC

Buuggan waxa loogu talagalay ardayda ku jirta fasalka lixaad ee dugsiyada dhexe. Ardayda buuggan loo qoray, markii ay ku jireen fasallada lixaad iyo toddobaad waxay waxbarashadoodii ku soo qaateen soomaali. Sidaa daraadeed waxan filaynaa in ayna wax dhibaato ah kala kulmi doonin.

Buuggu wuxu ka kooban yahay lix cutub oo ah aljebra, qiime sugan, kulanno sallax, qormo saynis iyo logardam, tirignoometeri iyo layli guud. Cutubka layli guud wuxu ka kooban yahay su'aallo taabanaaye cutubyadii lagu soo dhigtay afarta sannadood ee dugsiga dhexe.

Buugga waxa qoray Xasan Daahir Obsiiye, Saciid Cige, Maxamad Cali Maxamad, Maxamad Cumar Dubad iyo Cismaan Jaamac. Dhammaantood way mahadsan yihiin. Waxa kale oo aan mahad u naqaynaa Jaalle Cabdi Xirsi Qanyare oo buuggan garaacay, Xasan Sallaan Axmed oo sawirrada u sameeyay, Idriis Maxamuud Cabdillaahi oo naqshadda jaldiga dejiyay iyo dhammaan jaalleyaalkii suuragaliyay soo saaridda buuggan.

Waxa mahad gaar ah leh madbacadda Qaranka oo suuragelisay soo bixidda buuggan.

Maamulaha Xafiiska Manaahijta
Bashiir Faarax Kaahiye

TUSMO

Saxid :

Hoos waxa ku muujisan gafafka 96 bog ee ugu horreeya ku jira oo la saxay. Haddii ay H raacsan tahay, matalan H5, macnaheedu waxa weeye, sadarka 5aad marka hoos laga soo tiriyo.

Bogga	Sadarka	Khalad	Saxa
1	5	u ah I.W.W. xy	I.W.W. u ah xy
1	5	I.W.	I.W.W.
2	3	Isirada	Isirrada
4	H2	hubaale	hubaalood
5	16	$96 - 46 - b^2$	$96 - 4b - b^2$
5	17	Isirraadinta	Isireynta
5	H2	madoorsoontada	madoorsoomaha
7	2	suurgal	suuragal
7	H5	$4x^2 - 8x - 3x + 3x$	$4x^2 - 8x - 3x + 6$
9	5	isiro	Isirro
11	2	dhufanaa	dhufannaa
13	23	$x^3 - 4x^2 + 5x - 0$	$x^3 - 4x^2 + 5x = 0$
15	6	leekeysii	le'egkaysii
15	17	weydiino	weyddiinno
15	H5	$x(x^2 - 4x + 4)$	$x(x^2 - 4x + 3)$
15	H4	Ieekeysii	le'egkeysii
16	15	ururka furfurista	ururka furfuristu
16	H5	$y^2 - 29 - 8 = 0$	$y^2 - 2y - 8 = 0$
17	5	$(2m = 1)^2$	$(2m - 1)^2$
17	14	$x(x^2 - 6x) = 0$	$x^3 + x^2 - 6x$
18	13	ballaca Ax dherer A	ballaca x dherer

Bog-ga	Sa-darka	Khalad	Saxa
19	14	waa 100 mitir	waa 1000 mitir
20	H3	221 fuudh	21 fuudh
21	8	na tahay 20	na tahay 200
25	14	$\frac{7}{2}x^2 - 3x + \frac{}{} = 0$	$2x^2 - 3x + 7 = 0$
27	H1	$x + 5x = 6$	$x^2 + 5 = 6$
28	1	$x + 5x + \frac{25}{4} = 6 + \frac{25}{4}$	$x^2 + 5x + \frac{25}{4} = 6 + \frac{25}{4}$
29	H2	$^4y^2 - 9y = 9$	$y^2 - 9y = 9$
30	12	tibixaha isla	tibixaha isle isla
30	16	bixino	bixinno
30	H7	saabley sansaanta	saabley oo sansaanta
30	H4	leekayn	le'egkeyn
31	5	$-\frac{4at + b^2}{4a^2}$	$\frac{-4at + b^2}{4a^2}$
		su'aal	
35	3	$x^2 + -x + \frac{}{} = 0$	$x^2 + (-x) + (-\frac{1}{2}) = 0$
36	8	leekeeysiisaa	le'egkeysiisaa
38	1	mahadhada	astaanta
38	7	mahadhada	astaanta
41	H2	$\frac{x+3}{4x} ? \frac{1+1}{4} = 4$	$\frac{x+3}{4} ? \frac{1+3}{4} = 1$
43	17	mahadhada	astaanta
45	18	iyo	ka

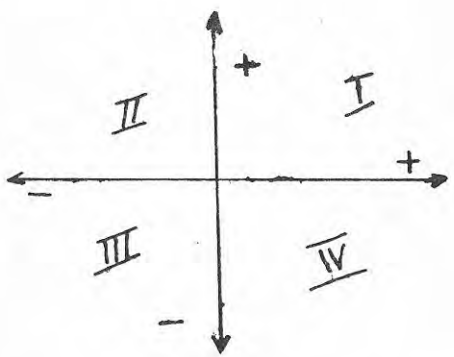
Bog-ga	Sa-darka	Khalad	Saxa
49	22	masagada	masaggada
52	H3	mahadhada	astaanta
60	H2	$\frac{4x}{x \div 4} + \frac{2x}{x + 3}$	$\frac{4x}{x + 4} + \frac{2x}{x + 3}$
60	1	$\frac{3t}{t + 2} + \frac{5t}{t \div 3}$	$\frac{3t}{t + 2} + \frac{5t}{t + 3}$
65	6	dhufano	dhufanno
65	7	raadinaa	raadinnaa
65	9	hore	kore
67	45	hogaleyaal	horgaleyaal
70	43	qiiham x	qiimaha x
71	19	$\frac{x}{30}$	$\frac{x}{30}$
79	4	toban	taban
79	4	x ÷ haddii	−x. Haddii
80	11	tcdoba	tcddoba
80	12	»	»
80	13	»	»
81	10	Kulankoodu yahay	kullannadoodu yihiin
83	9	Hedaad	Haddaad
85	3	dhamaad	dhammaad
	4	»	»
	6	»	»
86	1	fogaanti	fogaantii

Bogga	Sadarka	Khalad	Saxa
86	21	I I	I I
87	H3	dhexeeysa	dhexeysa
87	H1	»	»
92	3	kalkaa	kolkaa
93	H4	sile'eg	isle'eg
94	H9	runta iyo isleegtan?	runta iyo beenta isleegtan?
94	H1	sleeg	isleeg
95	16	7 ku beddel y	5 ku beddel y
95	H7	Iimisa	Imisa.

bogga 81 labada sadar ee ugu hooseeyaa waa:

$|x-a| = x-a$ haddii $(x-a) > 0$ ama $x > a$
$|x-a| = -(x-a)$ haddii $(x-a) < 0$ ama $x < 0$

bogga 88, sawirku wuxu noqon sidan oo kale:



bogga 208, su'aasha 47, sawirka bidixda xigaa ma jiro ee ka midigta ayaa sax ah.

Halkii aad ku aragto «horgalaha» waxad ku baddashaa «weheliye».

CUTUB I

ISIREYN

(Nakhtiin)

Haddii aynu rabno inaynu raadiinno isir weynaha ay wadaagaan (I.W.W.) labada haltibix ee $24x^2y$ iyo $18xy^2$, waxaynu horta raadinnaa isir weynaha ay wadaagaan (I.W.W.) weheliyayaashu. I.W.W. 24 iyo 18 waxa weeye 6. Doorsoomayaashana waxa I.W.W. u ah xy. Markaa I.W.W. labada haltibix waxa weeye taranta 6 iyo xy oo ah 6xy. Markaa haltibix wata weheliyaha ugu weyn iyo doorsoomaha leh heerka ugu weyn una isir dhowr haltibix ayaa ah I.W.W. dhowrka haltibix.

Bal hadda u fiirso tibxaalaha $15ab + 12a$. Haddii aynu adeegsano xeerka kala dhigga iskudhufashada ee isu-geynta waxaan heli karnaa :

$$15ab + 12a = 3a\,(5b + 4)$$

3a waa haltibix, $5b + 4$ na waa tibixaale. Markaa 3a waxa weeye isir haltibix ah oo u leeyahay tibixaalaha $15ab + 12a$. Isir weynaha haltibixa ah ee ay wadaagaan tibxaha 15ab iyo 12a ee tibixaalaha $15ab + 12a$ wuxuu yahay 3a.

Haddii la ina siiyo tibixaale oo la inaga rabo inaynu raadinno isirradooda waa inaynu horta eegnaa inuu jiro haltibix ah isir ay wadaagaan tibxaha tibxaalahaasu. Waxaad ka soo qaadataa in la innaga rabo inaynu raadinno isirka ay wadaagaan tibixaha tibixaalaha $12x^3 + 36x^2 + 8x$. Si aynu u helno isirkaa, waa inaynu raadinnaa isir weynaha haltibixa ah ee ay wadaagaan tibxaha tibixaaluhu. Waxaynu arki karnaa isir weynaha haltibaxa ah ee ay wadaagaan tibixaha $12x^3 + 36x^2 + 8x$ inuu yahay 4x. Sidaa daraaddeed,

$$12x^3 + 36x^2 + 8x = 4x\,(3x^2 + 9x + 2)$$

Waxa kale oo aynu naqaannaa sida loo raadiyo isirrada labatibixyada ah ee tibixaaleyaasha.

Tusaale :

Raadi isirrada $ax + by + ay + bx$.

Furfuris :

$+ by + ay + bx = ax + bx + ay + by$

Xeerka kala hormarinta isugeynta.

$= (ax + bx) + (ay + by)$

Xeerka hormagelinta isugeynta.

$= x(a + b) + y(a + b)$

Xeerka kala dhigga iskudhufashada ee isugeynta.

$= (a + b)\ (x + y)$

Xeerka kala dhigga iskudhufashada ee isugeynta.

Markaa $ax + by + ay + bx = (a + b)\ (x + y)$

Ma raadin kartaa isirrada faraqa laba labajibbaar? Waxay isirrada $9x^2 - 25y^2$? Waa inaad markaad aragtaad garan kartaa isirrada $9x^2 - 25y^2$ in ay yihiin $(3x + 5y)\ (3x - 5y)$. Tibixaaleyaasha leh sansaanta $a^2 + 2ab + b^2$ ama $a^2 - 2ab + b^2$ waxaynu isirradooda ku heli karnaa innaga oo adeegsanayna misaalladan :

$$(a + b)^2 = a^2 + 2ab + b^2$$
$$(a - b)^2 = a^2 - 2ab + b^2$$

Tusaale :

Raadi isirrada tibixaalaha $81x^2 + 90xy + 25y^2$

Furfurid :

Tibixda kowaad waa labajibbaarka 9x, ta saddexaadna waa labajibbaarka 5y. Tibixda dhexe waxay u dhigantaa $2\ (9x)\ (5y)$.

Markaa $81x^2 + 90xy + 25y^2$

$= (9x)^2 + 2\ (9x)\ (5y) + (5y)^2$

$= (9x + 5y)^2$

Layli :

I. Raadi isir weynaha ay wadaagaan :

1. $x^3y^2;\ x^2y^3$
2. $2x^2y;\ 10xy^3$
3. $x^2 - h^2;\ x^2 - xh$
4. $4r^4n^3 + 2r^2n^5;\ 3r^3n^4 - r^2n^2$
5. $x^3 - x^2;\ x^4 - 5x$

II. Raadi isirrada tibixaaleyaashan :

1. $3b^2 + 5b$
2. $d^2 + 2d + y^2d$
3. $8a^2 + 24b^2$
4. $a^2b + ab^2$
5. $dg + dm - fg - fm$
6. $2m\ (m - n) - (m + n)\ (m - n)$
7. $15n^2 - 20n - 12n^2 - 4$
8. $18x - 6 - 3x^3 - x^2$
9. $3b^2 + 2b + 12b + 8$
10. $2k^2 - 3k + 8k - 12$

11. $a^2 + ac + 4a + 4c$
12. $ab - by - ay + y^2$
13. $2a + 2x + ax + x^2$
14. $a^2 + 2ab + ab + 2b$
15. $a^3 - a^2 + a - 1$

III. Raadi isirrada

1) $a^2 - 64$
2) $25 - r^2$
3) $-d^2 - c^2$
4) $a^2 b^2 - d^2$
5) $n^2 - 2n + 1$
6) $r^2 + 4r + 4$
7) $36y^2 - 24y + 1$
8) $8n + 8n^2 + 2n^3$
9) $16r^2 + 40rt + 25t^2$

Bal u fiirso sida ay saddextibixyo uga samaysmaan taranta labatibixyo.

$$(x + 9)(x + 2) = x^2 + 11x + 18$$
$$(x - 9)(x - 2) = x^2 - 11x + 18$$
$$(x + 9)(x - 2) = x^2 + 7x - 18$$
$$(x - 9)(x + 2) = x^2 - 7x - 18$$

Waxaad ka soo qaaddaa, haddaba, inaynu rabno isirro saddextibixyo la jaad ah kuwa isle'egyadani dhinacooda midig ka muuqda. Haddii aynu baadhbaadhno go'aannadan kore waxaynu arki inay:

1) Tibixda koowaad ee labada isirba tahay x.
2) Taranta tibixaha labaad ee isirradu ay le'eg tahay tibixda madoorsoomaha ah ee saddextibixa.
3) Wadarta tibixaha labaad ee isirradu ay le'eg tahay weheliyaha tibixda toosan ee saddextibixa.

Innaga oo saddexdaa hubaalood adeegsanayna ayaynu isireyn karnaa saddextibixyada kuwa kor ku yaalla oo kale ah.

Tusaale :

Raadi isirrada $x^2 + 13x + 40$.

Furfuris :

1) Labada isir mid walba tibixdiisa koowaad waa inay noqotaa x.

   Isirrada tibixahooda labaad waa inay noqdaan laba tiro oo tarantoodu tahay 40, wadartooduna tahay 13. Waxa kuu muuqan kara inay labada tiro yihiin 8 iyo 5.

Markaa $x^2 + 13x + 40 = (x + 8)(x + 5)$.

Layli :

2) $x^2 + x - 2$
1) $x^2 + 7x + 12$
3) $x^2 + 14x + 24$
4) $b^2 - 12b - 45$
5) $d^2 + 9d - 22$
6) $y^4 + 13y^2 - 48$
7) $y^2 - 45y - 46$
8) $t^2 - 15t + 54$
9) $96 - 4b - b^2$
10) $y^2 + 7y + 98y^2$

Tabta guud ee Isireynta

Saddextibixyada Saableyda ah

Si loo raadiyo isirrada taranta saddextibix saabley ah oo tibixdeeda saableyda ah weheliyaheedu ka geddisan yahay I, waxa laga yaabaa inaynu adeegsanno dhugasho iyo innaga oo kolba wax ku dayna.

Tusaale :

Raadi isirrada $3x^2 - 5x - 12$.

Ilaynta koowaad: Tibixda madoorsoomaha ahi waa tiro taban, tibixda toosanina way taban tahay.

Ilaynta labaad : Taranta labada tibixood ee toosan ee labatibixyadu waa $3x^2$. Taranta labada tibixood ee madoorsoomayaasha ah ee labatibixyaduna waa -12.

Inta siyood ee la tixgelin karaana waa kuwan :

Isirrada suuragalka ah	**Tibixaha toosan ee ku aaddan**
1. $(x + 1)(3x - 12)$	$-12x + 3x = -9x$
2. $(x - 12)(3x + 1)$	$x - 36x = -35x$
3. $(x + 2)(3x - 6)$	$-6x + 6x = 0$
4. $(x - 2)(3x + 6)$	$6x - 6x = 0$
5. $(x + 4)(3x - 3)$	$-3x + 12x = 9x$
6. $(x + 3)(3x - 4)$	$-4x + 9x = +5x$
7. $(x - 4)(3x + 4)$	$4x - 12x = -8x$
8. $(x - 3)(3x + 4)$	$4x - 9x = -5x$

Ilaynta saddexaad: Tibixda toosan ee saddextibixu waa $-5x$.

Marka siddeedan siyood tan ugu dambaysa ayuun baa waafaqsan saddexda ilaynba.

$$\therefore 3x^2 - 5x - 12 = (x - 3)(3x + 4)$$

Ilayn kale ayaa innaga caawin karta isirrada suuragalka ah dhimistooda. Ilayntaasi waxay tahay :

Haddii saddextibix aanu lahayn isir ay wadaagaan tibixihiisu, labatibixyada isirrada u ahna midkoodna ma yeelan karo isir ay wadaagaan labadiisa tibxood.

Sidaa awgeed, ayaynu kolka ugu horreysaba aan tuuri karnaa labatibixyada $3x - 12$, $3x - 3$, $3x + 3$, $3x - 6$, iyo $3x + 6$. Maxaa yeelay mid kastaba wuxuu wataa isir wadaag aanu lahayn saddextibixa ay isirrada u yihiin.

Hilinkan aynu haddeer raacnay aad buu u dhib badan yahay waayo marmarka qaarkood ayayna suragal inoo ahayn inaynu helno inta siyood ee inna siin karta taranta labada madoorscome ee labatibixyada si loo helo tibixda toosan. Sidaa awgeed, ayaa loogu baahan yahay in la raadiyo hilin kale oo aynu adeegsanno, marka saddextibixyada jaadkan ah aynu isireyneyno. Hilinka kale ee aynu raaci doonnaa wuxuu aad ugu dhaw yahay mid aynu awal raaci jirnay. Bal u fiirso tusaalahan soo socda:

Tusaale :

Raadi isirrada $4x^2 - 11x + 6$.

Furfuris :

1) Raadi taranta wcheliyaha tibixda saableyda ah iyo ta madoorsoomaha ah. Waa 24.

2) Raadi labada tiro ee tarantoodu tahay 24, wadartooduna tahay -11. Halkaa waxaynu ka aragnaa inay labada tiroba taban yihiin. Inta tiro (abyoonayaal ah) ee ay tarantoodu tahay 24 waa kuwan :

   $(24)(1)$, $(-24)(-1)$; $(12)(2)$, $(-12)(-2)$, $(6)(4)$, $(-6)(-4)$, $(8)(3)$, $(-8)(-3)$. .

   Labada tiro ay tarantoodu tahay 24 wadartooduna tahay -11 waa (-8) iyo (-3).

3) Waxaynu ku beddeli tibixda toosan

   $$4x^2 - 11x + 6 = 4x^2 - 8x - 3x + 6,$$

   Waayo $-11x = -8x - 3x$

4) Raadi isirrada tibaaxda $4x^2 - 8x - 3x + 6$

   $= 4x(x - 2) - 3(x - 2)$

   $4x^2 - 8x - 3x + 6$

   $= (x - 2)(4x - 3)$

   $\therefore 4x^2 - 11x + 6 = (x - 2)(4x - 3)$

Tusaale 2

Raadi isirrada $6x^2 - 25x + 14$

Furfuris :

Taranta labada tiro waa 84. Wadarta labada tiro waa -25.

$\therefore$ Labada tiro waa -21 iyo -4.

Kolkaas, $6x^2 - 25x + 14 = 6x^2 - 4x - 21x + 14$

$= 2x(3x - 2) - 7(3x - 2)$

$= (3x - 2)(2x - 7)$

$\therefore 6x^2 - 25x + 14 = (3x - 2)(2x - 7)$

Layli :

1. $2x^2 - 11x + 5$
2. $2y^2 + 3y + 1$
3. $3y^2 + 5y + 2$
4. $3t + 5t - 2$
5. $5x^2 + 9x + 2$
6. $1 + 4x + 3x^2$
7. $6x^2 - 7x - 3$
8. $2x^2 + 7xy + 3y^2$
9. $18y^2 + 33y - 30$
10. $3x^2 + 7x + 2$
11. $4t^2 + 9t + 5$
12. $7x^2 + 10x + 3$
13. $15 - 2a - a$
14. $3n^2 + 3n - 18$
15. $35 + 36y + y^2$
16. $1 + 2a - 3a^2$
17. $x^2 - 6xy + 5y^2$
18. $3x^2 - 4x + 1$
19. $x^2y^2 - 4xy - 77$
20. $12r^2 + 14r - 20$

Iskudaridda dhowr jaad oo isireyn ah

Mararka qaarkood waxa la ina siiyaa tibaax aljebre oo tibixaheedu ay wadaagaan isir u dahsoon. Markaa, waxa habboon inaynu eegno in uu jiro isir ay wadaagaan, oo laga saari karo. Marka laga saaro isirka ka dhexeeya tibixaha, waxaan eegnaa inay tahay kuwa soo socda midkood.

1) Faraqa laba labajibbaar.
2) Saddextibix labajibbaaran.
3) Taranta laba labatibix.
4) Haddii saddexdaa midna aanay ahayn waa saddextibix mutuxan; waa saddextibix aan isirro lahayn.

U fiirso tusahan hoos ku yaal.

Faraqa labajibbaar	Saddextibix labajibbaaran	Taranta labatibix
$3y^2 - 27y$	$-x^2 + 2x - 1$	$5x^2 - 15x + 10$
$= 3y(y^2 - 9)$	$= -1(x^2 - 2x + 1)$	$= 5(x^2 - 3x + 2)$
$= 3y(y+3)(y-3)$	$= -1(x-1)^2$	$= 5(x-2)(x-1)$

5) Marka aad heshid isirrada tibixaale, waxaad qortaa isirrada oo dhan adoo ku daraaya wixii isir haltibix ah. Isirka haltibix ahi wuxuu noqon karaa taran, isirrada kale oo dhammise waa inay mutuxnaadaan. Taasi waxay tahay inaanu midna sii lahaan isirro. Markaas ayay isireyntu dhan tahay.
6) Had iyo jeer isku dhufo isirrada si aad u hubisid inay tarantoodu ku siiso tibaaxdii aad haysatay.

Marka aad isireyneyso tibixaale, kolka ugu horraysa raadi inuu jiro isir ay wadaagaan tibxuhu, dabadeedna raadi isirrada labatibixyada ah ee taranta inta hartay. Isirrada gebigood u qor sansaan taraneed.

Layli :

Sheeg isirka ay wadaagaan tibixuhu, dabadeedna raadi isirrada tibaaxahan :

1) $4x^2 - 16$

2) $15y^2 - 135$

3) $6x^2 + 18x - 126$

4) $12x^2 - 22x + 10$

5) $20r^2 - 32r + 24$

6) $49x^2 - 14x + 1$

7) $24y^2 - 56y + 48$

8) $-9ay^2 + 9ax^2$

9) $9m^2 - 24m + 16$

10) $225b^2 - 64y$

11) $ay^2 - 12axy + 36ax^2$

12) $3x^2 + 6x - 144$

13) $-16 - 10y - y^2$

14) $-56 - 15y - y^2$

15) $7a^2(a + 1) - 5a(a + 1) - 2(a + 1)$

16) $18x^2(x + 1) + 24x(x + 1) + 8(x + 1)$

17) $4n^2 - 40n - 96$

18) $5ax^2 - by^2 + bx^2 - 5ay^2$

19) $x^3 + x^2 - x - 1$

20) $m^4 - 13m^2 + 36$

Ku shaqaynta isirro tarantoodu tahay eber

Haddii aad ogtahay in taranta laba tiro ay tahay eber, maxaynu ka sheegi karnaa tirooyinkaas? Bal ka soo qaad in $a \cdot b = 0$, $a \neq 0$.

Kolba haddii $a \neq 0$ rogaalka (isweydaarka- iskudhufashada) a oo ah $\frac{1}{a}$ wuu jiraa, mana aha eber. Marka aan adeeg-

sanno xeerka isle'ekaanta iskudhufashada waxaan dhinac kasta ku dhufannaa $\frac{1}{a}$.

$ab = 0 \quad a \neq 0$	Dhinaca bidixda waxaan isticmaalnaa xeerka hormagelinta iskudhufashada. Dhinaca midigta xeerka iskudhufashada tiro iyo eber.
$\frac{1}{a}(ab) = \frac{1}{a}(0)$	
$\left(\frac{1}{a} \cdot a\right) b = 0$	Taranta tiro kasta iyo rogaalkeedu waa 1.
$1 \cdot b = 0$	Asal madoorshaha iskudhufashada.
$b = 0$	

Sidaas oo kale ayayanu u tusi karnaa in $a = 0$ haddii $ab = 0, b \neq 0$. Haddii $a = 0$, $b = 0$, kolkaas $ab = 0$.

Qeex :
Taranta laba tibxood ama wax ka badani waa eber haddii isirradeeda midkood tahay eber.

Tusaale :

Furfur isle'egtan $13(a - 5) = 0$.

Furfuris :

Waxaan naqaan in $13 \neq 0$, sidaas awgeed ayay

$$a - 5 = 0. \quad a = 5.$$

Ururka furfurista ee isle'gtan waa $\{5\}$

Tusaale :

Furfur isle'egtan $(x - 1)(x + 2) = 0$.

Furfuris :

Haddii $(x - 1)(x + 1) = 0$, kolkaas $(x - 1) = 0$ ama $(x + 2) = 0$.

Ururka furfurista ee $x - 1 = 0$ iyo $x + 2 = 0$ ayaa sameeya ururka furfurista ee $(x - 1)(x + 2) = 0$.

$$x - 1 = 0 \text{ ama } x + 2 = 0$$

$$x = 1 \text{ ama } x = -2$$

Ururka furfurista ee isle'gtan waa $\{1, -2\}$

Layli :

Furfur isle'egyadan :

1) $14(a - 6) = 0$
2) $13(a + 5) = 0$
3) $-12(a - 4) = 0$
4) $16(a - \frac{1}{4}) = 0$
5) $16(\frac{1}{a} - \frac{3}{4}) = 0$
6) $18(\frac{1}{5} + \frac{2}{a}) = 0$
7) $12(15 + t) = 0$
8) $0(t + 6) = 0$
9) $6(t + 6) = 0$
10) $65(15 - \frac{1}{5}y) = 0$

11) $(x + 3)(x - 2) = 0$
12) $(x + 7)(x - 5) = 0$
13) $(y + 4)(y - 6) = 0$
14) $0 = (y + 7)(y + 9)$
15) $0 = (x - 5)(x - 8)$
16) $0 = y(2y + 1)$
17) $0 = y(5 + 5)$
18) $(6y + 12)(3y - 18) = 0$
19) $(4x - 8)(-3x + 8) = 0$
90) $y(4y - 5)(y + 4) = 0$

Furfurista isle'egyada tibixaale adoo adeegsanaya isirayn :

Isle'eg tibixaale waa isle'eg dhinaceeda midig iyo dhinaceeda bidix ay yihiin tibixaale. Isle'eg tibixaale waxay u qoran tahay sansaan beegal haddii labadooda dhinac mid yahay eber, ka kalena uu yahay tibixaale tibixaha isu eg oo dhan la isu geeyey. Sansaanta beegalka ah ee $x^2 - 30x = 100$ waa $x^2 - 30x - 100 = 0$. Isle'egta sidan oo kale ah heerkeedu wuxuu yahay 2. Waxaana loo yaqaan isle'eg saabley ah. Heerka isle'eg tibixaale wuxuu yahay heerka ugu weyn ee tibixaheeda mid ka mid ahi leeyahay marka loo qoro sansaan beegal ah. Isle'eg heerkeedu yahay hal sida $2x + 4 = 3x - 5$ waxa loo yaqaan isle'eg toosan. Marka loo qoro sansaanta beegal ah waxay noqotaa $x - 9 = 0$. Isle'egta $x^3 - 4x^2 + 5x = 0$ heerkeedu yahay 3 waa isle'eg saddexjibbaar. Haddii isle'eg tibixaale aad u qortid sansaanta beegalka ah, oo dhinaca bidixda aad isiraysid, waxaad heshaa **furfuristeeda** ama **xididkeeda** marka isirrada ugu yaraan midkood le'eg yahay eber. Waayo mar kasta isirradu waxay yihiin kuwo la isku dhufanayo, oo dhufsanuhu yahay eber.

Tusaale :

Furfur isle'egta $x^2 - 5x = 24$.

Furfuris :

1) Isle'egta u qor sansaanta beegalka ah
$$x^2 - 5x - 24 = 0$$

2) Isiree dhinaca bidix
$$(x - 8)\ (x + 3) = 0$$

3) Isir kasta u sin eber
$$x - 8 = 0; \quad x + 3 = 0$$

4) Furfur isle'egyada toosan ee soo baxay
$$x = 8; \quad x = -3$$

5) Hubi xidid kasta adoo ku eegaya isle'gtii lagu siiyey
$$x^2 - 5x = 24$$

$(8)^2 - 5\ (8) = 24$ $\qquad$ $(-3)^2 - 5\ (-3) = 24$

$64 - 40 = 24$ $\qquad$ $9 + 15 = 24$

$24 = 24$ haa $\qquad$ $24 = 24$ haa

Ururka furfuristu waa $\{8, -3\}$

Waxa badanaaba dhacda marka aad furfurayso isle'eg tibixaale adeegsanaysana dariiqada isireynta in aad la kulantid siyaabaha soo socda :

1. Tibixa tibixaale oo leh isir ay wadaagaan oo tiro ah. Kolley isirka sidaas ahi maaha eber. Kolkaa, waxa fiican in aad ka saartid adoo u qaybinayaa tiradaa dhinac kasta.
2. Laba ama wax ka badan oo isirrada ah ayaa isku mid ah. Isirrada noocaas ah waxay ku siiyaan xididdo isku mid ah, oo loo baahan yahay in aad qortid mar kaliya markii aad taxaysid.

Tusaale :

Furfur : $4x^2 - 24x + 36 = 0$

Furfuris :

1) Dhinac kasta u qaybi 4
$$x^2 - 6x + 9 = 0$$

2) Raadi isirrada dhinaca bidix
$$(x - 3)\ (x - 3) = 0$$

3) Le'egkaysii isir kasta eber
$$x - 3 = 0; \quad x - 3 = 0$$

4) Furfur isleegta toosan ee soo baxday.
$$x = 3; \quad x = 3$$

5) Ku hubi isle'egtii lagu siiyey
$$4x^2 - 24x + 36 = 0$$
$$4\ (3)^2 - 24\ (3) + 36 = ?\ 0$$
$$4 \cdot 9 - 72 + 36 = ?\ 0$$
$$36 - 72 + 36 = ?\ 0$$
$$72 - 72 = ?\ 0$$
$$0 = 0$$

Masalocyin (weyddiino) kale waxaad kula kulmi isir haltibix ah oo ay wadaagaan tibixaha tibixaale oon tiro ahayn ee doorsoome ah. Isirka sidaas oo kale ihi wuxuu leeyahay qiima ah eber, waana xidid. Sidaas awgeed laguma saaro u qaybinta tibxaha.

Tusaale :

Furfur $x^3 - 4x^2 + 3x = 0$

Furufuris :

1) Raadi isirrada dhinaca bidix
$$x\ (x^2 - 4x + 3) = 0$$

2) Le'egkaysii isir kasta eber
$$x\ (x - 3)\ (x - 1) = 0$$

3) Furfur isle'egta toosan
$$x = 0; \quad x - 3 = 0; \quad x - 1 = 0$$

4) Ku hubi qiima kasta isle'egtii hore
$x = 0 \quad x = 3; \quad x = 1$

$x^3 - 4x^2 + 3x = 0$

1) $(0)^3 - 4\,(0)^2 + 3\,(0) = ?\,0$

$0 - 0 + 0 = ?\,0$

$0 = 0$; haa.

2) $(3)^3 - 4\,(3)^2 + 3\,(3) = ?\,0$

$27 - 36 + 9 = ?\,0$

$36 - 36 = ?\,0$

$0 = 0$; haa

3) $(1)^3 - 4\,(1)^2 + 3\,(1) = ?\,0$

$1 - 4 + 3 = ?\,0$

$4 - 4 = ?\,0$

$0 = 0$; haa

∴ Ururka furfuristu waa $\{0, 1, 3\}$.

Layli :

I. Furfur isle'egyadan soo socda. Hubi jawaabaha.

1) $x^2 - 3x + 2 = 0$
2) $x^2 - 7x + 10 = 0$
3) $x^2 + x - 2 = 0$
4) $x^2 - 2x - 3 = 0$
5) $x^2 - 3x = 0$
6) $x^2 + 7x = 0$
7) $x^2 + 7x + 12 = 0$
8) $y^2 - 2y - 8 = 0$
9) $y^2 - 2y + 1 = 0$
10) $x^2 - 5x + 4 = 0$
11) $y^2 - 9y = 0$
12) $y^2 - 9 = 0$
13) $x^2 = 16$
14) $m^2 - 8m - 9 = 0$
15) $5y^2 + 11y + 2 = 0$
16) $6x^2 + 13x - 5 = 0$

17) $8x^2 + 14x = 15$
18) $25y^2 = 9$
19) $6m^2 = 7m + 20$
20) $15d^2 + 23d - 28 = 0$
21) $70m = 24m^2 + 49$
22) $y^3 - 6y^2 - 40y = 0$
23) $d^3 + 8d^2 - 84d = 0$
24) $x^4 - 17x^2 + 16 = 0$
25) $(2m - 1)^2 + 3m\,(m - 3) = 3\,(m - 2)\,(m - 1) - 5$

II. Raadi isle'egta leh heerka ugu hooseeeya lehna ururka furfurista.

Tilmaan $x \in \{0, 2, -3\}$

Furfuris :

$x = 0; \quad x - 2 = 0; \quad$ ama $\quad x + 3 = 0$

$x = 0; \quad x = 2; \quad x = -3$

$x\,(x - 2)\,(x + 3) = 0$

$x\,(x^2 + x - 6) = 0$

$x^3 + x^2 - 6x = 0$

1) $y \in \{2, 4\}$
2) $x \in \{-1, 2\}$
3) $x \in \{2, 1\}$
4) $y \in \{1, -1, 2\}$
5) $x \in \{0, 3, 2\}$
6) $y \in \{-2, 3, 2, 3\}$
7) $m \in \{1, 2, 3\}$
8) $n \in \{0, -1, 1\}$

9) $r \in \left\{\frac{2}{3}, \frac{1}{4}\right\}$

Adeegsiga isireynta si loo furfuro masalo

Ilaa hadda waxaan soo aragnay sida loo furfuro isle'eg tibixaale, innaga oo adeegsannay isireyn. Hadda, waxaan furfuri doonaa mas'alooyin ku qoran weedho, kuwaas oo aan u beddelano xuruuf iyo tirooyin si furfuristu fudayd u noqoto.

Tusaale :

Laydi ayaa dhererkiisu ka weyn yahay 2 santimitir ballaciisa, bedka laydigu waa 99 sm oo labajibbaar ah. Raadi dhinacyada.

Furfuris :

Jidka bedka laydi waa: ballaca × dherer = lb.

Ballaciisu wuxuu yahay = x sm.

Dhererkiisuna = (x + 2) sm.

Bedka laydigu = 99 sm laba jibbaaran.

u qor sansaanta :

$$A = lb$$
$$99 = (x + 2)\ x$$
$$= x^2 + 2x$$
$$= x^2 + 2x - 99 = 0$$
$$x = -11, \text{ ama}$$
$$x = 9$$

Marka aynu helno xididdada isle'egta ayaan maskaxdeenna la kaashannaa, kolkaas waxaan tuuraynnaa xididka taban waayo ballacu ma noqdo tiro taban, jihana kama hadlayno.

Hubi $x^2 + 2x = ?\ 99$ $\quad (9)^2 + 2\ (8) = ?\ 99$

$81 + 18 = ?\ 99$ $\quad 99 = 99$

Ama bedka laydigu ma leeg yahay 99 sm oo labajibbaar ah. Ballacu waa x = 9sm. dhererkuna waa x + 2 = 9 + 2 = 11. Bedka = dherer x Ballac.

$$99 = 11 \times 9$$

Ururka furfuristu wuxu ina siiyaa jawaabaha **suuragalka** ah. Waxa inala gudboon in aynu kala saarno iyadoo la tixgalinayo markasta sida weedhaha mas'aladu u qoran tahay, si loo helo jawaabta **runta ah.**

Tusaale :

Iskaashato ayaa rabta inay dhulkeeda ku wareejiso dayr taar ah. Haddii dhulkeedu uu yahay 20,000 mitir oo labajibbaar ah, ballaca dhulkeeduna uu ka yar yahay 100 mitir dhererka. **Taarka** ay haysato iskaashataduna **waa** 1000 mitir dhererkiisu. Intee mitir ayaa uga soo haraysa taarka.

Furfuris :

Waxa loo baahan yahay in aynu helno dhererka iyo ballaca dhulka iskaashatada.

Bedka dhulku wuxuu yahay = 20,000 mitir oo labajibbaar ah.

Bedka dhulku wuxuu leeg yahay = Ballac x dherer.

Dhererka dhulku wuxuu ka weyn yahay 100 mitir ballaca.

Kolkaas haddii ballacu yahay x mitir, dhererkuna waa (x + 100) mitir.

Bed = ballac × dherer

20,000 = x (x + 100)

20,000 = x^2 + 100x

x^2 + 100x − 20,000 = 0

$(x + 200)\ (x - 100) = 0$

$x = -200$ ama $x = 100$. Kolkaa waynu tuuri -200,

sidaas awgeed ayaa ballaca dhulku yahay 100 mitir, dherrekuna waa $x + 100 = 100 + 100$ mitir. Dhererka taarku waa 1000 mitir, kolkaas si aan u ogaano inta u soo haraysa waxa loo baahan yahay in aynu helno wareegga dhulka.

Wareegga dhulku $= 2$ (ballac + dherer)

$= 2\ (100 + 200) = 2 \times 300 = 600$ mitir.

Iskaashatadu waxay haysataa 1000 mitir oo taar ah, waxayna ka isticmaali rabtaa 600 mitir

Inta taarka uga hartay = dhererka taarka dhan − taarka inta ay ka isticmaashay.

Inta taarka uga hartay = 1000m − 600m = 400 mitir.

Layli :

1. Haddii tiro aan labanlaabno, dabadeedna ku darno 3, labajibbaarka tiradaasu waxay tahay 81. Maxay ahayd tiradii hore.
2. Salka saddexagal wuxuu ka weyn yahay joogga saddexagalka 7 sentimitir. Bedka saddexagalku waa 39 sm^2. Raadi joogga.
3. Bedka saddexagal BTJ waa 56 santimitir oo labajibbaar ah. Raadi qiimaha salka iyo joogga, haddii joogu 6 sm salka ka weyn yahay.
4. Dhinac laydi ayaa ka weyn ka kale 4 sm. Haddii Bedka laydigu yahay 320 sm oo labajibbaar ah. waa maxay dhererka labada dhinac.
5. Dhererka qol wuxu 4 fuudh ka weyn yahay ballaca qolka. Haddii bedka qolku uu yahay 21 fuudh oo laba jibbaar ah, waa maxay dhererka iyo ballaca qolku?

6. Waa maxay laba tiro oo faraqoodu yahay 4, tarantooduna tahay 221.
7. Waa maxay laba tiro oo faraqoodu yahay 7, tarantooduna tahay 144.
8. Laba tiro ayaa faraqoodu yahay 4. Wadarta labada tiro oo labajibbaaranna waa 170. Raadi labada tiro.
9. Raadi laba tiro oo wadartoodu tahay 30, tarantooduna tahay 200.
10. Wareegga qol waa 60 mitir, bedka qolkaasi waa 209 mitir oo labajibbaar ah. Waa maxay dhererka iyo ballaca qolku?
11. Raadi laba abyoone oo isku xiga oo ay tarantoodu tahay 132.
12. Raadi laba tiro oo dhaban ah oo isku xiga, tarantooduna tahay 80.
13. Raadi laba tiro oo kisi ah oo isku xiga, tarantooduna tahay 143.
14. Labajibbaarka tiro waxay ka yar tahay 88 toban iyo sagaal laabka tirada nafteeda. Waa maxay tiradaasu.
15. Tirooyinka 13 iyo 21 ayaa labadooduba in isleeg laga jaray. Taranta tirooyinka cusubi waa 153. Maxay ahayd inta laga jaray labada tiro?

Dhammaystirka labajibbaarka

Badanaaba kuuma suurtowdo in aad furfurtid isleeg saabley adoo adeegsanaya dariiqada isireynta. Marka aad la kulantid isleeg saabley oo aanad isirradeeda heli karin, waxaa habboon in aad taqaanid dariiqooyin kale oo aad ku furfurtid.

Isleegta $x^2 + x - 1 = 0$ oo kale ma laha isirro aan aragtiku garan karno. Haddaba, sidee baan u furfuri karnaa? Dariiqada loo yaqaan dhammaystirka labajibbaarka waxaa loo baahan yahay in aad u beddelatid isle'eg kasta oo saabley sansaanta ah $(ax + b)^2 = t$, dabeetana aad furfurtid.

Waxaan naqaan in tibaax saabley ay tahay labajibbaar dhan oo saddextibix haddii laba ka mid ah saddexda tibxood ay yihiin labajibbaar dhan, ta saddexaadna labanlaabka taranta xididdada labajibbaarka ee labada tibixood ee kale.

TILMAAN : $4x^2 + 12x + 9$ waxay tahay labajibbaar dhan oo saddextibix, waayo $4x^2$ iyo 9 waxay yihiin labajibbaarka 2x iyo 3. Tibixda dhexda oo ah 12x waxay tahay labanlaabka taranta 2x iyo 3.

Tusaale :

Waxaad qortaa kuwa soo socda, buuxina tibixaha maqan, si ay u noqdaan labajibbaar dhan.

Furfuris :

b) $x^2 + 14$ — $14x = 2\,(7x)$. Kolkaas tibixda maqani waxay tahay $(7)^2$ ama 49. $x^2+14x+49$ waxay tahay labajibbaar dhan oo saddextibix.

t) $x^2 + 25$ — Xididdada labajibbaarka ee x^2 iyo 25 waxay yihiin x iyo 5. Tibixda maqani waa $2\,(5)\,(x) = 10x$. $x^2 + 10x + 25$ waa labajibbaarka dhan ee saddextibixa.

j) $4x^2 + 16$ — Taranta xididdada labajibbaarrada labada tibixood waxay tahay $(2x)\,(4) = 8x$. Tibixda maqani waa labanlaabka tarantooda ama 16x. $4x^2 + 16x + 16$ waa labajibbaarka dhan ee saddextibix.

x) $9x^2 + 30x$ — Xididka labajibbaarka tibixda hore waa 3x. 30x waxay leegtahay $(3x)\,(10)$ ama $2\,(3x)\,(5)$, haddaba tibixda maqani waa 5^2 ama 25; $9x^2 + 30x + 25$ waa labajibbaarka dhan ee saddextibixa.

Tusaale :

Waxaad u qortaa isleegyada sansaanta $(x + b)^2 = t$. Raadi qiimaha b iyo t.

1) $x^2 + 5x = 13$

$$x^2 + 5x + \left[\frac{5}{2}\right]^2 = 13 + \left[\frac{5}{2}\right]^2.$$

Maxaan ugu darnay $\left[\frac{5}{2}\right]^2$ dhinac kasta? Isleeg labada dhinac way isleeg yihiin. Sidaas awgeed ayaa wax isleeg dhinac kasta aynu ugu darnay.

$$x^2 + 5x + \frac{25}{4} = \frac{52}{4} + \frac{25}{4}$$

$$\left[x + \frac{5}{2}\right]^2 = \left[\frac{52}{4}\right] + \left[\frac{25}{4}\right]$$

Raadi isirrada dhinaca bidix

$$\left[x + \frac{5}{2}\right]^2 = \frac{77}{4}$$

$$b = \frac{5}{2}; \quad t = \frac{77}{4}$$

2) $5 + 8x = 2x^2$

$2x^2 - 8x = 5$ — Dhinac u wada wareeji tibxaha x leh.

$x^2 - 4x = \frac{5}{2}$ — Dhinac kasta u qaybi 2.

$x^2 - 4x + 4 = \left[\frac{5}{2}\right] + 4$ Dhinac kasta u gee 4.

$(x-2)^2 = \left[\frac{5}{2}\right] + \left[\frac{8}{2}\right]$ Raadi isirada dhinaca bidixda.

$$(x-2)^2 = \frac{13}{2}$$

$$b = -2; \quad t = \frac{13}{2}$$

I. Guuri weydiimaha 1 ilaa 20, buuxina meelaha maran, si tibaaxdu u noqoto labajibbaar dhan ee saddextibixyada :

1. $x^2 - 12x + (\quad)$
2. $4t^2 + 4t + (\quad)$
3. $x^2 - (\quad) + 0$
4. $(\quad) - 20d + 25$
5. $8x + (\quad)$
6. $x^2 + 11x + (\quad)$
7. $4x^2 + (\quad) + 10$
8. $5x + 9 + (\quad)$
9. $8x + (\quad) + 10$
10. $25 - 36t + (\quad)$
11. $4y^2 + 20xy + (\quad)$
12. $(1 + t)^2 + 4(1 + t) + (\quad)$
12. $(1 + t)^2 + 4(1 + t) + (\quad)$
13. $x^2 + 5x + (\quad)$
14. $9j^2 + 30j + (\quad)$

15. $100y^2 - (\quad) + 9$
16. $(\quad) + 35s + 36$
17. $25 + 70s + (\quad)$
18. $x^2 + (\quad) + 20$
19. $9x^2 + 3x + (\quad)$
20. $m^4 - 10m^2 + (\quad)$

II. Weydiimaha 21 ilaa 36 waxaad u qortaa sansaanta $(x + b)^2 = t$. Waxaad u qaybisaa tibix kasta ee isle'egta weheliyaha x^2 (Haddaanu ahayn 1).

21. $x^2 - 6x = 11$
22. $x^2 + 16x - 3 = 0$
23. $x^2 + 5x = 5$
24. $2x^2 + 8x + 3 = 0$
25. $3x^2 + 6x - 2 = 0$
26. $2x^2 + 6x = 7$
27. $3x^2 - 9x = 0$
28. $5x^2 + 10x - 12 = 0$
29. $2x^2 - 3x + 7 = 0$
30. $ax^2 + 2bx + t = 0$
31. $x^2 + dx + j = 0$
32. $(x + 2)(x - 3) = 0$
33. $21x = 7 - 14x^2$
34. $5x^2 + x = 0$
35. $(x + 1)(x - 1) = 4x$
36. $nx = m^2 - tx^2$

Furfurista isle'eg saabley iyadoo la adeegsanayo dhammaystirka labajibbaarka

Ilaa hadda waxaynu barannay sida isle'eg saabley ah loogu qoro sansaanta $(x + b)^2 = t$. Kolkaa, waxa inoo furan in aan baranno sida loo furfuro isle'eg saabley ah, iyadoo la adeegsanayo dhammaystirka labajibbaarka.

Tusaale :

Furfur isle'egtan adoo adeegsanaya dhammaystirka labajibbaarka.

Furfuris : $x^2 - 6x - 7 = 0$

$x^2 - 6x = 7$ Markasta tibixda tirada ah geyso dhinaca midigta. Sababtu maxay tahay?

$x^2 - 6x + 9 = 7 + 9$ dhinac kasta u geyso weheliyaha tibixda dhexda oo aad u qaybiso laba, dabadeedna aad labajibbaarto. Sababta taas aan u samaynaynaa waxay tahay in aan ognahay in labajibbaarka dhan ee saddextibix uu ka kooban yahay saddex tibixood oo ay laba yihiin labajibbaarro dhan, ta saddexaadna labanlaabka taranta xididdada labajibbaarrada tibixaha labajibbaaran. Kolkaa, innagu waxaan raadinaynaa in aan ku qorno dhinaca bidix ee isle'egta iyadoo ah labajibbaar dhan.

$(x - 3)^2 = 16$ Dhinaca bidix isiree, isle'egtana u dhig sansaanta $(x + b)^2 = t$.

$(x - 3)^2 - 16 = 0$ Dhinac kasta ku dar (-16).

$$\Big[(x - 3) + 4\Big]\Big[(x - 3) - 4\Big] = 0$$

Waxaynu naqaan haddaynu haysano $x^2 - y^2$

inay isirradeedu yihiin $(x + y)(x - y)$.

Markaa $(x - 3) + 4 = 0$ ama $(x - 3) - 4 = 0$

$x + 1 = 0$ ama $x - 7 = 0$

$x = -1$ ama $x = 7$

Hubin: Qiimayowga, x, ku beddel isle'egta $x^2 - 6x - 7 = 0$.

Marka $x = -1$

$$(-1)^2 - 6(-1) - 7 \overset{?}{=} 0$$

$$1 + 6 - 7 \overset{?}{=} 0$$

$$7 - 7 \overset{?}{=} 0$$

$$0 = 0$$

Marka $x = 7$

$$(7)^2 - 6(7) - 7 \overset{?}{=} 0$$

$$49 - 42 - 7 \overset{?}{=} 0$$

$$49 - 49 \overset{?}{=} 0$$

$$0 = 0$$

Tusaale :

Furfur adoo adeegsanaya dhammaystirka labajibbaarka :

$$x^2 + 5x - 6 = 0$$

Furfuris :

$x^2 + 5x - 6 = 0$

$x + 5 = 6$ **Madoorsoomaha geyso dhinaca midig.**

$x^2 + 5x + \frac{25}{4} = 6 + \frac{25}{4}$ Dhinac kasta u gee weheliyaha tibixda dhexe oo aad u qaybiso laba, dabadeedna aad labajibbaarto.

$\left[x + \frac{5}{2}\right]^2 = \frac{49}{4}$ Isle'egta u dhig sansaanta $(x + b)^2 = t$.

$\left[x + \frac{5}{2}\right]^2 - \frac{49}{2} = -$ Dhinac kasta ku dar $-\frac{49}{2}$.

$\left\{\left[x + \frac{5}{2}\right] + \frac{7}{2}\right\} \left\{\left[x + \frac{5}{2}\right] - \frac{7}{2}\right\} = 0$

Isiree dhinaca bidix.

$\left[x + \frac{12}{2}\right]\left[x - \frac{2}{2}\right] = 0$

$(x + 6)(x - 1) = 0$

Markaa, $x + 6 = 0$ ama $x - 1 = 0$

$x = -6$ ama $x = 1$

Hubin : Qiimayowga x ku beddel isle'egta

$$x^2 + 5x - 6 = 0$$

Marka $x = -6$

$$(-6)^2 + 5(-6) - 6 \overset{?}{=} 0$$

$$36 - 30 - 6 \overset{?}{=} 0$$

$$36 - 36 \overset{?}{=} 0$$

$$0 = 0$$

Marka $x = 1$

$$(1)^2 + 5(1) - 6 \overset{?}{=} 0$$

$$1 + 5 - 6 \overset{?}{=} 0$$

$$6 - 6 \overset{?}{=} 0$$

$$0 = 0$$

Layli :

1. $x^2 + 2x - 15 = 0$
2. $x^2 + 2x - 5 = 0$
3. $x^2 + 2x - 3 = 0$
4. $2x^2 + 4x + 2 = 0$
5. $x^2 - 3x + 4 = 0$
6. $x^2 + 7x + 10 = 0$
7. $5x^2 - 7x = x^2 + 2x - 5$
8. $4x - 1 = -x^2 - 3x - 13$
9. $3x^2 - 2x - 1 = 0$
10. $x^2 - 7x - 18 = 0$
11. $x^2 + 4x + 4 = 0$
12. $x^2 - 5x = 24$
13. $x^2 - 2x - 8 = 0$
14. $y^2 - 9y = 9$
15. $x^2 - 2x - 2 = 0$
16. $3y^2 - 4y = 4$

17. $2x^2 - 4x + 1 = 0$

18. $5x^2 + x - 6 = 0$

19. $ax^2 + bx + t = 0$

20. $kx^2 - kx - 1 = 0$

Jidka Saabley

Isle'eg kasta oo jibbaarka ugu weyn ee doorsoomuhu uu yahay **2 waxa lagu qori karaa sansaanta $ax^2 + bx + t = 0$, $a \neq 0$.** a, b, iyo t waa madoorsoomayaal. Isle'egta $2x^2 - 3x + 6 = 0$, **$a = 2$; $b = -3$; $t = 6$ sidaas oo kale** isle'egta $x^2 - 17 = 0$ **$a = 1$; $b = 0$; $t = -17$.**

$6x^2 = 8 - x$ waxay noqonaysaa $6x^2 + x - 8 = 0$ marka aan isugu wareejino dhinaca bidix, dabadeedna tibixaha is leh **raadsanno.**

Kolkaa, $a = 6$; $b = 1$; $t = -8$. Isle'egta $(4 - x)^2 = 7$ **waxaan u qori karnaa sida sansaanta guud haddii aynu kala bixinno** dhinaca bidix, dabadeedna tibixaha isle isla raadsanno.

$$(4 - x)^2 = 7$$

$$16 - 8x + x^2 = 7$$

$x^2 - 8x + 9 = 0$, Kolkaas $a = 1$; $b = -8$; $t = 9$

Kol haddii ay tahay $ax^2 + bx + t = 0$ sansaanta guud ee isleeg kasta oo saabley, oo aan dabadeedna furfurno waxa innoo soo baxa qiimaha x oo inoogu samaysan madoorsoomayaasha a, b, iyo t. Waxa inooga soo baxa waxan u qaadan karnaa in ay tahay **jid** aan raacno markii aan doonayno in aan furfurno isle'eg saabley sansaanta guud u qoran, a, b, iyo t waa tirooyin maangal ah. Haddii $a = 0$, isle'egteenu waxay isu beddelaysaa $bx + t = 0$ oo ah isleeg toosan. Taasi waxay ina tusaysaa in a marna aanay le'egkayn eber haddii isle'egtu tahay saabley.

Furur isleegta $ax^2 + bx + t = 0$ adoo adeegsanaaya dhammaystirka labajibbaarka.

$ax^2 + bx + t = 0$

$$x^2 + \frac{b}{a}x + \frac{t}{a} = 0$$ **Dhinac kasta u qaybi a.**

$$x^2 + \frac{b}{a}x = -\frac{t}{a}$$ **Dhinac kasta ku dar $-\frac{t}{a}$**

$$x^2 + \frac{b}{a}x + \left[\frac{b}{2a}\right]^2 = -\frac{t}{a} + \left[\frac{b}{2a}\right]^2$$ **Waxaa habboon si aad u buuxisid labajibbaarka dhinaca bidix in** aad u geysid weheliyaha tibixda dhexe oo laba loo qaybshay lana labajibbaaray.

$$\left[x + \frac{b}{2a}\right]^2 = -\frac{t}{a} + \frac{b^2}{4a^2}$$ **Raadi isirrada dhinaca bidix**

$$\left[x + \frac{b}{2a}\right]^2 = \frac{-4at + b^2}{4a^2}$$ **Isku dar tibxaha dhinaca midig.**

$$\left[x + \frac{b}{2a}\right]^2 = \frac{b^2 - 4at}{4a^2}$$ **Xeerka kala hormarinta isugeynta.**

Haddii aan u qaadanno in :

$$\Delta = \frac{b^2 - 4at}{4a^2}$$

isleegtii waxa ay u qormaysaa sidan :

$$\left\{x + \frac{b}{2a}\right\}^2 - \left\{\sqrt{\Delta}\right\}^2 = 0$$

Marka aan isiraynno dhinaca bidix ee isleegta waxa aan heleynaa :

$$\left\{\left[x + \frac{b}{2a}\right] + \sqrt{\Delta}\right\}\left\{\left[x + \frac{b}{2a}\right] - \sqrt{\Delta}\right\} = 0$$

$$\left\{x + \left[\frac{b}{2a} + \sqrt{\Delta}\right]\right\}\left\{x + \left[\frac{b}{2a} - \sqrt{\Delta}\right]\right\} = 0$$

Waxa aad arki kartaa in

$$\left\{x + \left[\frac{b}{2a} + \sqrt{\Delta}\right]\right\} = 0$$

ama $\left\{x + \left[\frac{b}{2a} - \sqrt{\Delta}\right]\right\} = 0$

$$\therefore \quad x = -\frac{b}{2a} - \sqrt{\Delta}$$

ama $\quad x = -\frac{b}{2a} + \sqrt{\Delta}$

$$x = -\frac{b}{2a} - \sqrt{\frac{b^2 - 4at}{4a^2}}$$

ama $\quad x = -\frac{b}{2a} + \sqrt{\frac{b^2 - 4at}{4a^2}}$

Waxa aan u qori karnaa sidan fudud.

$$x = \frac{-b \pm \sqrt{b^2 - 4at}}{2a}$$

Tusaale :

Furfur adoo adeegsanaaya jidka saabley.

Furfuris :

$$x^2 - 4x + 3 = 0$$

Jidka saabley wuxu yahay $x = \dfrac{-b \pm \sqrt{b^2 - 4at}}{2a}$

$b = -4$, Kolkaas $-b = 4$

$a = 1$

$t = 3$

Qiimayaasha $-b$, a, iyo t ayaan ku beddelaynaa

$$x = \frac{4 \pm \sqrt{(-4)^2 - 4 \cdot 1 \cdot 3}}{2 \cdot 1}$$

$$x = \frac{4 \pm \sqrt{16 - 12}}{2}$$

$$x = \frac{4 + \sqrt{4}}{2} = \frac{4 + 2}{2} = \frac{6}{2} = 3$$

ama $x = \dfrac{4 - \sqrt{4}}{2} = \dfrac{4 - 2}{2} = \dfrac{2}{2} = 1$

Ururka furfuristu waa $\{1, 3\}$

Tusaale 2 :

Furfur adoo adeegsanaya jidka saabley

$$3x^2 + 5x - 8 = 0$$

Furfuris :

$a = 3$

$b = 5$ kolkaas $-b = -5$

$t = -8$

$$x = \frac{-b \pm \sqrt{b^2 - 4at}}{2a}$$

$$x = \frac{-5 \pm \sqrt{5^2 - (4)\ (3)\ (-8)}}{2 \times 3}$$

$$x = \frac{-5 \pm \sqrt{25 + 96}}{6}$$

$$\frac{6}{}$$

$$x = \frac{-5 \pm \sqrt{121}}{6}$$

$$x = \frac{-5 \pm 11}{6}$$

$$x = \frac{-5 + 11}{6} = \frac{6}{6} = 1$$

$$x = \frac{-5 - 11}{6} = \frac{-16}{6} = \frac{-8}{3}$$

Ururka furfuristu waa $\left\{1, -\frac{8}{3}\right\}$

Layli :

Furfur isleegyadan. Adeegso jidka saabley :

1) $2x^2 + 7x + 3 = 0$
2) $7x^2 - 2x + 6 = 0$
3) $x^2 + (-x) + \frac{1}{2} = 0$
4) $4x^2 - 2x + 12 = 0$
5) $x^2 - -x + 3 = 0$
6) $10x^2 - 9x - 9 = 0$
7) $4x^2 - x = 0$
8) $62^2 + 12x + 9 = 0$
9) $2x^2 + 3x + 1 = 0$
10) $x^2 + 5x + 6 = 0$
11) $x^2 - 4x - 21 = 0$
12) $3x^2 + 2x - 5 = 0$
13) $2x^2 = 4 - 3x$
14) $5x^2 = 0$
15) $x^2 - 3x + 4 = 0$
16) $5x^2 - 7x - 6 = 0$
17) $4x^2 - 12x - 7 = 0$
18) $2x^2 - 6x - 56 = 0$
19) $x^2 - x - 6 = 0$
20) $x^3 - x^2 - 2x = 0$
21) $kx^2 + lx + m = 0$
22) $ax^2 + 2x - 3 = 0$
23) $(2x - 3)^2 = 10$
24) $\dfrac{y + 2}{y - 3} = 2y$
25) $3x^2 - 14 = 0$

Ku shaqeynta Jajabyo

Jajab iyo Saami

3 — 1 Qeexda jajab aljebra.
Qayb allaale qaybtii isu keenta laba tibixood oo aljebra,

sida $\frac{3}{1}, \frac{4}{11}, \frac{-3}{5}, \frac{x}{6}, \frac{1}{s}$ iyo $\frac{m^2 + 3m + 1}{2n - 3}$ ayaa loo yaqaan jajab aljebra.

U qaybinta eber (eber oo qaybshe ah) la ma oggola; kol haddii aan la oggolaynna jajab wuxuu si fiican u qeexan yahay marka hooseeyihiisu aanu ahayn eber. U fiirso jajabka hoos ku yaal marka x aan lagu beddelan karin tirooyinka qaarkood. Si aad u heshid tirooyinkaas laga tagaayo ee aan beddeli karin x, waxad leekeeysiisaa hooseeyaha oo dhan eber. Isleegta kuu soo baxdana furfur.

Jajab	$\frac{1}{x}$	$\frac{1}{x-4}$	$\frac{3x+4}{x+3}$	$\frac{2x+6}{4}$	$\frac{6}{x^2-4}$
Tirooyinka laga tagaayo ama aan la qaadan karin	0	4	−3	ma jirto tiro aan la qaadan karin	2 iyo −2

Layli :

Raadi qiimaha doorsoomaha ee jajabku aanu qeexnayn (jajabka ayaan macna lahayn).

Tilmaan

1) $\frac{m}{2m - 4}$ Waxaanay qeexnayn marka $m = 2$; waayo $(2 \cdot 2) - 4 = 0$.

2) $\frac{x + 2}{x^2 + 3x + 2}$ Waxaanay qeexnayn marka $x = -2$ iyo -1; waayo $x^2 + 3x + 2 =$

$(x + 2)(x + 1)$ sidaas awgeed ayaa

$(-2 + 2)(-2 + 1) = 0 \cdot -1 = 0$

$(-1 + 2)(-1 + 1) = 1 \cdot 0 = 0$

3) $\frac{1}{x - y}$ Waxaanay qeexnayn marka $x = y$ waayo $x - y = 0$.

1. $\frac{1}{3x}$

2. $\frac{x^2 + 3}{x + 4}$

3. $\frac{a - 8}{a - 8}$

4. $\frac{y + 5}{y^2}$

5. $\frac{1}{t^2 + 4t + 4}$

6. $\frac{4y + 16}{y^2 - y - 72}$

7. $\frac{8y + 4}{5y + 15}$

8. $\frac{3f^2 + 6f + 9}{f^2 - 6f + 9}$

9. $\frac{2x + 9}{x^2 + x - 90}$

10. $\frac{a + 4}{a^2 - 4}$

11. $\frac{3y}{y^2 - 9}$

12. $\frac{x + 4}{x^2 - 16}$

13. $\frac{1}{x(x - y)}$

14. $\frac{mn}{m^2 + 2mn + n^2}$

15. $\frac{r + d}{r^2 - d^2}$

Fududaynta Jajab

Jajabka $\frac{4}{9}$ iyo $\frac{12}{27}$ waxay sheegaan tiro kaliya; waayo had-

dii aan isticmaalno astaanta qaybta waxaan naqaan in $\frac{12}{27} = \frac{4 \cdot 3}{9 \cdot 3} = \frac{4}{9}$. Sidaas oo kale ayaa jajab sansaantiisu tahay $\frac{3x}{4x}$ u leeg yahay $\frac{3}{4}$ waayo $\frac{x}{x}$ ayaa leeg 1 haddii aanay $x \neq 0$.

Tusaalahani wuxuu caddaynayaa astaanta isku dhufashada jajab.

Ku dhufashada iyo u qaybinta hooseeyaha iyo sarreeyaha jajab tiro isku mid ah, oon ahayn eber, waxay ku siisaa jajab leeg kii aad awal haysatay.

Sidaas awgeed ayaa $\frac{-30}{36} = \frac{-5 \cdot 6}{6 \cdot 6} = \frac{-5}{6}$, $\frac{24x}{12x^2} = \frac{2 \cdot 12x}{x \cdot 12x} = \frac{2}{x}$ haddii $x \neq 0$.

Jajab wuxuu u qoran yahay sansaanta ugu fudud marka sarreeyaha iyo hooseeyaha aanu ka dhaxeyn isir ay wadaagaan oo aan ahayn 1 iyo -1. Fududaynta jajab waxay la mid tahay adoo u qaybiya hooseeyaha iyo sarreeyaha isir weynaha ay wadaagaan.

Tusaale 1 :

Fududee $\dfrac{24x + 6}{8x^2 - 6x - 2}$

Furfuris :

1. Raadi isirrada sarreeyaha iyo hooseeyaha

$$\frac{6\,(4x + 1)}{(2x - 2)\,(4x + 1)}$$

2. U qaybi sarreeyaha iyo hooseeyaha isir weynaha ay wadaagaan oo ah $4x + 1$

$$\frac{6\,(4x + 1) \div (4x + 1)}{(2x - 2)\,(4x + 1) \div (4x + 1)}$$

3. Fududee waxa kuu soo baxa $\dfrac{6}{6x - 2} = \dfrac{3}{x - 1}$

haddii $x \neq 1$. Haddii $x = 1$ jajabkii awal aynu haysanay ayaa noqonaya mid aan micna lahayn.

Tusaale 2 :

Fududee $\dfrac{8 - m}{m^2 - 64}$

Furfuris :

$$\frac{8 - m}{m^2 - 64} = \frac{8 - m}{(m - 8)\,(m + 8)}$$

$$8 - m = -1\,(m - 8)$$

Kolkaa, $\dfrac{-1\,(m - 8)}{(m - 8)\,(m + 8)} = \dfrac{-1}{m + 8}$ haddii $m \notin \{-8, 8\}$

Jajabka $\dfrac{-1}{m + 8}$ waxa loo qori karaa sansaanta ah $-\dfrac{1}{m + 8}$,

waayo jajab waxaad fududayn kartaa uun marka sarreeyaha iyo hooseeyaha oo kaliya ay leeyihiin isir ay wadaagaan. Isgarab dhig labadan jajab ee hoos ku yaal.

$$\frac{2 \cdot 3}{2} = \frac{3}{1} \qquad \frac{2+3}{2} = \frac{5}{2}$$

$$\frac{a \cdot b}{a} = \frac{b}{1} \text{ Haddii } a \neq 0. \qquad \frac{a+b}{a} = \frac{a+b}{a}$$

a iyo b waa isirrada sarreeyaha. Jajabkan waa la fududayn karaa waayo a waxay tahay isir ay wadaagaan sarreeyaha iyo hooseeyuhu.

Haddii $a \neq 0$.

a iyo b midna maaha isirada sarreeyaha. Jajabkanna lama fududayn karo, waayo ma jiro isir ka dhaxeeya ama ay wadaagaan sarreeyaha iyo hooseeyuhu (1) iyo -1 mooye.

Tusaale 3 :

Waxaad ku qortaa run ama been jajabka soo socda :

b) $\frac{am}{a} = \frac{m}{1} = m$ haddii $a \neq 0$ (Run)

t) $\frac{m+n}{n} = m + 1$ haddii $m \neq 0$ (Been)

Tusaalayaasha 3 (b) iyo 3 (t) waxay raacsan yihiin xeerka sare waayo 3 (b) waxay run ku noqotay a iyo m waa isirro kolkaas sarreeyaha iyo hooseeyuhu waxay leeyihiin isir ay wadaagaan oo ah a. 3 (t) waa been waayo m iyo n waa la isugeeyey ee maaha isirrada sarreeyaha.

Layli :

1. U qor jajabyadan soo socda sansaanta ugu fudud, u fiirso xannibaadda qiimaha doorsoomayaasha.

1. $\frac{xy}{20x^2y}$

2. $\frac{10mn^2}{15mn}$

3. $\frac{-24mn^2}{30mn}$

4. $\frac{-5x^2y}{-16xy}$

5. $\frac{1-m^2}{m-1}$

6. $\frac{5d-5r}{5d+5r}$

7. $\frac{x^2-16}{x^2-8x+16}$

8. $\frac{5x+10}{x^2+4x+4}$

9. $\frac{m^2n-n}{m^2-1}$

10. $\frac{x^2-4x+4}{y^2-4y+4}$

11. $\frac{2x^2+x-15}{2x^2+11x+15}$

12. $\frac{x^2+x-30}{x^2-8x+15}$

13. $\frac{4x^2+12x+19}{4x^2-9}$

14. $\frac{y^2-6y-54}{y^2-81}$

15. $\frac{x^3+5x^2+6+}{x^2+x-6}$

II. Sharax waxayna jajabyadani u ahayn sax:

1) $\frac{x+3}{4x} \;?\; \frac{1+3}{4} = 1$

2) $\frac{9+y}{3+y} \;?\; \frac{9}{3} = 3$

3) $\dfrac{m-6}{m+6} \stackrel{?}{=} \dfrac{6-6}{6+6} = \dfrac{0}{12} = 0$

4) $\dfrac{4+m^2}{4+m} \stackrel{?}{=} \dfrac{1+m}{1+1} = \dfrac{1+m}{2}$

5) $\dfrac{bx+x}{x} \stackrel{?}{=} \dfrac{b}{1} = b$

III. U qor jajabyadan sansaanta ugu fudud, adoo u fiirsanaya xannibaadda qiimaha doorsoomaha.

1) $\dfrac{5x^2-11x+6}{5x^2-x-6}$

2) $\dfrac{7x^2+x-8}{7x^2-15x+8}$

3) $\dfrac{6y^3+18y^2+12y}{6y+3y^2-3y^3}$

4) $\dfrac{5t^3-15t^2-10t}{8t^3-16t^2}$

5) $\dfrac{6a^3b-6a^2b-36ab^3}{8a^3b-8a^2b-48ab^3}$.

Saami

Haddii la isgarab dhigo inta ka soo baxda labada warshadood ee kalluunka ee Laasqoray iyo Qandala, oo Laasqoray ay soo saarto 15,000 qasaacadood maalintii, Qandalana 5.000 oo qasaacadood maalintii, waxaan oran karnaa Laas-qoray waxay

soo saartaa 3 laabka Qandala. Isgarabdhigga waxa ay soo saaraan labada warshadood waxa lagu helay isuqaybinta laba-

da tiro : $\dfrac{15{,}000}{5{,}000} = 3.$

Waxa kaloo la oran karaa maalin walba inta labada warshadood soo saaraan waa **Saamiga** 3 ka 1. Waxana loo qoraa 3 : 1 **Saamiga** hal tiro iyo tiro kale waxay tahay qaybta tirada hore oo loo qaybiyey ta dambe. Saami waa isgarab dhig laba tiro, oo loo adeegsado isuqaybin. Saamiga 5 ka 4 waxa loo dhigi karaa sidan oo kale :

1. Isu qaybinta labada tiro iyadoo la adeegsanaayo astada qaybta: ⟶ 5 ÷ 4,
2. Isu qaybinta labada tiro iyadoo la adeegsanaayo astada Saamiga : ⟶ 5 : 4.
3. Jajab ⟶ $\dfrac{5}{4}$.

Saamiga 5 : 4 isma garab dhigo uun tirooyinka 5 iyo 4 oo kaliya ee wuxuu isgarab dhigi karaa tirooyinka 10 iyo 8; 15 iyo 12; —25 iyo —20; 5m iyo 4m haddii $m \neq 0$. Taasna waxa lagu helay isticmaalidda astaanta isku dhufashada jajabka. Hase ahaatee haddii xarriiq 2 mitir ah aad garab dhigtid mid 40 santimitir ah, waxa loo baahan yahay in aad u rogtid 2 mitir santimitirro ama 40 santimitir mitirro, dabadeedna aad isu garab dhigtid sidan oo kale:

2 mitir = 2x100 santimitir = 200 santimitir.

Kolkaa, saamigu waa $\dfrac{200 \text{ santimitir}}{40 \text{ santimitir}} = \dfrac{200}{40} = \dfrac{5}{1}$.

ama 5 : 1.

Marka la isgarab dhigo laba xaddi oo isku jaad ah, waxa cabbiraaddooda lagu sameeyaa halbeeg isku mid ah, dabadeedna waxa la raadiyaa saamigooda.

Qeex:

Saami waa isgarabdhig qaybeed oo laba tiro, ama laba xaddi oo isku jaad ah, oo isla halbeeg lagu cabbiray.

Tusaale :

Isku-dhisanaha biyaha saamiga Haydaroojiinka iyo Ogsijiinka cuf ahaan waa 1 : 8. Immisa garaam ayuu mid kastaa noqonayaa haddii Isku-dhisanaha biyaha cufkiisu yahay 360 garaam.

Furfuris :

1. Dooro doorsoome u taag-
   naada cufafka — n = Cufka Haydarojiin
   loo baahan yahay — 8n = Cufka Ogsijiin
2. Samayso isle'eg — $n + 8n = 360$
3. Furfur isle'egta — $n + 8n = 360$
   $9n = 360$
   $n = 40$
   $8n = 320$
4. Hubi. Saamiga cufkoodu-
   na ma yahay — $\frac{40}{320} = \frac{1}{8}$ ama 1 : 8

Cufafka haydarojiin iyo ogsijiin isugeyntoodu ma tahay 360 garaam.

n = 40 garaam oo ah Haydarojiin

8n = 320 garaam oo ah Ogsijiin

Isugeynta Cufafka 360 garaam.

Layli :

1. Saamiyadan u qor sansaanta ugu fudud.

1) 4 : 8
2) 5 : 20
3) $\frac{xy}{xm}$
4) $\frac{amx}{bdx}$
5) $\frac{400}{300}$
6) $\frac{4a}{3b}$
7) 7a : 8a
8) $\frac{8}{8}$
9) $\frac{9m^3}{6m^2}$
10) $\frac{2 \cdot 5}{5}$
11) $(x^3 + 1) : (x^3 + 1)^3$
12) $(y^2+4)^2 : (y^2+4)$
13) 5sm ka 20 mitir
14) 10 wiqiyadood ka 8 rodol
15) 1 kg. iyo 10 garam ka 3 kg. iyo 40 garaam
16) 8 bilood ka 3 sanadood
17) Bedka laydi ah 20×24 sm.^{2} ka bedka laydi ah 4×12sm^2
18) Bedka laydi ah 1 fuudh $\times$ 3 fuudh ka bedka laydi ah 8 hiish $\times$ 12 hiish
19) Gabdho iyo wiilal ku jira dugsi qaada 480 arday, oo 200 ay yihiin gabdho

29) Bedka saddexagal salkiisu yahay 1 mitir, joogga qotomaana 8 mitir, iyo bedka saddexagal salkiisu yahay 6 mitir, joogga qotomaana 1200 santimitir.

II. Raadi saamiga x : y ee

1) $5x = 4y$ 2) $x = y$

3) $4x - 3y = 0$ 4) $6x = 8y$

5) $\frac{3y + 2x}{2x} = \frac{5}{6}$ 6) $\frac{x^2 - 3y^2}{y^2} = \frac{3x - 2y}{y}$

Boqolkiiba iyo Masalooyin Boqolley

Saamiga laba tiro waxa loo qori karaa boqolkiiba inta ay ka noqonayso. Ereyga **Boqolkiiba** waxay u taagan tahay wax **boqol loo qaybiyey** ama boqoleed. Sidaas awgeed, ayaa 4% oo si kale loo qorayay ay tahay 4/100 ama 0.04 si kale oo loo qoray waxay tahay 125/100 ama 1.25; 1% waxay iyana tahay 1/100. Maxay noqonaysaa 100%? Waxay tahay 100/100 = 1.

Si aad ugu qortid saami boqolley ahaan, waxaad u qortaa saamiga sansaan jajab oo hooseeyuhu yahay 100; dabadeedna qaado sarreeyaha oo ay la socoto astada boqolley.

Tusaale :

U qor tirooyinkan boqolley ahaan :

$$\frac{3}{4} : 0.35$$

Furfuris :

$$\frac{3}{4} = \left[\frac{3}{4} \times 100\right] \quad 1/00 = 75\%$$

$$0.35 = (0.35 \times 100) \quad 1/100 = 35\%$$

Boqolley waa tiro le'eg boqolkiiba inta ay ka noqonayso tiro mid kale, oo loo yaqaan sal. Boqolkiiba tiro waxay tahay saamiga boqolley ka salka, waxaanan oran karnaa dulsaar si aynu uga du'no boqolley.

$$\frac{\text{Boqolley}}{\text{Sal}} = \text{dulsaar} \qquad \text{ama } \frac{b}{s} = d \quad \text{haddii } s \neq 0.$$

Tusaale :

Waa imisa 20% ka 40.

Furfuris :

Dulsaar = 20%
Sal = 40
Boqolley = ?

Kolkaas, $b/s = d$; $b = d$

$$b = \frac{20 \times 40}{100} = 8$$

Layli :

I. Raadi boqolleyda tirooyinkan:

1)	8% ee 120	2)	2% ee 100
3)	40% ee 720	4)	90% ee 1,000
5)	25% ee 5	6)	100% ee 65
7)	200% ee 16	8)	160% ee 38
9)	1/5 ee 250	10)	·04% ee 200

II. Raadi tirada:

1) 28 waa 12% ee . . . . . .

2) 80% tirada . . . . . waa 128

3) 600% ee tirada . . . . . waa 600

4) 20 waxay tahay 20% ee tirada . . . . . .

5) 100% ee tirada . . . . . waa 280

6) $\frac{1}{5}$ ee . . . . . waa 10

7) 150% ee tirada . . . . . waa 63

8) 56% waa 20% ee tirada . . . . . .

9) — ee tirada . . . . . waa $\frac{3}{2}$

10) 200% ee tirada . . . . . waa 38

III. Raadi Dulsaarka:

1) Boqolkiiba imisa ayay ka tahay 96 tirada 480

2) » » » » » 21 » 35

3) » » » » » 4 » 12

4) » » » » » 25 » 250

5) » » » » » 1 » 100

IV. Masalooyinkan furfur

1) Imtixaan arday laga qaaday ayaa 45% ay dhacday. Boqolkiiba imisa ayaa gudubtay. Haddii ardaydu ay ahayd 360, imisa ayaa dhacday. Imisa ayaana gudubtay?

2) Arday ayaa 50 su'aalood ka saxay 40. Walaashiina 30 su'aalood ayay 20 ka saxday. Midkoodba boqolkii imisa ayuu ka saxaya? Labadooda keeba calaamad wanaagsanaa?

3) Nin ayaa lacag ka dhintay. Wuxuu uga tagey 10% xannaanada ilmaha agoonta ah, 45% wuxuu uga tagay carruurtiisa, inta hartayna wuxu yiri dugsi ha lagu

dhiso. Boqolkiiba intee bay ahayd inta dugsiga lagu dhisayo? Imisa ayuu carrurta uga tegey, intee xannaanada ilmaha agoonta la siiyey, haddii lacagta uu ka dhintay ay ahayd 120.000 Shilin Somali.

4) Dugsi ayaa 45% ay yihiin gabdho. Haddii dugsiga ay ku jiraan 900 oo arday. Imisa ayaa wiilal ah ? imisaa ayaa gabdho ah?

5) Warshadda hilibka ee Kismaayo ayaa 1972 qali jirtay 52.620 lo'o ah. Haddii 60% ay kordhisay, hadda imisa ayay qashaa?

6) Warshadda Kalluunka ayaa waxa loogu talagalay tacab ah 5.000 oo tan oo kalluun ah. Haddii 75% ay kordhisay waa imisa tacabkeedu hadda ?

7) Warshadda dharka ee Balcad ayaa soo saartay 9.5 malyuun oo yaardi oo dhar ah. Haddii ay kordhisay soo saarida 95% hadda maxay soo saartaa?

8) Warshadda Khudradda ee Afgooye ayaa kordhisay tacabkeeda. Haddii ay inta loogu tala galay ay ahayd 4,500 oo tan laakiin markii ay kordhisay tacabku uu noqday 6,000 oo tan. Boqolkii imisa ayaa ku kordhay?

9) Warshadda Shiidda Masaggada ayaa sannadka billowgiisa shiidday 240 tan. Sannadka dhammaadkiisii waxay gaadhay in ay shiiddo 480 tan. Imisa ayaa boqolkiiba ku korodhay?

10) Warshadda Caanaha ee Xamar waxay 95% kordhisay soo saaridda caanaha. Hadda waxay soo saartaa 250,000 qarsho maalintii. Imisa qarsho ayay ka biloowday?

ISKU DHUFASHADA IYO ISU QAYBINTA JAJAB

Iskudhufashada jajab

Markaa aan haysanno isle'egta $\frac{xy}{mn} = \frac{x}{m} \cdot \frac{y}{n}$

qaan in dhinaca bidixda ee isle'egtu ay had iyo jeer le'eg ay dhinaca midigta taas waxa innooga cad xeerka isku dhufa a ee jajab haddii $m \neq 0, n \neq 0$.

$$\frac{x}{m} \cdot \frac{y}{n} = \frac{xy}{mn}$$ **Marka laba jajab la isku dhufto, tarantoodu waxay tahay jajab sarreeyihiisu yahay taranta sarreeyeyaasha labada jajab, hooseeyihiisuna taranta hooseeyaasha labada jajab.**

Tusaale :

1) $$\frac{x+2}{x-3} \cdot \frac{x-4}{x+3} = \frac{(x+2)(x-4)}{(x-3)(x+3)} = \frac{x^2 - 2x}{x^2 - 9}$$

2) $$15y \cdot \frac{3y}{x} = \frac{15y}{1} \cdot \frac{3y}{x} = \frac{45y^2}{x}$$

Taran jajab oon ku qornayn tibixda ugu yar, waxa loo sii fudaydin karaa sidan oo kale.

1) $$\frac{m}{y} \cdot \frac{y}{m} = \frac{my}{ym} = \frac{my}{my} = 1$$

2) $$\frac{x-y}{x+y} \cdot \frac{x+y}{8} = \frac{(x-y)(x+y)}{8(x+y)} = \frac{x-y}{8}$$

Isku dhufashada jajabyo waxaan ku fududayn karnaa haddii aan isireynno kuwa allaale kuwii suurtooba.

$$\frac{4x+4}{3x+2} \cdot \frac{9x^2 - 4}{x^2 - 3x + 2} = \frac{4(x+1)}{(3x+2)} \cdot \frac{(3x+2)(3x-2)}{(x-2)(x+1)}$$

$$= \frac{4(x+1)(3x+2)(3x-2)}{(3x+2)(x-2)(x+1)}$$

$$= \frac{4(3x-2)}{x-2} = \frac{12x-8}{x-2}$$

Layli :

Raadi taranta tibxahan soo socda :

1) $$\frac{3}{15} \cdot \frac{5}{8} \cdot \frac{24}{27}$$

2) $$\frac{m}{y} \cdot \frac{y}{c} \cdot \frac{c}{m}$$

3) $$\frac{mn}{tw} \cdot \frac{t}{m} \cdot \frac{w}{n}$$

4) $$\frac{5y}{16x} \cdot \frac{32x}{15y}$$

5) $$\frac{x-y}{9} \cdot \frac{18}{x+y}$$

6) $$\frac{x^2 - 3x + 2}{2x} \cdot \frac{4x}{x-2}$$

7) $x^2 + 6x + 8 \cdot 2x - 4$

8) $$\frac{y^2 - 5y - 24}{y^2 + 7y + 12} \cdot \frac{y+4}{y-8}$$

9) $\dfrac{3x^2 + 6x + 4}{x^2 - 3x - 40} \div \dfrac{8 - x}{3x + 2}$

10) $\dfrac{2x^2 - 50}{2x + 6} \cdot \dfrac{x^2 - 9}{x + 5} \cdot \dfrac{1}{x^2 - 8x + 2}$

Isu qaybinta jajab

Qaybin waxa loo qori karaa taranta la qaybshe iyo rogaalka qaybshe, sidan oo kale :

$$a \div b = a \times \frac{1}{b} = \frac{a}{b};\ \text{haddii } b \neq 0.$$

Tilmaan :

1) $6 \div 3 = 6 \times \dfrac{1}{3} = \dfrac{6}{3} = 2$

2) $12 \div \dfrac{1}{4} = 12 \times \dfrac{4}{1} = 12 \times 4 = 48$

3) $\dfrac{3}{5} \div \dfrac{2}{3} = \dfrac{3}{4} \times \dfrac{3}{2} = \dfrac{9}{10}$

Haddii aad haysatid laba jajab oo aad doonaysid inaad isu qaybisid waxaad u qortaa qaybshaha rogaalkiisa, dabadeedna adeegso astaanta isku dhufashada jajabyo.

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$$ **haddii** $c \neq 0,\ d \neq 0.$

Rogaalka $\dfrac{c}{d}$ **wuxuu yahay** $\dfrac{d}{c}$.

Tusaale :

$$\frac{t^2 - 16}{t - 3} \div \frac{t^2 - 8t + 16}{3 - t}$$

$$= \frac{(t + 4)\ (t - 4)}{t - 3} \cdot \frac{3 - t}{t^2 - 8t + 16}$$

$$= \frac{(t + 4)\ (t - 4)\ (3 - t)}{(t - 3)\ (t^2 - 8t + 16)}$$

$$= \frac{(t + 4)\ (t - 4)\ (3 - t)}{(t - 3)\ (t - 4)\ (t - 4)}$$

$$= \frac{(t + 4)\ (3 - t)}{(t - 3)\ (t - 4)}$$

$$= \frac{-1\ (t - 3)\ (t + 4)}{(t - 3)\ (t - 4)}$$

$$= \frac{-1\ (t + 4)}{t - 4} = \frac{-t - 4}{t - 4}$$

Layli :

Isu qaybi kuwa soo socda :

1) $\dfrac{3}{7} \div \dfrac{11}{14}$

2) $\dfrac{a}{b} \div \dfrac{a}{b^2}$

3) $\dfrac{13r^2}{20a^2} \div \dfrac{39r^3}{5a}$

4) $\dfrac{a-b}{4} \div \dfrac{a-b}{2}$

5) $\dfrac{m^2-n^2}{mn} \div \dfrac{m-n}{m}$

6) $\dfrac{x}{x^2-4x+4} \div \dfrac{1}{x-2}$

7) $\dfrac{m^2-2^2}{9m^2n^2} \div \dfrac{3m-3m}{mn}$

8) $\dfrac{2x+4}{3x+9} \div \dfrac{4x+8}{5x+15}$

9) $\dfrac{3x+5}{x^2+6x+9} \div \dfrac{3x^2+8x+5}{x^2-x-12}$

10) $\dfrac{x^2+y^2}{x^2-y^2} \div \dfrac{x^2+xy^2}{x^2-2xy+y^2}$

Jajabyo isugu jira iskudhufasho iyo isuqaybin

Marka la iskudhufanayo ama la isu qaybinayo jajabyo isugu jira iskudhufasho iyo isuqaybin ay ka maqan yihiin bilo, waxa la raaca xeerarka iskudhufashada iyo isuqaybinta ee jajabyada. Waxa kaliya ee loo baahan yahay waxay tahay in lagu beddesho jajab rogaalkiisa marba haddii uu ka dambeeyo astada isuqaybinta. Kolkaas jajabyadaasi waa qaar la isku dhufan karo.

Tusaale :

$$\frac{(y+1)^2}{15} \times \frac{5}{y+1} \times \frac{3}{y+1}$$

$$= \frac{(y+1)^2\ (5)\ (3)}{(y+1)\,(y+1)\,(15)} = 1$$

Hubi marka $y = 2$.

Layli :

Isku dhufo ama isu qaybi dabadeedna hubi adoo adeegsanaya tabta ku beddelidda :

1) $\dfrac{3}{x^3} \cdot \dfrac{x^2}{5} \div \dfrac{6}{xy}$

2) $\dfrac{a^2d}{c} \cdot \dfrac{c3}{a3} \div \dfrac{b^2d}{d}$

3) $\left[\dfrac{a^2-b^2}{a^2}\right]\left[\dfrac{a+b}{a-b}\right] \div \dfrac{a^2+2ab+b^2}{a5}$

4) $\dfrac{x^2+10x+25}{x^2+10x} \cdot \dfrac{10x}{x^2+15x+50} \div \dfrac{x+5}{x+10}$

5) $\dfrac{3a^3}{3a+c} \div \dfrac{9a^2}{9a^2-c^2} \cdot \dfrac{3ad}{3a^2-ac}$

ISUGEYNTA IYO KALA GOYNTA JAJAB

Isugeynta jajabyo leh hooseeye isku mid ah :

U fiirso wadarta $\dfrac{a}{b} + \dfrac{c}{b}$. Waxaan naqaan in

$\frac{a}{b} = a \cdot \frac{1}{b}$, $\frac{c}{b} = c \cdot \frac{1}{b}$ kolkaas innaga oo adeegsanayna

xeerka kala dhiga isku dhufashada waxaana helnaa

$$\frac{a}{b} + \frac{c}{b} = a \cdot \frac{1}{b} + c \cdot \frac{1}{b}$$

$$= (a + c) \cdot \frac{1}{b}$$

$$= \frac{a + c}{b}$$

Xeerka Isugeynta Jajabyo :

Wadarta jajabyo leh hooseeyeyaal isku mid ahi waxa ay tahay jajab sarreeyihiisu yahay wadarta sarreeyeyaasha jajabyada, hooseeyihiisuna yahay hooseeyaha ay wadaagaan jajabyadu.

Tusaale :

1) $\frac{4}{9} + \frac{7}{9} - \frac{y}{9} = \frac{4 + 7 - y}{9} = \frac{11 - y}{9}$

2) $\frac{5}{m + n} + \frac{m}{m + n} - \frac{m - n}{m + n} = \frac{5 + m - m + n}{m + n} = \frac{5 + n}{m + n}$

Mararka qaarkood waxaad heshaa wadar la sii fududayn karo.

$$\frac{7a}{a^2 - b^2} - \frac{5a + 4b}{a^2 - b^2} + \frac{2b}{a^2 - b^2} = \frac{7a - (5a + 4b) + 2b}{a^2 - b^2}$$

$$= \frac{7a - 5a - 4b + 2b}{a^2 - b^2}$$

$$= \frac{2a - 2b}{a^2 - b^2} = \frac{2(a - b)}{(a + b)(a - b)}$$

$$= \frac{2}{a + b}$$

Layli :

1. $\frac{4}{15} - \frac{8}{15} - \frac{7}{15}$

2. $\frac{3}{50} - \frac{29}{50} + \frac{1}{50}$

3. $\frac{12a}{5r} - \frac{2a + 5}{5r}$

4. $\frac{3b + 5}{7} + \frac{2 - 3b}{7}$

5. $\frac{2xy}{x + y} + \frac{x^2 + y^2}{x + y}$

6. $\frac{2x}{x^2 - x - 2} - \frac{x + 2}{x^2 - x - 2}$

7. $\frac{14a}{b^2 - 16} - \frac{2a + a^2}{b^2 - 16}$

8. $\frac{5 - b}{a^2 + 3a - 4} - \frac{b^2 - 3}{a^2 + 3a - 4}$

9. $\frac{x^2 + 2x + 1}{(x + 1)^2} + \frac{3x^2 + 6x + 3}{(x + 1)^2}$

10. $\frac{42b^2 + 16ab}{t(a^2 + 2ab + b)^2} + \frac{8ab + 24a^2}{t(a^2 + 2ab + b^2)} + \frac{24ab}{t(a^2 + 2ab + b^2)}$

Isugeynta jajabyo leh hooseeye kala duwan

Marka la isugeynaayo $\frac{4}{45}$ iyo $\frac{7}{24}$, waxaan raadinnaa jajabyo u dhigma oo leh hooseeyeyaal isle'eg, dabadeetana waan isugeynaa. Abyoone kasta oo isirradiisa ay ka mid yihiin 45 iyo 24 wuxuu inna siiyaa hooseeyaha ay iskaga mid yihiin, hase ahaatawaxa ugu habboon in aan raadinno hooseeyaha ugu yar ee wadaagaan (H.Y.W.). Si loo helo hooseeyaha ugu yar ee wadaagaan waxa habboon in la raadiyo dhufsana yaraha ay wadaagaan labada hooseeye iyada oo la qorayo labada hooseeye isirradooda mutuxan.

$$45 = 3^2 \cdot 5 \qquad 24 = 3 \cdot 2^3$$

Hooseeye yaraha ay wadaagaan (H. Y. W.) 45 iyo $24 = 2^3 \cdot 3^2 \cdot 5 = 360$. Si kolkaa loogu dhigo jajabyada kuwa leh hooseeye 360, waxaan u qornaa sidan oo kale:

$$\frac{4}{45} = \frac{4 \times 8}{45 \times 8} = \frac{32}{360}$$

Markasta waxaan ku dhufanaa 1, waayo $\frac{8}{8} = 1$ sida 8da loo heleyaa waxay tahay: 360 ayaan u qaybinaa 45 oo ah hooseeyaha.

$$\frac{7}{25} = \frac{7 \times 15}{24 \times 15} = \frac{105}{360}$$

Sidii ta hore ayaan tanna ku dhufanaa 1, waayo $\frac{15}{15} = 1$. Sida 15ta loo heleyna waxay tahay innaga oo 360 u qaybinnay 24 oo ah hooseeye

Labadii jajab ee aan isugeynnay waxay u dhigmaan $\frac{32}{360}$

iyo $\frac{105}{360}$.

$$\frac{4}{45} + \frac{7}{24} = \frac{32}{360} + \frac{105}{360} = \frac{32 + 105}{360} = \frac{137}{360}$$

Tusaale :

$$\frac{x + 2}{x^2 + 3x + 2} + \frac{1}{x^2 + x} - \frac{3}{x^2 + 2x}$$

Furfuris :

Raadi hooseeyaha yar ee ay wadaagaan

$$x^2 + 3x + 2 = (x + 2)\ (x + 1)$$

$$x^2 + x = x(x + 1)$$

$$x + 2x = x(x + 1)$$

Qaado isir kasta tirada ugu badan ee uu ka muuqdo hooseeyaha H.Y.W waa $x(x+2)\ (x+1)$

2. Qoro jabjabyada iyada oo hooseeyaasha ay ka muuqdaan isirradoodu.

$$\frac{x+2}{(x+2)\,(x+1)} + \frac{1}{x(x+1)} - \frac{3}{x(x+2)}$$

3. Ku beddelo jajab kasta mid u dhigma

$$\frac{x(x+2)\,(x+1)}{(x+2)x} - \frac{x(x+2)\,(x+1)}{1(x+2)} + \frac{x(x+2)\,(x+1)}{3(x+1)}$$

4. Isugeyso jabjabyada, fududeena.

$$\frac{(x+2)x+1(x+2)-3(x+1)}{x(x+2)(x+1)} = \frac{x^2+2x+x+2-3x-3}{x(x+2)(x+1)}$$

$$= \frac{x^2-1}{x(x+2)(x+1)} = \frac{(x+1)(x-1)}{x(x+2)(x+1)} = \frac{x-1}{x(x+2)}$$

$$= \frac{x-1}{x^2+2x}$$

Hubi haddii $x=2$

Laylisyo:

I Raadi hooseeye yaraha ay wadaagaan (H.Y.W.)

(1) 6,9 (2) 2,a (3) 10,4
(4) 3,b (5) x,xy,y (6) a,b,ab
(7) $x-y$, $y-x$ (8) x^2,$x+y$ (9) $c-b$, $b-c$
(10) x^2+3x, $x\div3$, $x+1$

II Raadi wadarta jabjabyadan

1. $\frac{a}{a+b} - \frac{b}{a^2-b}$ 2. $\frac{4x}{x+4} + \frac{2x}{x+3}$ 3. $\frac{1}{r^2-s^2} + \frac{1}{r-s}$

4. $\frac{3t}{t+2} - \frac{5t}{t+3}$ 5. $\frac{x}{x^2-9} + \frac{3}{x+3} + \frac{3x}{x^2-x}$

6. $\frac{4b}{a} - \frac{1}{2}$ 7. $\frac{3}{a^3} - \frac{2}{a^2} + \frac{1}{a}$

8. $\frac{2x-5}{2-x} + \frac{x}{2x-4}$ 9. $\frac{x}{ab^2} + \frac{y}{a^2b}$ 10. $\frac{5ax}{24} + \frac{8by}{36}$

TIBAAXO ISKU DHAFAN.

Tiro isku dhafan oo isugu jirta jabjab iyo tiro idil waxay wax ka sheegtaa wadarta abyoone iyo jabjab. Marka aynu u beddelayno jajab dhafan mid ma qummane ah, waxan tiradaa abyoon u qornaa jajab hooseeyihiisu yahay 1.

Markaas ayaan labada jabjab ee hooseeyaha kala duwan leh isu geynaa.

TILMAAN.

$$3\frac{1}{8} = \frac{3}{1} + \frac{1}{8} = \frac{24}{8} + \frac{1}{8} = \frac{25}{8}$$

Wadarta ama faraqa tibxaale iyo jabjab waxa loo yaqaan tibxo isku dhafan. Tibix isku dhafan waxa lagu qori karaa jabjab soocan.

1. $x+\frac{2}{x} = \frac{x}{1} + \frac{2}{x} = \frac{x^2}{x} + \frac{2}{x} - \frac{x-2}{x}$

2. $3-\frac{a+b}{a-b} = \frac{3}{1} - \frac{a+b}{a-b} = \frac{3(a-b)}{(a-b)} - \frac{a+b}{a-b}$

$$= \frac{3(a-b)-(a+b)}{(a-b)}$$

$$= \frac{3a-3b-a-b}{(a-b)}$$

$$= \frac{2a-4b}{a-b}$$

$$= \frac{2(a-2b)}{a-b}$$

Haddii sarreeyuhu uu yahay tixbaale, waxaan u beddelan karnaa tibxo isku dhafan adoo isu qaybinaaya sareeyaha iyo hooseeyaha.

1) $\frac{5x^2-3x}{5x} = \frac{5x^2}{5x} - \frac{3x}{5x} = x - \frac{3}{5}$

2) $\frac{3x^2+2x-5}{x+1} = 3x-1 - \frac{4}{x+1}$ waxaad isticmaali kartaa qaybta dheer

$$\begin{array}{r} 3x-1 \\ x+1 \,/\, 3x^2+2x-5 \\ -3x^2+3x \\ \hline -x-5 \\ -x-1 \\ \hline -4 \end{array}$$

3) $\frac{a^2+7a+8}{a+1} = a+6 + \frac{2}{a+1}$

$$\begin{array}{r} a+6 \\ a+1 \,/\, a^2+7a+8 \\ a^2+a \\ \hline 6a+8 \\ 6a+6 \\ \hline 2 \end{array}$$

Laylisyo:

U qor jabjabyadan dhafan jabjab soocan.

(1) $3\frac{3}{4}$ (2) $-6\frac{3}{5}$ (3) $5\frac{1}{3}$

(4) $-3\frac{1}{8}$ (5) $a+\frac{31}{3b}$ (6) $x-\frac{6}{7y}$

(7) $3+\frac{x}{y-5}$ (8) $4-\frac{d}{m+5}$ (9) $6+\frac{m}{n}$

II. Jabjab kasta ka dhig mid isku dhafan

(1) $\frac{y^2+x}{y}$ (2) $\frac{x^2+3x+2}{x}$ (3) $\frac{xy+y+r}{y}$

(4) $\frac{x^3+6}{x}$ (5) $\frac{m^2+4m+8}{m}$ (6) $\frac{1284}{17}$

(7) $\dfrac{284}{15}$ (8) $\dfrac{15x^3+10}{5x}$ (9) $\dfrac{6-2x^2}{3x}$

(10) $\dfrac{4m^3+2}{4m^3}$ (11) $\dfrac{x^2+3x+2}{x+1}$ (12) $\dfrac{4a^2b+8ab}{4a^2b^2}$

(13) $\dfrac{a^2+6a+9}{a+2}$ (14) $\dfrac{81-t^6}{3t^2}$ (15) $\dfrac{x^3+4x^2+8x+5}{x^2+3x+5}$

JAJABYO KAKAN

Jajab kakan waa jajab sarreeyihiisu iyo hooseeyahiisu ay ka kooban yihiin hal ama wax ka badan oo jajabyo ah.

TUSAALE:

$$\frac{\frac{3}{4}}{\frac{6}{8}}$$

Si jajabkan kakan aan uga dhigno mid fudud waxaa loo baahan yahay in aan fahamno in ay la mid tahay qayb la isu qaybinaayo labada jajab, oo jajabka sarreeyaha ah loo qaybinaayo ka hooseeyaha ah.

Kolkaas waxan u qoran karnaa:

$$\frac{\frac{3}{4}}{\frac{6}{8}} = \frac{3}{4} \div \frac{6}{8} = \frac{3}{4} \times \frac{8}{6} = \frac{24}{24} = 1$$

Tabta hadda aan isticmaalnay waxay ku tusaysaa in jajabka kakan loo qoro qaybinta laba jajab, dabadeedna la isu qaybiyo. Tab kale oo la isticmaalo marka aynu rabno in aan ka dhigno jajab kakan mid fudud, waxaan adeegsannaa asal madoorshaha isku dhufashada, kaasoo jajab hal ah aan ku dhufanno sarreeyaha iyo hooseeyaha. Si loo helo jajabkaas ah hal, waxaan raadinnaa hooseeyaharaha ay wadaagaan labada hooseeye ee jajabka kore iyo ka hoose.

$\dfrac{\frac{3}{4}}{\frac{6}{8}}$, 4 iyo 8 waa labada hooseeye ee jajabka kore iyo ka hoose, kolkaas H.Y.W. waa 8.

$$\frac{\frac{3}{4}}{\frac{6}{8}} \times \frac{8}{8} = \frac{\frac{3}{4} \times 8}{\frac{6}{8} \times 8} = \frac{6}{6} = 1$$

TUSAALE 2

$$\frac{\frac{x-4}{3x^2}}{\frac{2x+1}{6x}}$$

FURFURIS TABTA 1.

$$\frac{\frac{x-4}{3x^2}}{\frac{2x+1}{6x}} = \frac{x-4}{3x^2} \div \frac{2x+1}{6x}$$

$$= \frac{x+4}{3x^2} \times \frac{6x}{2x+1}$$

$$= \frac{(x-4)6x}{3x^2(x+1)} = \frac{2(x-4)}{x(2x+1)}$$

Tabta II.

H.Y.W. labada hooseeye ee jajabyadu waa $6x^2$

$$\frac{\frac{x-4}{3x^2}}{\frac{2x+1}{6x}} \quad \frac{6x^2}{6x^2} = \frac{\frac{x-4}{3x^2}(6x^2)}{\frac{2x+1}{6x}(6x^2)} = \frac{2(x-4)}{x(2x+1)}$$

Laylisyo:

Fududee jajabyadan kakan.

(1) $\frac{\frac{6}{7}}{\frac{8}{9}}$ (2) $\frac{\frac{24}{30}}{\frac{16}{35}}$ (3) $\frac{\frac{x}{y}}{\frac{x^2}{y^2}}$

(4) $\frac{\frac{x^2}{y^2}}{\frac{x}{y}}$ (5) $\frac{\frac{8t^2}{4m^2}}{\frac{16t^2}{8m}}$ (6) $\frac{\frac{x+3}{3x}}{\frac{x-3}{x}}$

(7) $\frac{\frac{m-n}{n}}{\frac{m+n}{3n}}$ (8) $\frac{\frac{2}{x-1}+\frac{x-1}{x+1}}{1+\frac{x+1}{x-1}}$ (9) $\frac{\frac{r^2-9s^2}{6rs}}{\frac{r^2+3s^2}{2rs}}$

(10) $\frac{\frac{3}{8}+\frac{1}{4}}{\frac{1}{6}-3}$ (11) $\frac{\frac{x+y}{x^2+y^2}-\frac{1}{y}}{\frac{x+y}{x^2y^2}-\frac{1}{x}}$ (12) $\frac{\frac{x}{y}-1}{\frac{x}{y}+1}$

(13) $\frac{\frac{m-5}{m+5}}{-1}$ (14) $1+\frac{1}{b+\frac{1}{b}}$ (15) $1+\frac{1}{2+\frac{1}{3}}$

JAJAB KU JIRA WEEDHO FURAN IYO MAS'AL◌◌YIN:

Weedho furan oo weheliyayaal jajab ah leh :

Tabihii hore ee aan u soo baranay si loo furfuro weedho furan iyo tabaha la isticmaalo marka jajab aan fududeyneyno ayaa la adeegsadaa haddii weheliyayaasha weedho furan ay yihiin jajabyo:

Tusaale:

Furfur isle'egtan $\frac{6x}{4} + \frac{x+4}{10} = 2$

Dariiqada Koowaad: waxa habboon in aad raadiso hooseeye yaraha ay wadaagaan hooseeyaasha tibixuhu, dabadeedna aad ku dhufatid tibix kasta oo isle'egta ku jirta.
H.Y.W. 4 iyo 10 waa 20

$$\frac{6x}{4} + \frac{x+4}{10} = 2$$

$$\frac{20(6x)}{4} + \frac{20(x+4)}{10} = 20(2)$$

$$30x + 2x + 8 = 40$$

$$32x = 32$$

$$x = 1$$

Dariiqada Labaad: Waxaad raadisaa H.Y.W. hooseeyeyaasha tibxuhu. Dhinaca bidixda isku hooseeye ka dhig, dabadeedna hooseeyahaa labada dhinacba ku dhufo.

$$\frac{6x}{4} + \frac{x+4}{10} = 2$$

$$\frac{30x}{20} + \frac{2(x+4)}{20} = 2$$

$$\frac{30x+2x+8}{20} = 2$$

$$30x + 2x + 8 = 40$$

$$32x + 8 = 40$$

$$32x = 32$$

$$x = 1$$

LAYLISYO:

1. Waxaad sheegtaa H.Y.W. dabadeedtana qor weedhaha furan kadib markii aad ku dhufatid tibixaha HYW.

Tilmaan:

$$\frac{3a}{4} + \frac{a}{3} = 2 \quad \text{HYW} = 12$$

$$12\frac{(3a)}{4} + 12\frac{(a)}{3} = 12\,(2)$$

$$9a + 4a = 24$$

1) $\frac{3x}{5} + \frac{2x}{3} = 6$ (2) $\frac{m}{4} + \frac{6m}{7} = 2$

3) $\frac{1n}{6} - \frac{2n}{3} + \frac{1}{5} = n + 2$ (4) $\frac{y^2}{3} + \frac{2y}{4} = -5$

5) $\frac{11}{6} + \frac{21}{9} - 1 = 4$

II. Furfur isle'egyadan.

1) $\frac{3x}{2} + 1 = \frac{x}{2}$ (2) $\frac{u}{3} + \frac{4u}{3} = 30$

3) $\frac{y}{4} + \frac{y}{2} - 3 = 0$ (4) $\frac{x}{3} + \frac{x}{2} + x = 11$

5) $\frac{m}{3} - \frac{m}{6} + 1 = 3$ (6) $\frac{5}{3} - \frac{1-x}{6} = 0$

9) $\frac{n}{4} - \frac{n}{8} = \frac{3}{8}$ (10) $\frac{y}{6} + \frac{2y}{6} - \frac{4y}{6} = -1$

11) $\frac{2}{3y} - \frac{3}{5y} = 1$ (12) $\frac{3x-5}{2} - \frac{x}{3} = 8$

13) $$\frac{3x+1}{3} = \frac{3x+2}{2} - \frac{3x-4}{6}$$

14) $$\frac{4x+1}{3} - \frac{1+x}{2} = \frac{3}{2}$$

15) $$\frac{1}{3}(3d+1) + \frac{1}{4}(2d-1) = \frac{d+19}{12}$$

Mas'alooyin ay ku jiraan jajabyo

Tusaale:

Haddii 60 lagu daro tiro, dabadeedna wadarta loo qaybiyo, 2, tirada cusub ee soo baxdaa waxay leeg tahay tii aad ku billawday 3 laabkeed. Raadi tiradii aad haysatay.

Furfuris:

Haddii tirada aan ku bilawnay ay tahay x, marka 60 loo geeyo ee wadarta 2 loo qaybiyo, waxay tahay $\frac{x+60}{2}$

Tirada cusubi waxay leeg tahay 3 laabka tii aan ku bilawnay.

$$\frac{x+60}{2} = 3x$$

Furfur isleegta si aynu u helno qiimaha x, taasoo ah tiradii aan haysanay awal.

$$\frac{x+60}{2} = 3x$$

$$x + 60 = 6x$$
$$60 = 5x$$
$$12 = x$$

HUBI:

$$12 + 60 = 72$$
$$\frac{1}{2} \text{ ka } 72 = 36$$
$$36 \text{ waa } 3 \text{ laabka } 12.$$

TUSAALE 2:

Baabuur ayaa in mudda ah socday 30 mayl saacadiiba. Intaas dabadeed ayuu ka dhigay kaynaanka 40 mayl saacadiiba si uu u dhammaystiro safarkiisa inta ka hartay. Fogaantii oo dhammi waxay ahayd 180 mayl, waxaana uu ku sameeyey 5 saacadood. Raadi fogaanta uu jaray markuu 30 mayl saacadiiba ku socday.

Furfuris:

Haddii keynaanka 30ka mayl saacadiiba uu ku sameeyey x mayl, kolkaa inta saacadood uu socday waxay tahay $\frac{x}{30}$

safarka inta uga hartay $= 180 - x$, waxaanu ku socday saacadiiba 40 mayl. Inta saaçadood ee uu kaynaankaa ku socday

$$= \frac{180 - x}{40}$$

Safarka oo dhanna wuxuu ku sameeyey 5 saacadood. Kolkaa:

$$\frac{x}{30} + \frac{180 - x}{40} = 5. \quad \text{HYW waa } 120$$

$$120\frac{(x)}{30} + 120\frac{(180-x)}{40} = 5(120)$$

$$4x + 540 - 3x = 600$$

$$4x - 3x = 600 - 540$$

$$x = 60$$

Markaa, 60 mayl ayuu sameeyey intii uu ku socda[illegible] mayl saacadiiba.

Hubin: 1.

60 mayl uu ku socday 30 mayl saacaddiiba ku qaa[illegible] saacadood.

2. Safarka oo dhammi wuxu ku qaatay 2 + 3 = 5 [illegible] mayl, wuxuuna ku socday 40 mayl saacadiiba. Kolkaas [illegible] ku qaadatay 3 saacadood.

3. Safarka dhammi wuxu [illegible] qaatay 2 + 3 = 5 [illegible] dood.

LAYLISYO:-

1. Haddii 40 laga jaro 2/3 [illegible], waxa inoo soo [illegible] wuxuu le'egyahay 1/4 [illegible]radaas. Raadi tirada [illegible] an.

2. Waxaan ka fakiraa [illegible] u geeyaa 20, [illegible] deedna wadarta ayaan [illegible]aybiyaa 6. Kolkaas [illegible] xa ii soo baxa waa 10 [illegible]adi tiradaas.

3. Ul dhererkeedu yahay [illegible] sm ayaa 2 gabal loo [illegible] biyay si 1/5 ka gabal [illegible]shu u le'ekaato 3/8 ka [illegible] kale. Raadi dhererka labada gabal (u fiirso [illegible] gabal uu yahay x, ka kale waa 23 − x).

4. Haddii nin da'diisu ahayd 56 sano markii [illegible] dhashay, imisa sano ka bacdi ayaa da'da wi[illegible] qonaysaa badhka da'da aabbihiis?

5. Haddii tiro marka laga jaro15, dabadeedna loo qaybiyo 5 waxa soo baxana loo geeyo 16, aynu helno 25, waxaad raadisaa tirada iyada ah.

6. Raadi labada qaybood ee tirada 24 loo qaybiyo haddii 1/6 ka qaybta hore marka loo geeyo 3/4 ka qaybta labaad ay inna siiso 11. (u fiirso haddii qaybi tahay x, ta kale waa 24 − x).

7. Baabuur in muddo ah jarayay 25 mayl, saacaddii, ayaa ka dhigay kaynaankiisii 40 mayl saacaddiiba. Haddii waqtiga uu ku qaatay laba magaalo oo isu jira 235 mayl ay ahayd 7 saacdood. Intee mayl ayuu sameeyey markii uu ku socday 25 mayl saacaddiiba iyo 40 mayl saacaddii.

8. Cali ayaa haystay lacag ka badan ta Caashi haysatay. Haddii uu dheeraa 60 shilin, waxay lacagta Caashi 1/2 keed ay le'egtahay 1/4 ka ta Cali. Midkoodba imisa ayuu haystay ?

9. Nin dhugdhugley wata ayaa Xamar ilaa Marka ku socdey soddon mayl saacadiiba. Haddii uu ku socon lahaa afartan mayl saacadiiba, waxay ku qaadan lahayd in ka yar saacad intii marka hore ay ku qaadan lahayd.
Waa maxay fogaanta u dhexeysa Xamar iyo Marka?

10. 14 buug ayaa lacagtoodu dhan tahay 58 shilin. Buuggaga qaarkood, midkii wuxuu joogaa 5 shilin, kuwa kalena wuxuu midkiiba joogaa 3 shilin. Labada jaad midkiiba intee laga gadan karaa?

ISLE'EGYO JAJABYO AH

Isle'eg sida $\frac{6}{x^2 + 9} + \frac{1}{x + 3} + 1 = 0$ oo hooseeyaha jajabka uu ka muuqdo doorsoome ayaa loo yaqaan isle'eg jajab. Haddii isle'eg

jajab aan ku dhufano tibix kasta hooseeyaha ugu yar ee ay w... daagaan, isle'egta cusub ee inoo soo baxda maaha mid tii hore u dhigmi karta.

TUSAALE 1

Furfur isle'egtan.

$$\frac{6}{x^2-9} + \frac{1}{x+3} + 1 = 0$$

Furfuris.

$$\frac{6}{x^2-9} + \frac{1}{x+3} + 1 = 0$$

1. HWY hooseeyayaashu waa $x^2 - 9$
2. Tibix kasta ku dhufo HWY $(x^2 - 9)$

$$(x^2-9)\frac{6}{x^2-9} + (x^2-9)\frac{1}{x+3} + (x^2-9)1 = 0$$

$$6+x-3+x^2-9=0$$

$$x^2+x-6=0$$

$$(x+3)(x-2)=0$$

$x+3=0$	$x-2=0$
$x=-3$	$x=2$

Marka aad hubisid in $x=-3$ iyo $x=2$ ay yihiin xididdo waxan aragnaa waxyaalaha soo socda:

Isle'egta oo dhan qoro, dabadeedna ku beddelo qiimayaasha -3 iyo 2.

$$\frac{6}{x^2-9} + \frac{1}{x+3} + 1 = 0$$

Marka $x=-3$,

$$\frac{6}{(-3)^2-9} + \frac{1}{-3-3} + 1 = ?0$$

$$\frac{6}{9-9} + \frac{1}{0} + 1 = ?0$$

$$\frac{6}{0} + \frac{1}{0} + 1 = ?0$$

Jajabka $\frac{6}{0}$ iyo $\frac{1}{0}$ macna ma sameeyaan sidaas awgeed ayaa -3 aanay ugu ahayn isle'egta xidid.

Marka $x=2$

$$\frac{6}{2^2-9} + \frac{1}{2+3} + 1 = ?0$$

$$\frac{6}{4-9} + \frac{1}{5} + 1 = ?0$$

$$\frac{6}{-5} + \frac{1}{5} + 1 = ?0$$

$$\frac{-6}{5} + \frac{1}{5} + 1 = ?0$$

$$\frac{-6+1+5}{5} = ?0$$

$$-6+1+5=?0$$

$$0=0 \text{ haa.}$$

Ururka furfuristu waa $\{2\}$

Markaan isle'egta ku dhufannay x^2-9 waxaan helnay isle'eg cusub oon u dhigmayn tii aan ku bilownay. Isle'egta cusub waxay leedahay xididka -3 waayo tirada lagu dhuftay oo ah x^2-9 ayaa le'eg ama u taagan eber mar allaale markii x lagu beddelo -3.

Haddii tibixaale lagu dhufto isle'egta, ururka furfurista isle'egta cusub waxa ku jira xididka isle'egtii hore iyo xididdo kale oo tirada lagu dhuftay had iyo jeer eber ka dhiga. Kolkaas waxa habboon in aad ka digtoonaatid.

Marka isle'eg lagu dhufto tibaax leh doorsoome oo noqon karta eber haddii doorsoomaha lagu beddelo tiro waxay kuu soo saartaa isle'egtii hore. Sidaas awgeed ayaa loo baahan yahay in xididdada lagu beddelo isle'egtii hore si looga bixiyo kuwa aan ururka furfurista ku jirin. Qiimayaasha ku siiya weedhaha runta ayuun baa ku jira ururka furfurista isle'gtaas.

TUSAALE 2.

$$\frac{x}{x+2} = \frac{4x-3}{x-2}$$

Furfurista : Raadi HYW hooseeyaasha jajabyada isle'egta.

waa x^2-4.

Dhinac kasta ku dhufo HYW.

$$(x^2-4)\frac{x}{x+2} = (x^2-4)\frac{4x-3}{x-2}$$

$$(x-2)\,x = (x+2)(4x-3)$$

$$x^2-2x = 4x^2+8x-6-3x$$

$$3x^2+7x-6 = 0$$

$$3x^2+9x-2x-6=0$$

$$3x(x+3)-2(x+3)=0$$

$$(x+3)(3x-2)=0$$

$$x+3=0 \text{ ama } 3x-2=0$$

$$\therefore x=-3 \text{ ama } x=2/3$$

Haddii aan hubino waxaan arkaynaa in labada qiime ee x ay yihiin xididdda. Bal u fiirso tusaalahan iyo tusaalaha 1. Labada xidid ee -3 yo $2/3$ midna kama dhigo hooseeyaasha

eber, oo midna ma aha xidid ay keentay isle'egta cusub ee soo baxday, hase yeeshee waa qaar dhab ah. Hubi adoo beddelaaya.

LAYLISYO:

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

(2) $\frac{5}{x-2} - \frac{12}{x+3} = 3$

(3) $\frac{4}{9x} + \frac{1}{x} = \frac{1}{18}$

(4) $6x + \frac{2x}{x-1} + 9 = 0$

(5) $\frac{1}{x+1} - \frac{1}{x+3} = \frac{1}{x} - \frac{1}{x+2}$

(6) $\frac{y+2}{3y-6} - \frac{2}{3y+6} + \frac{7}{9} = 0$

(7) $\frac{x+2}{x+1} = \frac{x-1}{x+1} + \frac{1}{x^2-1}$

(8) $\frac{1}{x+5} + \frac{4}{2x-1} = \frac{1}{5x+1}$

(9) $\frac{2}{x+5} + \frac{3}{x-5} = 0$

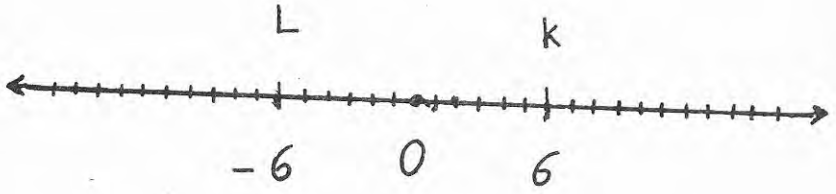
(10) $\frac{x+3}{2x+3} + \frac{x+1}{2x-3} = 0$

CUTUB II

Qiime Sugan

Qeex: Qiimaha sugan ee tiro kasta waa tiro togan waxay doonto tiradu markii hore ha ahaatee.

Qiimaha Sugan iyo Xarriiqda Tirada



Shaxankani haddaad u fiirsatid waxaad ogaanaysaa inuu yahay xarriiqda tirada. Waxaynu ognahay tirooyinka midig ka xiga unugga 0 inay yihiin tirooyin togan kuwa bidix ka xigaana ay yihiin kuwo taban.

Haddaad lix tallaabo uga socotid unugga 0 xagga midig waxaad gaadheysaa K oo kulankeedu yahay 6. Markaa waa inaad ogaataa fogaanta L iyo unuggu isu jiraan inay la mid tahay fogaanta K iyo unugga isu jiraan. Haddaba waxaynu oran karnaa qiimaha sugan ee -6 iyo $+6$ waa fogaanta L iyo 0 isu jiraan iyo fogaanta K iyo 0 isu jiraan; waana 6.

Asto u go'an baa jirta qiimaha sugan. Taasina waxay tahay laba xarriiqood oo qotoma oo labada hareerood laga mariyo tirada qiimaheeda sugan la doonayo.

Markaa fogaanta L iyo 0 isu jiraan

$$= |-6| = 6,$$

Fogaanta K iyo 0 isu jiraan

$$= |+6| = 6$$

TUSAALE 1

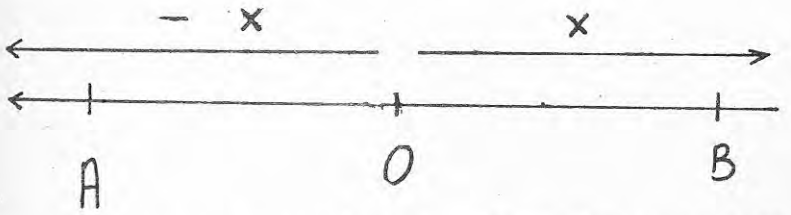
Waxa lagu weydiiyey qiimaha sugan ee doorsoomaha x, markaa X waxay noqon kartaa tiro togan, tiro taban ama eber.

Haddii X ay tahay tiro togan qiimaha sugan ee X, $|X|$, waa X; haddii X ay tahay tiro taban, $|X|$ **waa** $-X$; haddii ay X tahay eber, $|X|$ waa eber.

Markaa $|x| = x$ haddii $x=0$ ama $x>0$
$= -x$ haddii $x<0$

TUAALE

$$|5| = 5$$
$$|-5| = -(-5) = 5$$
$$|10-7| = |3| = 3$$
$$|7-10| = |-3| = 3$$



Shaxankan haddaad u fiirsatid waxaad ogaaneysaa in fogaanta A iyo 0 isu jiraan iyo ta B iyo 0 isu jiraan ay isle'eg yihiin. Markaa, waxaynu oran karnaa $|-x| = |x| = x$.

LAYLI

Kala sheeg weedha runta ah iyo ta beenta ah:

1) $|-2| = 2$
2) $|-3| = +3$
3) $|-7| = -7$
4) $-|-8| = 8$

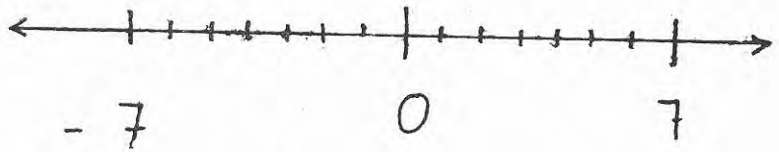
5) $|\ 8-11\ | = -3$

6) $|\ 7-3\ | = 10$

7) $|\ -5\ | - |\ -5\ | = 0$

TUSAALE 3

$|\ x\ | = 7$



Haddii lagu yiraahdo furfur isle'egta $|\ x\ | = 7$, waa inaad cgaataa in x leedahay laba qiime. Mar $x = 7$, marna $x = -7$, sababtuna waxay tahay fcgaantu waa isku mid haddii toddoba tallaabo loo socdo unugga xaggiisa midig iyo haddii toddoba tallaabo looga socdo unugga xagga bidix.

Ta kale waxaynu cgnahay in haddii $x \leqslant 0$ ama haddii $x < 0$ $|\ x\ | = -x = 7$

Markaa $x = -7$ ama $x = 7$.

LAYLISYO

Furfur isle'egyadan soo socda:

1) $|\ y\ | = 9$

2) $|\ -a\ | = 4$

3) $|\ x\ | = 0$

4) $3|\ b\ | = 6$

5) $\dfrac{|\ n\ |}{4} = 2$

6) $|\ d\ | + 3 = 7$

7) $|\ x\ | - 3 = 8$

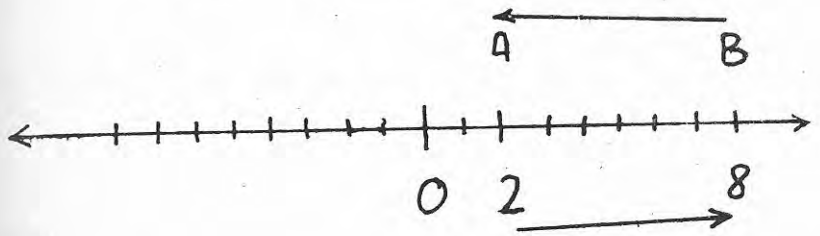
8) $|\ t\ | - |\ -5\ | = 2$

9) $2\ |\ t\ | = |\ t\ | + 11$

10) $|\ x\ | - |\ -5\ | = 0$

QIIMAHA SUGAN EE FARAQYADA

U fiirso shaxanka



Waxaynu haysannaa labada meelood A iyo B oo kulannadoodu yihiin 2 iyo 8. Haddii layna weydiiyo faraqa kulanka labada meelocd, laba jawaabood baa suuragal ah:

$8-2=6$ iyo $2-8=-6$. Faraqa $8-2=6$ wuxuu ku tusayaa in A laga tegayo oo B la gaaray, faraqa $2-8=-6$ wuxuu ku tusayaa in B laga tegayo oo A la gaaray. Markaa waxaynu oran karnaa fcgaanta A iyo B u dhexaysaa waa 6, macnihii waxa weeye $|8-2|=|2-8|=6$.

$|8-2|=8-2$ haddii $(8-2)>0$

$\therefore |8-2|=6$

$|2-8|=-(2-8)$ haddii $(2-8)<0$

$=-2+8=6$

Markaa, guud ahaan

$|\ x-a\ | = x-a$ haddii $(x-a)>0$ ama $x>a$

$|\ x-a\ | = -(x-a)$ haddii $(x-a)<0$ ama $x<a$

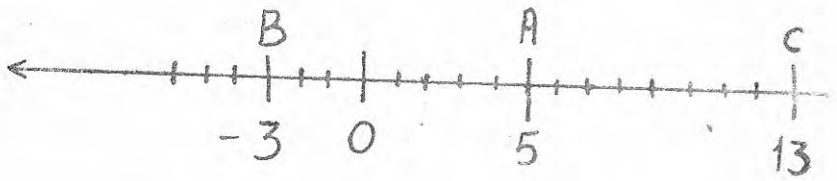
TUSAALE 1.

Furfur

$$| x - 5 | = 8$$

Furfurid 1.

$| x - 5 | = 8$ u fiirso shaxanka



Macnaha isle'egtu waxa weeye fogaanta u dhexaysa labada meelood ee kulannadoodu yihiin x iyo 5 waxay tahay 8. Markaa 8 tallaabo xagga midig ee A haddii aan u soconno waxaynu gaareynaa C oo kulankeedu yahay 13.

Haddaynu 8 tallaabo xagga bidix ee A u soconno waxaynu gaareynaa B oo kulankeedu yahay -3. Markaa

$$x = 5 + 8 = 13$$
$$x = 5 - 8 = -3$$

Furfurid 2

$| x - 5 | = x - 5$ haddii $x > 5$

Markaa $x - 5 = 8 \quad \therefore x = 13$

$| x - 5 | = -(x-5)$ haddii $x < 5$

Markaa $-(x - 5) = 8$

$\therefore -x + 5 = 8$

$-x = 3$

$x = -3$

TUSAALE 2

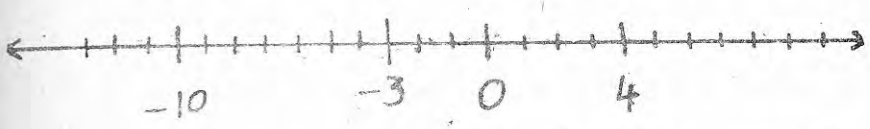
Furfur

$$| x + 3 | = 7$$

Furfurid 1

$$| x + 3 | = 7 = | x - (-3) |$$

Waxaad haysataa laba meelood oo kulannadoodu yihiin x iyo -3, fogaanta u dhexeysaana tahay 7.



Haddaad kulanka -3 ka tagtid oo 7 tallaabo xagga bidix u socotid waxaad gaadheysaa kulanka -10. Macnuhu waxa weeye

$$x = -3 - 7 = -10$$

Ta kale haddaad kulanka -3 ka tagtid oo 7 tallaabo xagga midig u socotid, waxaad gaadheysaa kulanka 4.

Taasoo ah $x = -3 + 7 = 4$

Markaa x qiimaheedu waxa weeye -10 ama 4.

Furfurid 2

$$| x + 3 | = 7$$

$| x + 3 | = x + 3$ haddii $x < 3$

Markaa, $x + 3 = 7$

$x = 4$

$| x + 3 | = -(x + 3)$ haddii $x < -3$

Markaa $-(x+3) = 7$

$\therefore -x-3 = 7$

$x = -10$

LAYLISYO

B. Furfur isle'egyada soo socda.

1) $|5-x| = 7$

2) $|x-4| = 6$

3) $|-5-y| = 9$

4) $|-(-3)-t| = 3$

5) $|-(4-m)| = 2$

(6) $|-(n+10)| = 8$

(7) $|2x+5| - 2$

(8) $|3x+7| = 1$

(9) $\left|1+\frac{3}{2}x\right| = \frac{1}{2}$

(10) $\left|\frac{3x}{4}+2\right| = 6$

T. Furfur isle'egyada soo socda adoo isticmaalaya xarriiqda tirada.

1) $|5-x| = 3$

2) $|x-(-3)| = 4$

3) $|-2-x| = 1$

4) $|x-2| = 2$

5) $|-y+4| = 2$

CUTUB III.

Kulanno sallax

Xarriijin iyo Xarriiq

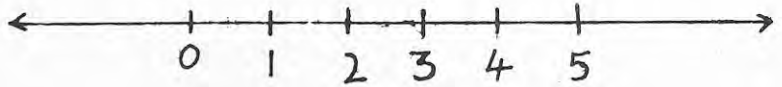
Xarriijin waxay ka kooban tahay baro fara badan oo sanka isku wada haya. Hase yeeshee waxay leedahay laba bar dhammaad.

AB waa xarriijin. A iyo B waa labadii bar dhammaad. Bal ka warran haddii aynu haysano urur ka kocban baro fara badan oo aan labada bar dhammaad midna aan lahayn, oo waligood sidaa isu dabajooga. Ururkaas baa la yiraahaa xarriiq. Haddaba, sidee baa loo tusaa in aynan xarriiqdu bar dhammaad lahayn? Waxa la jeexaa xarriijin, labada dhammaadna, waxa lagu sameeyaa midba gammuun.

xarriiq

Xarriiqda tirada

Waxaad jeexdaa xarriiq. Bartaad doontid ee ku taalla xarriiqda u qaado bilow, ka soo qaado in ay bartaasi u taagan tahay tirada 0 (eber). Adoo fogaanta aad doontid qaadanaya calaamadee bar kale oo eber ka xigta midig. Bartani ha u taagnaato hal, fogaantii u dhaxaysay eber iyo hal adoo isticmaalaya, calaamadee bar kale oo u taagan labo. Isla fogaantii adoo isticmaalaya calaamadee baro u taagan saddax, afar, shan, lix . . . . . Halkaa waxa inooga cad in eber tirocyinka midigta ka xigaa ay yihiin ur"rka abyooneyaasha togan sida hoos ka muuqata.

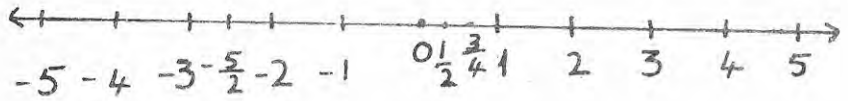


Fogaantii eber iyo hal u dhaxeysay adoo qaadanaaya eber xaggiisa bidix ka calaamadee bar. Bartaasi adoo ka tagaya, tu kale oo ka bidixeysa oo isla fogaantii u jirta samee. Sidaa u wad.

Haddaad xasuusan tahay hore waxaynu u niri tirooyinka togan iyo kuwa taban waa isku lid. Markaa, haddii iminka aynu ku bayaaminay abyooneyaasha togan eber midigteeda, waa in baraha eber bidixda ka xiga ee isu jira inta ay isu jiraan 0 iyo 1 noqdaan qaar lid u ah abyooneyaasha togan. Maxaa lid u ah abyooneyaasha togan. Abyooneyaasha taban. Halkaa waxa inooga muuqata in xarriiqdaani aynu ku bayaaminay dhammaan ururka abyooneyaasha.

Mar haddii fogaani u dhaxeyso laba abyoone oo kasta, waxaynu qayb qaybin karnaa fogaantaa. Markaa habar jajab oo dhan baan sidaa ku muujin karnaa. Taasi waxay ku tusaysaa in iminka tirooyinka lakab oo dhan lagu muujin karo xarriiqdii. Ma kula tahay in lagu muujin karo tirooyinka lakab wax dhaafsan? Labada barood ee ku beegan 3.1 iyo 3.2 haddaad sii qayb-qaybisid waxad heli bar u taagan tirada loo yaqaan (bay). Hase yeeshee tiradaasi maaha tiro lakab ee waa tiro lakab la'. Run ahaantii, tirooyinka lakabka la' oo dhan waad ku muujin kartaa xarriiqda.

Ugu dhambeystii waxa inoo cadaatay in xarriiqdii lagu muujin karo dhammaan tirooyinka maangal, kolkaa bar kastaa waxay ku beegan tahay tiro. Sidaa darteed baa xarriiqdan loogu bixiyey xarriiqdii tirada.



Bal ka warran haddii isle'eg lagu siiyo hal doorsoome leh oo lagu yidhaa ku bayaami furfurista xarriiqda tirada.

TUSAALE.

$$3x + 1 = 7$$
$$3x = 7 - 1$$
$$3x = 6$$
$$x = 2$$

Bartani waxay u taagan tahay 2. Ama waxaad odhan kartaa 2 waxay ku beegan tahay barta A. Tirada bar ku beegan waxa la yiraahaa kulan. Iminka 2 waa kulanka A.

TUSAALE.

Ururkan ku muuji xarriiqda tirada.

$$\{ -4, -3, 0, 2 \}$$

TUSAALE

Dhammaan tirooyinka u dhexeeya 0 iyo 1 ku muuji xarriiqda tirada.

Imisa tiro baa u dhexeysa 0 iyo 1? Run ahaantii tirooyin aad u badan baa u dhexeeya 0 iyo 1. Markaa waxa inoo hawl yar innagoo calaamadayna fogaanta u dhexeeysa 0 iyo 1. 0 iyo 1 miyay ku jiraan tirooyinka la calaamadaynayo? 0 iyo 1 midna kuma beegna baraha iyaga u dhexeeya. Kolkaa, si loo tuso

in ayna ku jirin laba goobo oo yar yar baa lagu sameeya baraha ku beegan 0 iyo 1. Labada goobo dhexdooda qalinka lama taabsiiyo.Haddii ay ku jiri lahaayeen, labada goobo gudahooda ayaa la madocbeyn lahaa.

LAYLISYO

Ku muuji xarriiqda tirada

1) Abyooneyaasha togan ee ka yar 9.

2) Dhamaan tirooyinka u dhexeeya 2 iyo 5.

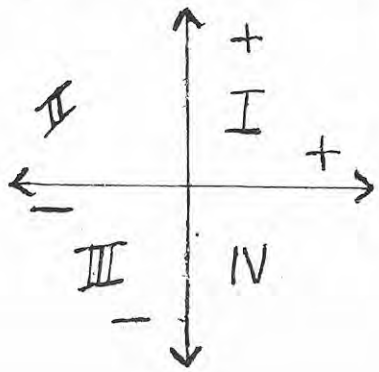
3) « « « « 2 iyo 5, oo ay ku jiraan.

4) $\{ -2, 0, +2 \}$

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

Dhidibbada kaartis

Waxaanu hore u aragnay xarriiqda tirada. Ka soo qaad inaad haysato laba xarriiq tiro. Bal mid jiifi, xarriiqda kalena ku qotomi ta hore adoc isa saaraya labadooda eber. Ma heshay shaxankan hoos ku yaal oo kale?

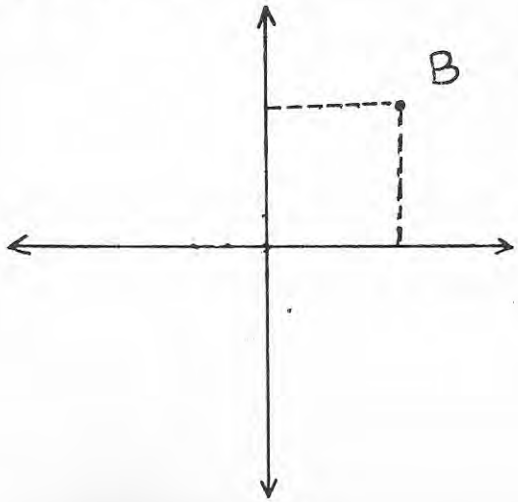


Barta ay iska jaraan labada xarriiqood waxa la yidhaa unug. Xarriiqda jiifta waxa la yidhaa dhidibka — x, ta taagan na waxaa la yidhaahaa dhidibka — y. Labada dhidib waxa la isku yidhaa dhidibbada kaartis ama dhidibka kulanka laydi. Ninkii u horreeyey ee hindisay laba xarriiq tiro oo sidaa isugu qotoma baa la odhan jiray Dhikaart, sidaa daraadeed baa dhidibbada loo yidhi dhidibbadii kaartis. Sida shaxanka ku bayaansan, dhidibka —x ee midigta unugga waa tiro togan, bidixduna waa tiro taban. Dhidibka — y wixii unugga ka sarreeya waa tiro togan wixii unugga ka hooseeyaana waa tiro taban.

Adoo shaxanka fiirinaya imisa gobol bay dhidibbadu u qaybiyeen xaashida? Afar gobol. Gobolkiiba waxa la yiraahdaa **waax.** Kolkaa afar waaxood baa xaashida loo qaybiyay. Marka la tirinaayo afartaa waaxood waxa lagaga bilaabaa waaxda ka samaysanta dhidibka —x ee togan iyo ka y ee togan. Dabadeed waxa loo socdaa lid saacad wareeg.

LAMMAANE HORSAN

Hore waxaynu u nidhi bar kasta oo ku taalla xarriiqda tirada waxay u taagan tahay tiro kaliya. kolkaa tiradaasi baa lagu tilmaamaa bartaa. Iminka ka soo qaad inaad haysato sallaxa ay sameeyaan dhidibbada **Kaartis.** Haddaba barta B ee sallaxa ku bayaansan sidee loo tilmaamayaa ? Bal qotome ka soo deji B oo jiraya dhidibka — x. Qotome kale oo jaraya dhidibka — y ka jeex B.



Barta B waxay ku beegan tahay laba tiro oo; midi ku taallo dhidibka — x ta kalena ku taallo dhidibka — y. Labada tiro ee ay bartu ku beegan tahay miyaa la wada qorayaa mise mid uun baa la qorayaa? Runtii labada tiraba waa la qorayaa si barta loo tilmaamo. Maxay tiro kaliyihi innoogu filaan weydey?

Halkaa waxaynu ka garanay in bar kasta oo sallaxan ku taalla lagu tilmaamayo laba tiro oo midi ka timid dhidibka — x ta kalena ka timid dhidibka — y. Labadaa tiro oo wadajira waxa la yiraa lammaane. Haddaba, lammaanayaasha ma sida la doono baa loo kala horeysiin karaa mise mid uun baamar walba la horreysiiyaa

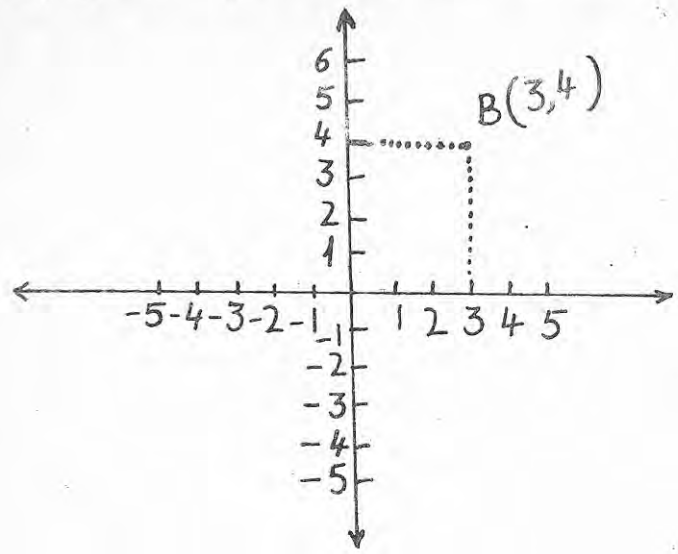
Run ahaantii, tirada dhidibka — x ka timid baa mar kasta la horeysiiyaa. Halkaa waxa ka cad in lammanayaasha loo qoro si horsan. Kolkaa, bar kasta oo sallax ku taalla waxa lagu tilmaamaa lammaane. Lammaanuhu labada tiro ee horsan uu ka kooban yahay middiiba waxa la yiraa kulan. Kolkaa, kulanka —x baa mar kasta horeeya, kulanka —y na wuu dambeeyaa. Markaa, sansaanta loo qoro lammaanayaasha horsan waa (x, y).

Lammaane horsan waxa aad loo fahmi karaa, haddii aad u fiirsato sida loo tiriyo «buundooyinka» ciyaaraha kubbadda laliska. Haddii siiriwalahu yidhaa 7, 19 markaaba waxaad garanaysaa in qolada kubbadda tuuranaysaa leeyihiin 7 buundo qolada kalena 10 buundo.

BAR DHIGID

Waataynu gaadhnay in bari ay leedahay laba k u l a n. Su'aasha iminka inoo furan waxa weeye, haddii lagu siiyo bar labadeeda kulan, sidee bartaa loogu muujin kara dhidibbada kaartis?

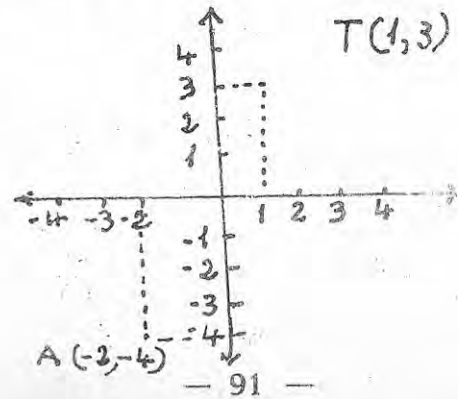
Ka soo qaad in lagu siiyay barta B (3,4). Bartani



B, kulanka hore waa kii x, ka dambena waa kii y. Kolkaa, 3 waa kulanka x, kulanka — y na waa 4. Haddaba sidee loogu dhiggaa bartan sallaxa? Sida shaxanka ku bayaansan, halka 3 ku beegan ee dhidibka — x ka jeex xarriiq taagan oo barbarro la ah dhidibka —y. Haddana, halka 4 ku beegan ee dhidibka —y ka jeex xarriiq jiifta oo barbarro la ah dhidibka +x. Ma aragtaa in ay labada xarriiq isgoynaayaan? barta ay laba xarriiq iska gooyaan baa tilmaamaysa barta B.

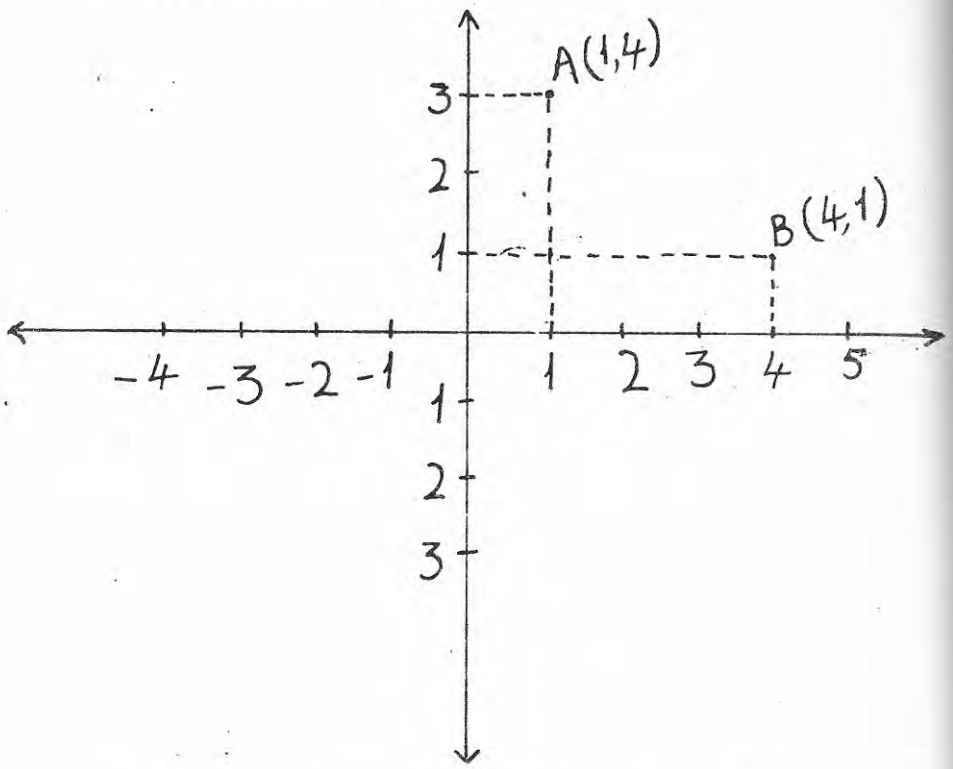
TUSAALE

Muuji Barahan A (— 2, — 4), T (1,3)



TUSAALE

Muuji A (1, 4) , B(4.1)



Halkaa waxa ka cad in (1,4) iyo (4.1) laba barood oo kala jaad ah ay yihiin. Kolkaa, horsanaanta lammaanayaashu macna weyn bay ku fadhidaa.

LAYLISYO

B

1) Waa maxay faraqa u dhaxeeya xarriiq iyo xarriijin?
2) Maxaa dhidibka x iyo ka y loogu bixiyay dhidibbadii kaartis?
3) Dhidibbada Kaartis imisa waaxood bay u qaybiyaan xaashida?
4) Lammaanaha horsan ee bar lagu tilmaamaa sidee buu u horsan yahay ?

T

Barahan soo socda ku muuji dhidibbada Kaartis :

A (5, −1), B (−2, −1), T (0, 5)
J (−3, 0), X (0, 0)

J.

Magacow waaxyaha barahani ku dhacaan :

1) (2, 4)
2) (−3, −3)
3) (−2, 5)
4) (4, −2)
5) (0, 0,)

X

Waa maxay kulanka —y ee dhammaan baraha ku yaalla dhidibka —x.

Kh

Waa maxay kulanka —y ee dhammaan baraha ku yaalla dhidibka —y.

GARAAFKA ISLE'EG TOOSAN

Calaamaddan «=» waa calaamadda isle'ekaanta. Bal laba tibaaxood qor una dhaxaysii summaddan =. Weedhaas baa la yidhaa isle'eg. Ma heshay wax jaadkan ah ?

2 + 2 = 5 Isle'eg
dhinac ↓ dhinac
summad

Bal weedhan ka warran? 4+x=7

Miyayna isleeg ahayn? Way tahay.

Waa maxay faraqa u dhaxeeya isle'egtaa iyo tii hore ?

Isle'egtaa hore, ir. ay run tahay iyo in ay been tahay waa la garan karaa, waayo waxay ka kooban tahay tirooyin.

Bal laba u gee saddex, miyaanad helayn shan? Markaa isle'egta hore waa run.

Isle'egta dambe, sida ka muuqata kama wada koobbna tirooyin. Waayo? Waxa ku jira hal doorsoome.

Doorsoome waxa la yidhaa xaraf, ama sawir lagu beddeli karo tiradii la doono. Hadaba, $4+x = 7$ waa isleeg hase yeeshee, ma garan kartaa run iyo been mid ay tahay ? la garan maayo runteeda iyo beenteeda ilaa doorsoomaha x, tiro lagu beddelo.

Bal 3 ku beddel x.

Waxaad heshay isle'egtan

$$4+3 = 7$$

Isle'egta aad heshay ma run baa mise waa been? Waa run. Imika 5 ku beddel x.

Waxaad helaysaa,

$$4+5 = 7$$

Ka warran runta iyo isleegtan? Miyayan tani kula hayn been? Bal tiradaad doonto ku beddel x; dabadeed, eeg runta iyo beenta isleegta aad hesho. Maxaa halkaa ka cad? Waxa aad garan doontaa in 3 u yahay tirada qudha ee isleegta run ka dhigaysa. Tiro kasta oo kale marka lagu beddelo x, waxay ka dhigaysaa isle'egta been.

Bal u fiirso, weedhan:

$$y = x + 1$$

La iskuma hayo inay weedhani sleeg tahay, laakiin sidaydu

uga duwan tahay isle'egtii hore ee ahayd $4+x = 7$? Isle'egta $4+x = 7$ waxay qabtaa hal doorsoome sidaynu hore u sheegnay. Laakiin isle'egta ah $y = x + 1$ waxay qabtaa laba doorsoome. Waa kuwee labada doorsoome? waa x iyo y.

Hore, waxaynu u aragnay sida loo helayo waxa run ka dhiga isle'eg qabta hal doorsoome.

Haddaba sidee loo helayaa waxa run ka dhigaya isle'eg qabta laba doorsoome sida $y = x+1$.

Sida muuqata waa in tirooyin lagu beddelaa x iyo y. Bal 2 ku beddel x, 3 ku beddel y. isle'egta kuu soo baxday ma run baa mise waa been?

$$3 = 2+1$$

Waa caddaan in ay run tahay isle'egtani, iminka, 4 ku beddel x, 7 ku beddel y. Kolkaa isle'egtii waa $5 = 4 + 1$ welina waa run. Haddana, 6 ku beddel x, 5 ku beddel y. Isle'egtii waxay noqotay $7 = 6 + 1$ waana run. Ugu dambeys, 8 ku beddel x, 9 ku beddel y. Run ma tahay isle'egta kuu soo baxday? Halkaa maxaa laga garan karaa? Waxaa halkaa ka cad in ay jiraan tirooyin badan oo laba laba u wada socda, runna ka dhiga isle'egyada qaba laba doorsoome. Bal u fiirso isle'egtan

$$y = x - 3$$

Imisa doorsoome bay qabtaa isle'egtani ? Laba.

Tirooyinkani run ma ka dhigaan isle'egta ?

$$x = 1,\ y = -2$$

$$x = 2,\ y = -1$$

$$x = 3,\ y = 0$$

$$x = -1,\ y = -4$$

$$x = -2,\ y = -5$$

Bal ka warran haddii aynu ku muujinno tusahan.

x	y
+1	-2
2	-1
3	0
-1	-4
-2	-5

Labadii tiro ee kasta ee run ka dhiga isle'eg waxa la yidhaa lammaane.

Lammaanayaashan si horsan ma u qori karnaa ?

Haa. Tirada lagu beddelayo x hor qor, ta y lagu beddelayana dambaysii. Tirooyinka ku qoran tusaha, marka loo qoro si lamaanayaal horsan ah, waxay noqonayaan :

(1, −2,)
(2, −1)
(3, −0)
(−1, −4)
(−2, −5)

LAYLISYO

1) Lamaanayaasha horsan ee soo socdaa run miyay ka dhigaan isle'egta ?

$$y = x + 3$$

b) (5, 8)

t) (0, 3)

j) (4, 2)

x) (1, 4)

kh) (−2, 1)

d) (−1, 2)

r) ($^1/_2$, 2)

s) (2, 5)

sh) (−5, −2)

m) (4, 1)

2) Qor **toban** lammaane oo run ka dhiga isle'egtan,

$$y = 2x - 2$$

Hore waataynu u aragnay sida lammaane horsan loogu muujiyo bar sallax Kaartis ku taalla.

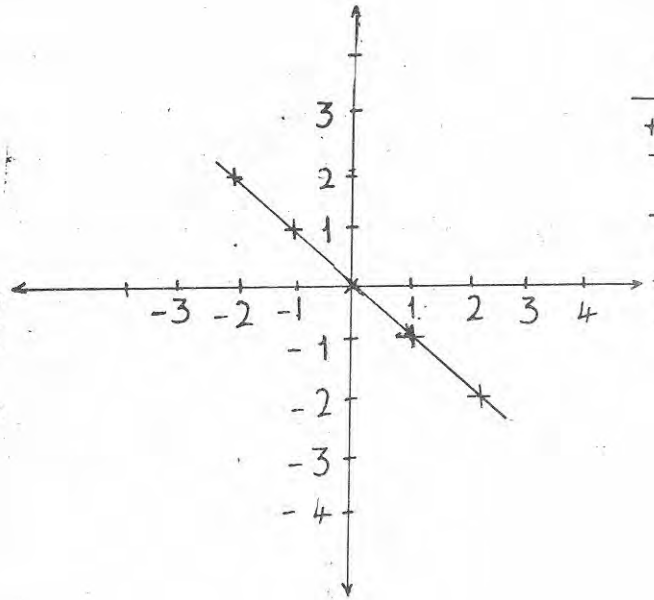
Ugu dambaystii isku xir baraha.

Xarriiqda toosan ee aad heshay baa la yiraa garaafka isle'egta.

TUSAALE:

Muuji garaafka

$$y = -x$$



x	y
+2	-2
1	-1
0	0
-1	1

Inaad aragtay mooyee, tusaalihii hore waxaynu qaadnay shan barood, tusaalahan dambe waxaynu isticmaallay afar barood. Haddaba, su'aasha inoo furani waxa weeye, imisa barood baa loo baahan yahay si loo sawiro garaafka isle'eg toosan ? Fududaa jawaabtu !

Bal xaashida ku samee laba barood. Isku xir. Maxaad heshay? Kolkaa, si loo sawiro garaafka isle'eg toosan waxa loo baahan yahay laba barood oo qudha. Hase yeeshee, si looga foojignaado inay baraha mid kaa khaldanto ayaa la isticmaalaa saddex barood. Haddaba iminka iyo wixii ka dambeeya waxaynu qaadan doonnaa seddex barood si loo sawiro garaafka isle'eg toosan.

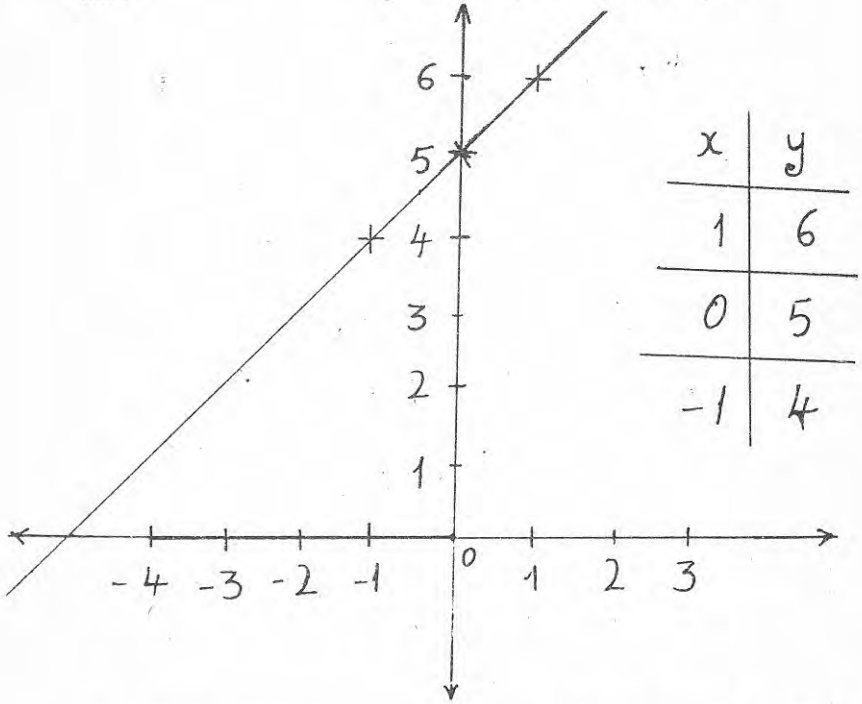
TUSAALE

$$y - x = 5$$

Si ay shaqadu kuugu fududaato, y dhinac u deyso waxa kalena dhinaca kale wada gee,

Kolkaa $y = 5 + x$

ama $y = x + 5$ Waayo?



x	y
1	6
0	5
-1	4

Xarriiqda aan samaynay miyayna ahayn garaafka isle'egta ?

(1) **Lamaanayaal ka mid ah furfurisyada** isle'egta hore sida kor ku qoran waxa weeye :

$(1,2)$, $(2,3)$, $(3,4)$ $(-1,0)$ $(-2,-1)$ $(0,1)$

(2) Lamaanayaal ka mid ah furfurisyada isleegta dambe waxa weeye :

$(1,3)$, $(2,5)$, $(3,7)$, $(-1,-1)$, $(-2,-3)$ $(0,1)$

Hase yeeshee. furfurista labada isle'eg ee wadajira waa lammaanayaasha run ka dhiga labada isle'egba. Sida kor ka muuqata lammaanaha (0,1) waa lammaanaha qudha ee labada isle'egba run ka dhiga. Bal ka feker lammaane kale oo labada isle'egba run ka dhiga. Haddaba, sidee baa loo helayaa **furfurista** isle'egyo wadajira? Siyaala badan baa furfurista isle'egyo wada jira lagu heli karaa. Aljebra ahaan waa lagu heli karaa. Hase yeeshee waxaynu isku koobaynaa sida lagu helo furfuristaas inakoo isticmaalayna garaaf. Aan qaadano labadeeni isle'eg ee hore :

$$\begin{cases} y = 2x + 1 & -(2) \\ y = x + 1 & -(1) \end{cases}$$

Labada isle'eg mid **kasta garaafkeeda** sawir, laakiin, labada gaaraaf ku wada sawir isla dhidibbo.

(1)

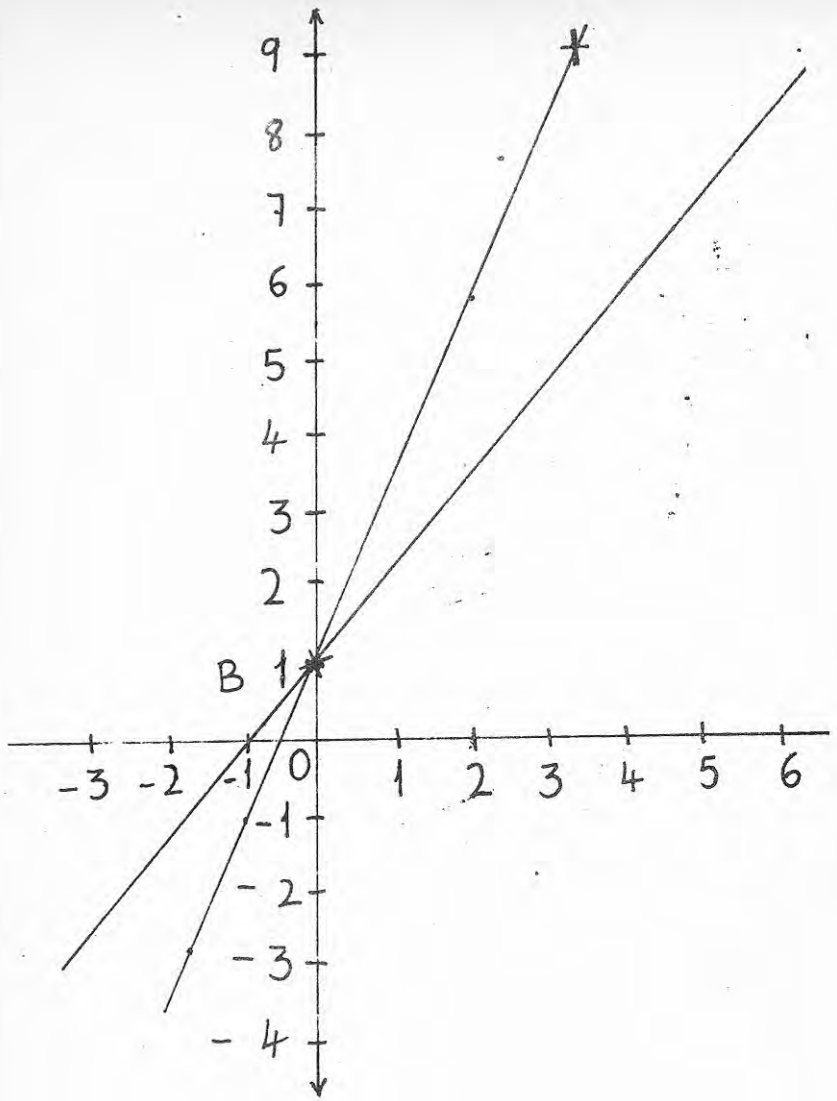
(b)

x	y
2	5
3	7
4	9

(2)

(a)

x	y
2	3
3	4
4	5



U fiirso nidaamka lagugu tusay isle'eg kasta xarriiqdeeda. Isle'egta hore xarriiqdeedu waa —— (1). Isle'egta dambe xarriiqdeedu waa —— (2).

Bal u fiirso barta B. bartaasi miyayna ahayn barta labada xarriiq ay iska jaraan ? Bar kale oo labada xarriiq ku kulmaan ma jirtaa? Runtii barta B waa ta kaliya ee labada xarriiq ku kulmaan. Sidaa daraadeed, barta B waa barta kaliya ee

run ka dhigta labada isle'egba. Sidee bay bartan B run uga dhigtaa labada isle'eg? B oo ah (0,1) ku beddel isle'egta hore oo ah :

$$y = x+1$$

$$1 = 0+1$$

$$\therefore 1 = 1$$

Bal isle'egta dambana ku day.

$$y = 2x+1$$

$$1 = 2.0 +1$$

$$1 = 0 + 1$$

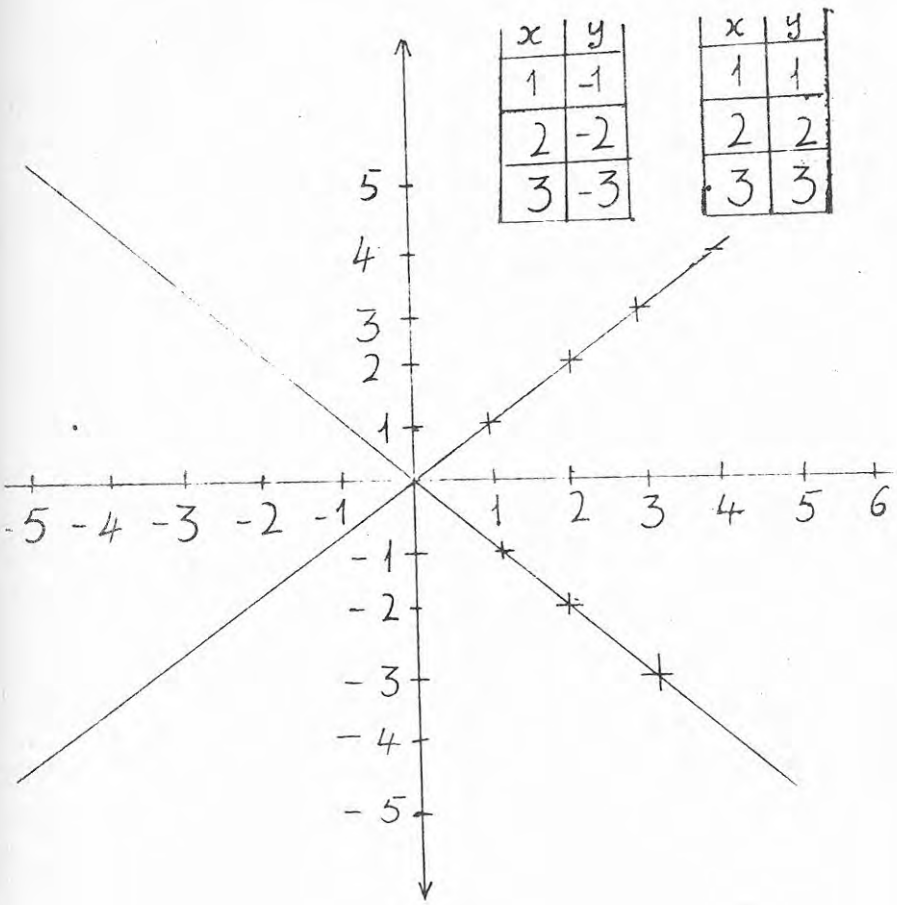
$$\therefore 1 = 1$$

Kolkaa, bartu labada isle'egba run bay ka dhigtaa. Iminka, bar kale oo labada xarriiq midkood ku taalla qaado. Bal ku day inay labada isle'egba run ka dhigto. Maxaad halkaa ka gaadhay? In bar kale oo labada isle'egba run ka dhigtaa aysan jirin.

TUSAALE:

Garaaf ku furfur isle'egyadan wada jira :

$$\begin{cases} y = -x & -(1) \\ y = x & -(2) \end{cases}$$



Iminka furfurista isle'egyada wada jira waa B (0,0).

TUSAALE:

Furfur isle'egyada wada jira adoo isticmaalaya habka garaafka.

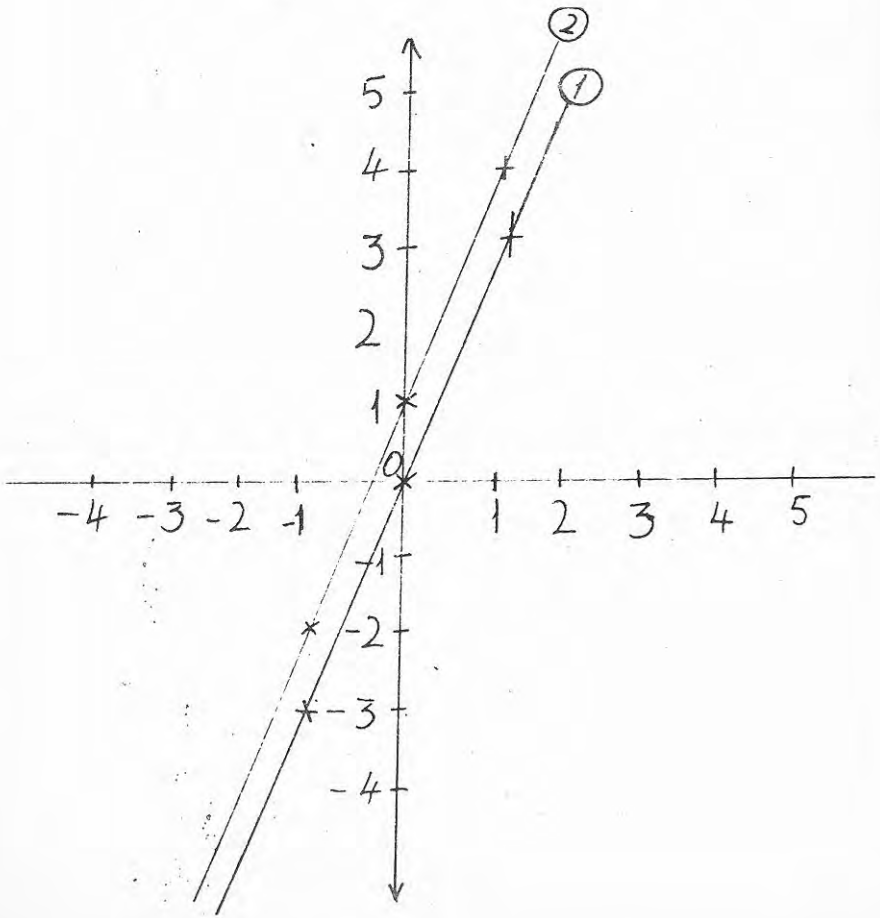
$$\begin{cases} y = 3x & -(1) \\ y = x & -(2) \end{cases}$$

(1)

x	y
1	3
0	0
-1	-3

(2)

x	y
1	4
0	1
-1	-2



Waa sidee? Bal labada xarriiqba sii jeex. Ma aragtaa inaysan waligood isjarayn? Kolkaa labada xarriiq waa barbarro. Haddaba haddii isle'egyo wada jiraa ku siiyaan xarriiqyo barbarro ah waa maxay furfuristu? Mar haddii aysan jirin bar ay ku kulmaan, ma jirto bar labada isle'egba run ka dhigaysaa. Kolkaa jawaabta su'aashan oo kale waxay noqoneysaa ururka madhan.

TUSAALE

Garaaf ku soo saar furfurista isle'egyada wada **jira.**

$$\begin{cases} y = x + 1 & -(1) \\ 2y = 2x + 2 & -(2) \end{cases}$$

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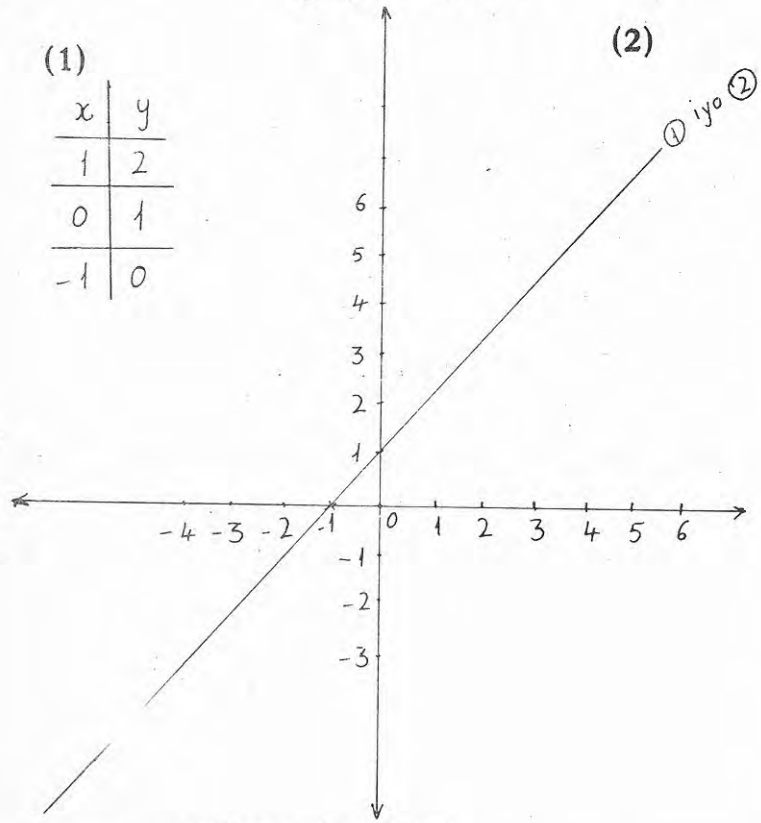
(1)

x	y
1	2
0	1
-1	0

(2)



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Mee xarriiqdii labaad? Cajiib!

Wax lala yaabo ma aha. Halkii aynu ka filaynay laba xarriiq baa xarriiq kaliyihi inoo soo baxday. Taasi waxay ku tusaysaa labadii xarriiq ee la filayay inay isudulfuuleen ama isa saarmeen. Haddaba waa maxay furfurista labadan isle'eg ee wada jira.

Bal eeg bar kasta oo xarriiq aynu hellay ku taalla inay run ka dhigayso labada isle'egba. Halkaa waxa inoogu caddaatay inay bar kasta oo xarriiqda ku taallaa run ka dhigayso labada isle'egba. Sidaa daraadeed, bar kastaa way noqon kartaa furfuris. Halkaa waxad ka aragtaa inay furfurisyadoodu aad iyo aad u badan yihiin ooysan xad lahayn.

NAKHTIIN

Laba isleeg oo wada jira garaafkoodu waa:

1) Laba xarrriiq oo isjaraya — markaa furfuristu waa bar kaliya.
2) Laba xarriiq oo barbarro ah — markaa furfuristu ma jirto.
3) Laba xarriiq oo isduldhaca — markaa bar kasta waa furfuris.

LAYLISYO

Garaaf ku furfur isleegyadan wada jira:

1) $y = x - 3$
   $y = -2x$
2) $2x + y = 1$
   $x + 2y = 5$
3) $y = x$
   $y = -x$
4) $y = 3x$
   $y = -\frac{1}{2}x + 2$

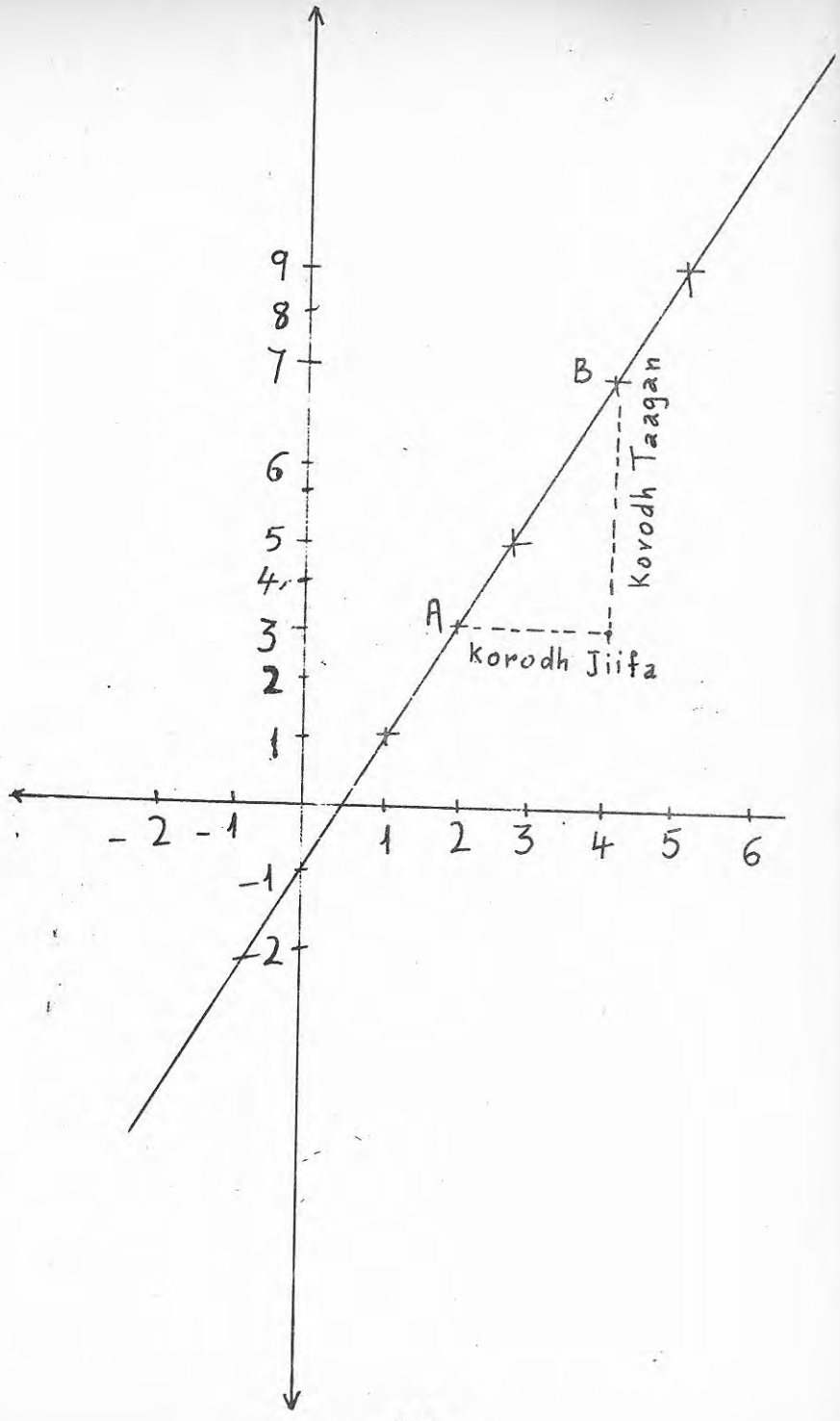
5) $3x - 4y = 10$
   $6x - 8y = 20$
6) $x + 2y = 1$
   $y = -\frac{1}{2}x$
7) $y = 5$
   $x = 4$
8) $y = 0$
   $x = 0$
9) $x = \frac{1}{2}y$
   $y = 2x$
10) $2y - x = y$
    $3x + y = +4x$

Tiirada Xarriiq:

Waataynu soo aragnay sida loo sawiro garaafka isleeg toosan.

Bal aan eegno garaafka $y = 2x - 1$

x	y
1	1
2	3
3	5
4	7
5	9

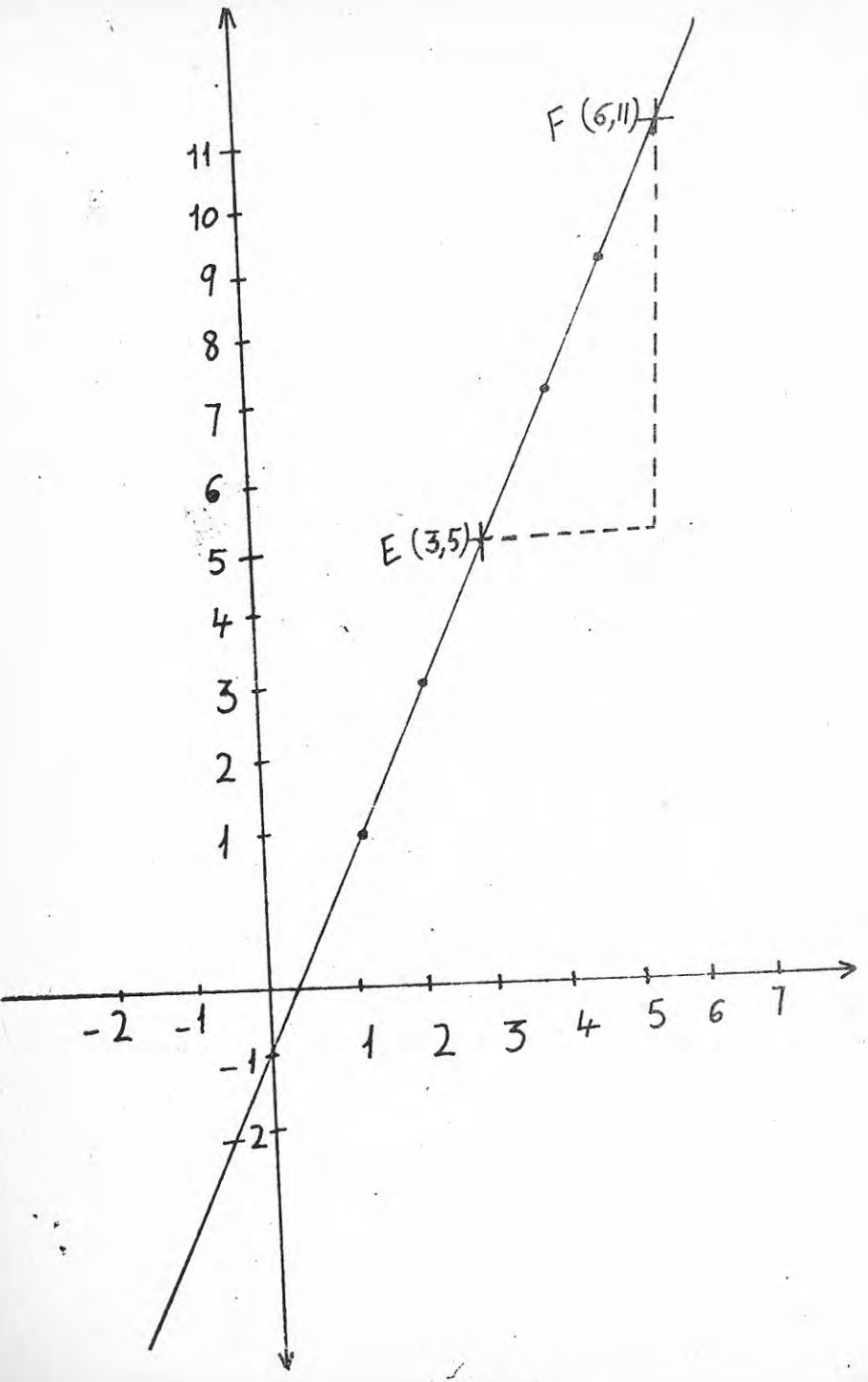


U bixi A barta u taagan (2,3), B ta u taagan (4,7) sida ku muujisan sawirka. Haddaba, A ka tag oo laba xubnood u soco midigta, halkaa aad joogto afar xubnood kor uga soco. Ma timid B? Labadii xubnood ee aad midigta u socotay waxay ku kordhiyeen kulanka x ee A laba. Afartii xubnood ee aad dabadeed sare u socotayna waxay ku kordhiyeen kulanka y ee A afar.

Haddaba waa maxay saamiga, $\frac{\text{korodh taagan}}{\text{korodh jiifa}}$. Saamigani wuu dhib yar yahay. Korodhka taagan marka la tagayo A (2,3) ee laga tagayo B (4,7) waa $7 - 3 = 4$; korodhka jiifaana waa $4 - 2 = 2$.

Markaa $\frac{\text{korodhka taagan}}{\text{korodhka jiifa}} = \frac{4}{2} = 2$

Bal, iminka qaado laba barood oo kale oo ku yaal isla garaafkeenii. . . . .

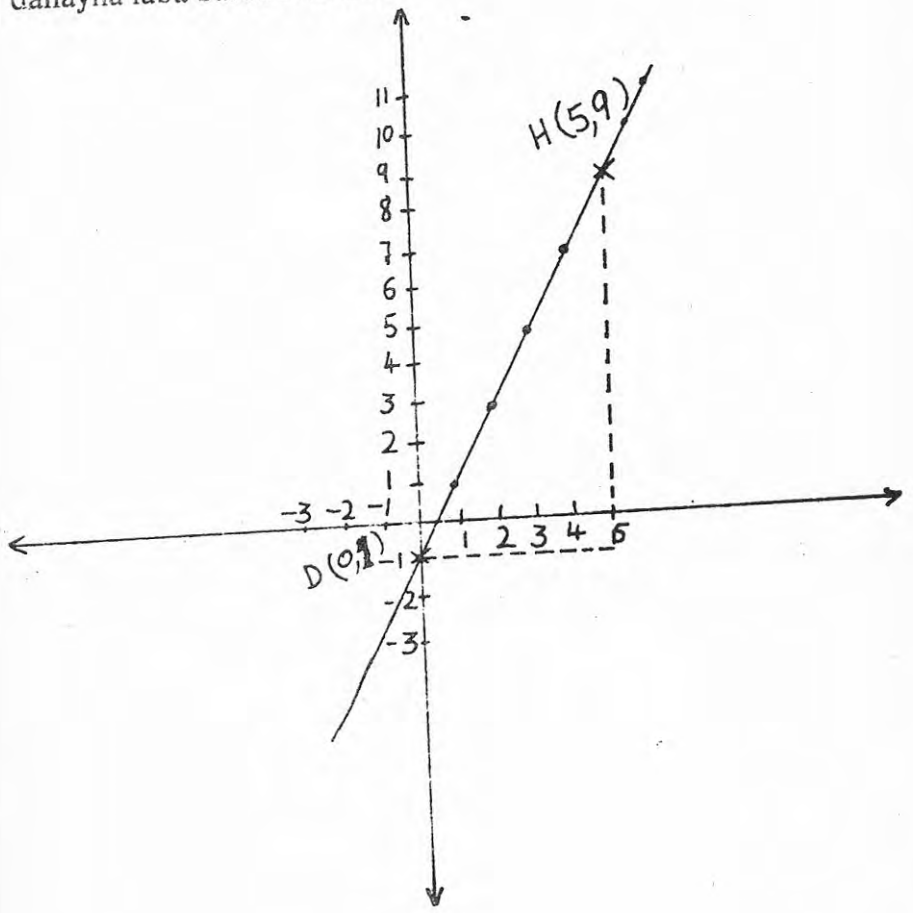


Ka soo qaad in labadii barood yihiin E (3,5) iyo F (6,11). Haddaba, haddii aad joogto F, oo aad dooneyso inaad tagto F, imisa xubnood baad midig u soconaysaa ? Saddex. Imisa xubnood baad sare u soconaysaa? Lix. Ma aragtaa in korodhka jiifaa uu yahay saddex xubnood, korodhka **taaganina**

Kolka:

$$\frac{\text{korodh taagan}}{\text{korodh jiifa}} = \frac{6}{3} = 2$$

Bal, mar kale aan ku noqonno garaafkeenii innagoo qaadanayna laba barood oo kale.



Iminka waxaan ka imanaynaa H, oo waxaan imaanaynaa D. Imisa xubnood baad hoos u soo soconaysaa si aad ula sinaatid D ? Toban xubnood oo hoos u socod ah. Mar haddii sare u socodkii ahaa tiro togan waa inuu hoos u socodku noqdaa tiro taban. Marka aad hoos u soo degtid toban xubnood imise xubnood ayaad bidix u soconaysaa si aad u timaadid D ? Shan bidix u socod ah. Mar haddii midig u socodkii ahaa tiro togan waa inuu bidix u socodku noqdaa tiro taban.

Kolkaa, $$\frac{\text{Korodh taagan}}{\text{Korodh jiifa}} = \frac{-10}{-5} = 2$$

Halkaa maxaa ka cad? Waxaan halkaa ka garan karnaa, haddii labada barood eed doonto aad qaadato, in saamigan

$$\frac{\text{Korodh taagan}}{\text{Korodh jiifa}}$$

yahay mid aan isbeddelin oo jawaab qur ah ku siiya. Tusaalahaa aan wadnay, mar kasta saamigu wuxuu soo baxay 2.

Haddaba, saamigan $$\frac{\text{Korodh taagan}}{\text{Korodh jiifa}}$$

waxa la yidhaahaa tiirada xarriiqda. Tiiradana waxa loo soo gaabiyaa m.

Kolka, tiirada xarriiqdu $= m = \frac{\text{Korodh taagan}}{\text{Korodh jiifa}}$

Haddii aad u fiirsato faallada kor ku qoran, waxaad odhan kartaa, xarriiqdii kasta tiiradeedu isma beddesho. Waxaad kalood odhan kartaa qiimaha tiirada xarriiqi waa isku mid adoo labada barood ee aad doonto isticmaalaya.

Haddii aad u fiirsato faalladaan soo wadney, imisa barood baa loo baahan yahay si loo soo saaro tiirada xarriiq ? Laba.

Haddaba, marka aad haysato xarriiq, ee lagu yiraahdo soo saar tiiradeeda, waa inaad doorataa laba barood oo ku yaalla xarriiqda. Hase yeeshee waa yara kadeed inaad ka fikirtid imisaa hoos a m a sare loo soconayaa i y o imisaa midig ama bidix loo soconayaa. Markaa, sidee baynu hawsha u yaraynaa ? Inaad aragtay mooyee korodh taagani waa baraha labadood kulan ee Y oo la kala gooyey, korodh jiifaana waa labada kulan ee X oo la kala gooyey. Markaa, miyuuna kula haboonayn jidkaani. Labada barood ka soo qaad A (x_1, y_1) iyo B (x_2,y_2).

$$\text{Tiiro} = m = \frac{\text{Korodh taagan}}{\text{Korodh jiifta}} = \frac{y_2 - y_1}{x_2 - x_1}$$

Iminka su'aasha inoo furani waa, labada barood sidee baa loo garanayaa ta ah (x_1, y_1) iyo ta ah (x_2, y_2) ? Jawaabtu way fududahay; bartaad doonto u bixi (x_1,y_1) markaa barta kalena waxay noqonaysaa (x_2,y_2).

TUSAALE

Waxaad haysataa xarriiq labadan barood ku yaallaan, waxaana lagu weydiiyay tiirada xarriiqda.

A (2,3), B (5,6)

Haddaba baraha midkood u bixi (x_1, y_1) ta kalena ha noqoto (x_2, y_2).

Ka soo qaad A (2 , 3) inay tahay (x_1, y_1) markaa B (5 , 6) waxay noqonaysaa (x_2, y_2).

Kolkaa, $$\text{tiiro} = m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\therefore \quad m = \frac{6 - 3}{5 - 2} = \frac{3}{3} = 1$$

Bal kala beddel oo A (2 , 3) ka dhig (x_2, y_2)

B (5 , 6) » (x_1, y_1)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Kolkaa, $$m = \frac{3 - 6}{2 - 5} = \frac{-3}{-3} = 1$$

ma aragtay in jawaabtu isku mid tahay, sidaad doonto baraha u magacaw oo.

DIGNIIN:

Iska jir inaad bar u bixiso (x_1, y_2) ama (x_2, y_1). Waa inaad barta mar kasta u bixisaa (x_1, y_1) ama (x_2, y_2). Waliba jidka tiiradana ma beddeli kartid. Sidiisa u isticmaal.

TUSAALE:

Soo saar tiirada xarriiqda marta baraha soo socda.

A (5, 3), B (10, 8), D (12, 10)

Furfuris:

Markaaba waa inaad isweydiiso imisa barood baa loo baahan yahay si loo soo saaro tiirada. Laba qur ah. Haddaba saddexda barood uma wada baahnide, laba uun ka qaado, Ka dhig inaad qaadatay A (5,3) iyo B (12,10); midkood u bixi (x_1, y_1) ta kalena ha noqoto (x_2, y_2).

A (5, 3) $\longrightarrow$ (x_1, y_1)

B (12, 10) $\longrightarrow$ (x_2, y_2)

Kolka,

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{10 - 3}{12 - 5} = \frac{7}{7} = 1$$

Bal D (12,10,) ka dhig (x_1, y_1)

A (5,3) ka dhig (x_2, y_2)

tiiradu ma kuu soo baxday I?

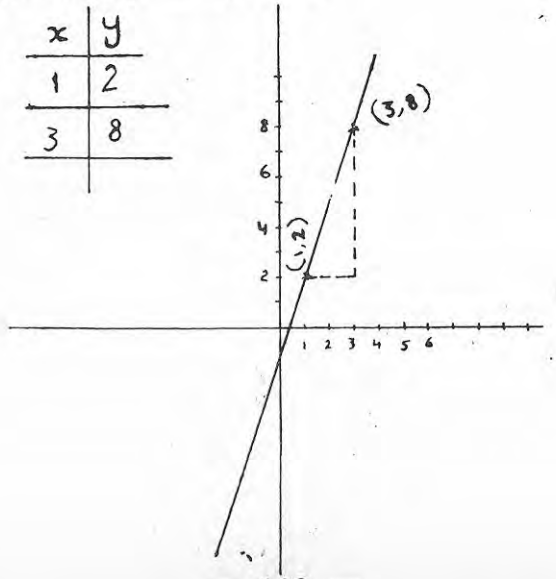
TUSAALE:

Waxa lagu siiyey isle'egta $y = 3x - 2$ waxana lagu weydiiyey tiirada xarriiqda isle'egta.

Furfuris :

Sawir garaafka $y = 3x - 1$

x	y
1	2
3	8



(3, 8) » (x_2, y_2)

Haddaba, labadaa barood isticmaal si aad u hesho tiirada xarriiqda.

(1, 2) ka dhig (x_1, y_1)

(3, 8) » (x_2, y_2)

Kolkaa, $$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 2}{3 - 1} = \frac{6}{2} = 3$$

TUSAALE

Waa maxay tiirada isle'egtani,

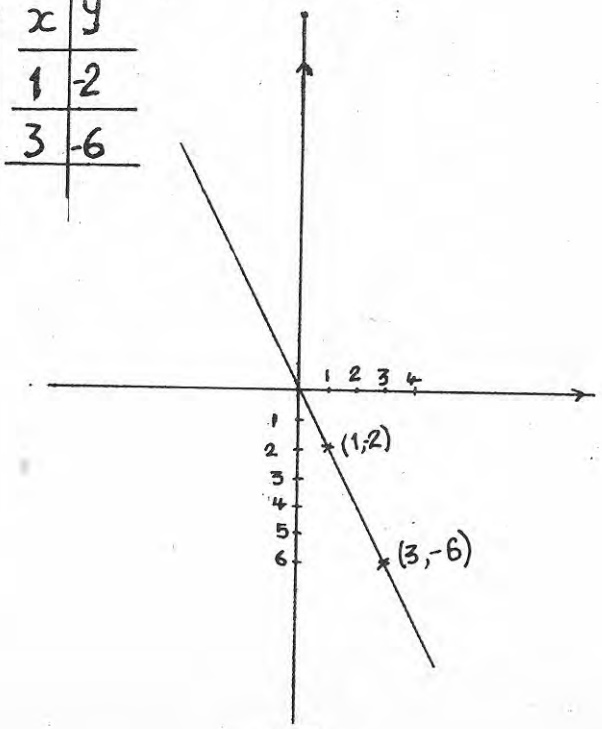
$$y = -2x$$

Furfuris

Sawir garaafka,

$$y = -2x$$

x	y
1	-2
3	-6



(1, 2) ka dhig (x_1, y_1)

(3, −6) » (x_2, y_2)

Kolkaa,

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(-6) - (-2)}{3 - 1} = \frac{-6+2}{2} = \frac{-4}{2} = -2$$

Tusaalahani wuxuu caddeynayaa in xarriiqyada qaarkood leeyihiin tiiro ah tiro taban.

LAYLISYO

1) Imisa barood baa loo baahan yahay si aad u hesho tiirada xarriiqda ?

2) Waa maxay jidka lagu soo saaro tiirada xarriiq ?

3) Labada barood ee loo baahan yahay marka la soo saarayo tiirada xarriiq, ma tii la doonaa loo bixinayaa (x_1, y_1) ?

4) Soo saar tiirada xarriiqyada mara barahani :

b) (0, 0), (2, 2)

t) (0, 0), (2, 3)

j) (1, 2), (2, 3), (5, 6)

x) (3, −3), (4, −4)

5) Sawir garaafka isle'eg kasta oo soo socota. Garaaf kastana laba barood ka dooro oo soo saar tiirada xarriiqdaas.

b) $y = 2x + 3$.

t) $2y = x$

j) $y = 5x - 5$

x) $y = 2$

kh) $x = 2$

Tiirada xarriiqda sida loo ga soo saaro isle'egta xarriiq

Waataynu soo aragnay marka la raadinayo tiirada xarriiq in loo baahan yahay laba barood, dabadeed lagu shaqeeyo jidka. Su'aasha imika aynu isweydiincynaa waxa weeye haddii isle'eg aad haysato, markaaba ma garan kartaa tiirada xarriiqda isle'egtaa. Isle'eg kasta oo toosan wuxuu garaafkeedu noqonayaa xarriiq toosan sidii hore aynu u sheegnay.

Haddaba, waa maxay tiirada $y = 2x + 1$

Kolkaa, $(1, 3)$ ka dhig (x_1, y_1)

$(2, 5)$ » (x_2, y_2)

$$m = \frac{y_2 - y_2}{x_2 - x_2}$$

$$\therefore \frac{5 - 3}{2 - 1} = \frac{2}{1} = 2$$

Bal u fiirso wehelivaha x ee isle'egta.
Miyunna laba ahayn.

TUSAALE

$$y = -x + 1$$

x	y
2	-1
3	-2

$(2,-1)$ ka dhig (x_1, y_1)

$(3,-2)$ » » (x_2, y_2)

$$\text{Kolkaa, } m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(-2)-(-1)}{3 - 2}$$

$$= \frac{-2+1}{1} = \frac{-1}{1} = -1$$

Waa maxay wehelivaha x ee isle'egtu ?- Waa — 1. Halkaa maxaa ka cad? Waxa ka cad xeerkan haddii isle'eg toosan loo qoro sansaanta $y = mx + b$, wehelivaha x oo ah m waa tiirada xarriiqda.

TUSAALE

Waa maxay tiirada

$$y = 3x + 5$$

Ma tahay isle'egtani sansaanta $y = mx + b$?
Bal is garab dhig:

$$y = 3x + 5$$
$$\downarrow \quad \downarrow \downarrow \quad \downarrow$$
$$y = mx + b$$

Maxaa ku beegan m? 3.
haddaba $m = 3$

TUSAALE:

$$y = -4x + 4$$

Bal garab dhig sansaantii

$$y = -4x + 4$$
$$\downarrow \quad \downarrow\downarrow \quad \downarrow$$
$$y = \quad m\,x \quad b$$

Kolkaa m = −4

TUSAALE:

$$3y = 12x + 4$$

Isle'egtani u ma qorna sansaantii y = mx+b waayo waa inaad dhinac y kaligeed ku haysataa. Hase yeeshee, si aan y keligeed dhinac ugu haysano, waa in labada dhinacba loo qaybiyaa 3.

$$\frac{3y}{3} = \frac{12x + 4}{3}$$

$$\therefore y = 4x + 4/3$$

Haa, iminka ayay sansaantii u qoran tahay.

Haddaba $y = 4x + 4/3$

$$\downarrow \quad \downarrow \quad \downarrow$$
$$y = m\,x + b$$

Kolkaa, m = 4

Waxaynu gaadhnay haddii isle'eg loo qoro sansaanta y = mx+b, in weheliyaha x yahay tiirada. Haddaba **b maxay tahay ?**

TUSAALE

$$y = 2x + 1$$

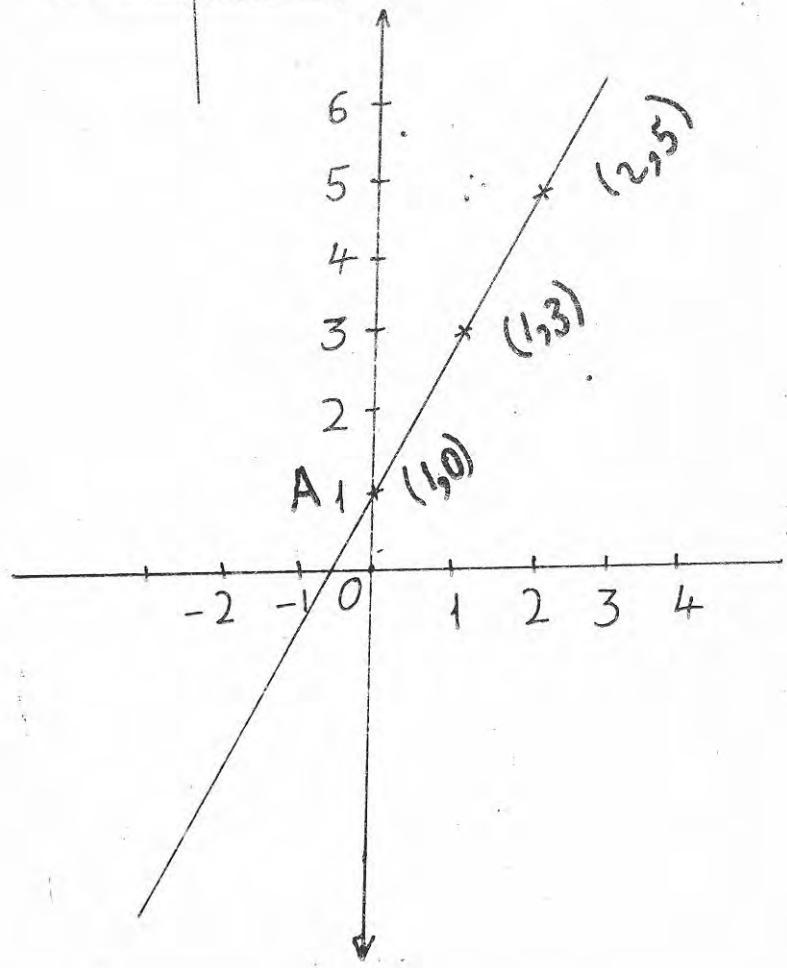
maxay noqonaysaa b?

$$y = 2x + 1$$
$$\downarrow\downarrow \quad \downarrow$$
$$y = 2x + b$$

Kolka b = 1

Bal isle'egtaa sawir garaafkeeda :

x	y
1	3
2	5



Waa maxay barta xarriiqdu ay ka jarto dhidibka y ?
Bartaasi waa A (0,1), kolkaa kulanka y ee barta A waa 1, kor maxaynu nidhi b way le'egtahay ?
Haddaba, haddii isle'eg loo qoro sansaanta $y = mx + b$ wheliyaha x waa tiiradii, b waa kulanka **y ee barta ay xarriiqdu** ka jarto dhidibka y, waxana la yiraahaa waa tikraar.

TUSAALE:

Waa maxay tiirada iyo tikraarka y ee isle'egtani :

$$\begin{array}{ccccc} y & = & -3x & + & 7 \\ \downarrow & & \downarrow\downarrow & & \downarrow \\ y & = & mx & + & b \end{array}$$

Kolkaa $m = -3$, $b = 7$

Sidee baa loo caddayn karaa in tikraarka y uu yahay 7? Tikraarka y waa kulanka y ee barta ay xarriiqdu ka jarto dhidibka y. Kolkaa bartaa kulankeeda x waa 0, markaa kulanka y muxuu noqonayaa ?

Kolkaa:

$$y = -3(0) + 7$$
$$y = 0 + 7$$
$$y = 7$$

Waxaad aragtaa in kulankii y noqday 7.

TUSAALE

$$\begin{array}{ccccc} y & = & 2x & & \\ \downarrow & & \downarrow\downarrow & & \\ y & = & mx & + & b \end{array}$$

Mar haddii tibixda 2x wax ka dambeeyaa aanu jirin, $b = 0$.

TUSAALE

$$\begin{array}{ccccc} y & = & 3x & - & 4 \\ \downarrow & & \downarrow\downarrow & & \downarrow \\ y & = & mx & + & b \end{array}$$

Kolkaa $b = -4$

LAYLISYO

B) Waa maxay tiirada iyo tikraarka y ee isle'egyadan soo socda ?

1) $y = 100x + 3$
2) $y = 20x - 3$
3) $y = \frac{2}{3}x + 5$
4) $2y = 3x + 4$
5) $3y = 12x$
6) $y = -4x - 4$
7) $3y - 2x = 0$
8) $y + 3 = 2x$
9) $y = 4$
10) $y = -5$

T) Sawir garaafka isle'eg kasta. Garaaf kasta ka soo saar tikraarka y. Hubi in tikraarka y sax yahay adoo isle'egta garab dhigaya sansaanta $y = mx + b$.

1) $y = 2x - 3$
2) $2y + 3x - 6 = 0$
3) $3x - y = 3$
4) $2y = 3x$
5) $3x - 3 = 0$

Xarriiq Isle'egteed

Waxaynu hore u gaadhnay in xarriiq kasta oo toosani leedahay isle'eg toosan. Xarriiq toosanna waynu sawiri karnaa.

Waliba waxaynu soo aragnay in isle'eg kasta oo toosan loo qori karo sansaanta $y = mx+b$, m waa tiirada, b waa tikraarka y. Kolkaa haddii tiirada iyo tikraarka y aad haysato miyaanad isle'egta soo saari karin ?

TUSAALE

Waa maxay isle'egta toosani ee xarriiq tiiradeedu tahay 3, tikraarka y yahay 5.

Furfuris:

Isle'eg kasta oo toosan waxa loo qori karaa sansaantan :

$$y = mx + b$$

Kolkaa, $y = 3x+5$

TUSAALE:

Soo saar isle'egta xarriiqda marta barta (2,3), tiiradeeduna tahay 4.

Furfuris

Isle'egtan waxa loo qori karaa sansaanta

$$y = mx + b \text{ Kolkaa}$$

Tiirada waan haysannaye, sidee baa loo helaa tikraarka ?

Bal horta 4 ku beddel m.

Kolkaa, $y = 4x + b$

Haddaba, mar haddii la ina siiyey bar ku taalla xarriiqda, wàa in bartaasi ay run ka dhigtaa isle'egtan :

Kolkaa
$$y = 4x + b$$
$$(3) = (4 \times 2) + b$$
$$3 = 8 + b$$
$$3 - 8 = b$$
$$-5 = b$$

Kolkaa waxan ka soo saarnay b.
Markaa, isle'egtii xarriiqdu waxay noqonaysaa :

$$y = 4x + (-5)$$
$$y = 4x - 5$$

TUSAALE

Soo saar isle'egta marta labadan barood :

(2, 6) iyo (1, 4)

isleegta la doonayo waxa loo qori karaa $y = mx + b$

Hase yeeshee, tiirada iyo tikraarka y midna ma haysanno. Markaa, waa in aynu raadinaa si aynu u helno m iyo b. Ma xasuusan tahay haddii laba barood oo ku yaalla xarriiq aad haysato in la soo saari karo tiirada xarriiqdaas ?

(2, 6) ka dhig (x_1, y_1)

(1, 4) » (x_2, y_2)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 6}{1 - 2} = \frac{-2}{-1} = 2$$

Iminka tiiradii waynu hellay. Bal qiimaha m ku beddel sansaantii guud ee isleegta.

$$y = mx + b$$
$$y = 2x + b$$

Weli waxa inoo dhiman sidaynu u heli lahayn qiimaha b. Sidii su'aasha hore labada barood midkood qaado oo ku beddel isle'egta. Maxaan kulannada bartaa ugu beddelaynaa isle'egta ?

Bal isticmaal (2, 6)

$$y = 2x + b$$
$$6 = (2x2) + b$$
$$6 = 4 + b$$
$$6 - 4 = b$$
$$2 = b$$

Kolkaa, isleegtii waa $y = 2x + 2$

Bal hadda isticmaal barta kale ee ah (1,4). Isle'egta aad heshay ma la mid tahay tii sare ?

LAYLISYO:

B) Soo saar isle'egta xarriiq kasta. Waxaana lagu siiyey tiirada xarriiqda iyo bar ku taalla xarriiqda:

(1) $m = 1$ (3,5)
(2) $m = -1$ (0,0)
(3) $m = 2/3$ (1,4)
(4) $m = 0$ (0,5)
(5) $m = \frac{2}{1}$ (3,2)

T) Soo saar isle'egta xarriiq kasta oo marta barta lagu siiyey.

1) (5, 6) iyo (3, 3)
2) (−4, 1) iyo (3, −8)
3) (−2,−2) iyo (0, 0)
4) (−5,−3) iyo (−2, −7)
5) (0, 0) iyo (4, 0)

J) Sidee baad u caddayn in tikraarka y ee isle'egtani yahay −2.

$$y = 3x - 2$$

CUTUB IV

Qormo Saynis iyo Logardamka Caadiga ah

Culimada Saynisku waxay isticmaalaan qormada sayniska si ay u qori karaan tirooyinka aad u waa weyn iyo kuwa aad u yar yar sida xawaaraha ilaysku uu hawada ku maro oo ah 29,900,000,000 sentimitir sakandkiiba, ama cufka borotoonka oo ah 0.000,000,000,000,000,000,000,001,65 oo garaam. Haddii tirooyinkaa loo qoro sida caadiga ah, meel weyn bay qaadanayaan akhrigooduna wuu adkaanayaa. Markaa waxa wanagsan in la isticmaalo qormada sayniska. Tirada hore oo ah 29,900,000,000 waxay noqonaysaa 2.99×10^{10}, ta dambe oo ah 0.000,000,000,000,000,000,000,001,65 waxay noqonaysaa 1.65×10^{-24}.

Tirada qormo saynis ku qoran waxay ka kooban tahay tiro ka weyn ama le'eg kow, kana yar toban oo lagu dhuftay toban abyoone ku jibbaaran. Waxa kale oo aan odhan karnaa, tirada u qoran qormo saynis waa tiro leh hal god oo aan eber ahayn oo bidix ka xiga barta jabjab tobanlaha, waxayna ku dhufsan tahay toban ku jibbaaran abyoone togan ama abyoone taban.

Tusaale ahaan, haddii aan rabno in aan u qorno xawaaraha ilayska oo ah 29,900,000,000, habka qormada sayniska waxaan u rarayna barta jajab tobanlaha sagaalka iyo labada dhexdooda, waxaynu ku dhufanaynaana toban ku jibaaran toban. Markaa wuxuu noqonayaa 2.99×10^{10}. U fiirso in 2.99 ay tahay tiro toban ka yar, kowna ka weyn, ama ay tahay tiro god keliyihi bidix ka xigo barta jabjab tobanlaha, tobanka ku jibbaaran tobanku waa inta god ee barta jabjab tobanlaha loo raray xagga bidix.

Cufka Borotonka oo ah 0.000,000,000,000,000,000,000,001,65 marka loo qoro qormo saynis wuxu noqonayaa 1.65×10^{-24} U fiirso in 1.65 ay tahay tiro ka yar toban kana weyn hal, ama

tiro god qudhihi bidixda ka xigo barta jajab tobanlaha. Afarta iyo labaatanka (—24) waxay tilmaamaysa inta god ee barta jajab tobanlaha midig loo raray. Haddii barta jabjab tobanlaha loo raro bidix, jibbaarka tobanku wuxu noqonayaa abyoone togan, haddii midig loo rarana jibbaarka tobanku wuxuu noqonayaa abyoone taban.

Tusaale ahaan, haddii aan rabno in aan u qorno tirada 3713.427 habka qormada saynisku waxay noqonaysaa 3.713427×10^3. Haddii aad eegtid 3.713427 waa tiro ka weyn hal kana yar toban ama god qudhihi bidix ka xigo barta jajab tobanlaha. Seddexda tobanka ku jibbaarani waxay sheegeysaa inta god ee barta bidix loo raray.

Haddii aan xeerarkii jabjab tobanlaha dib ugu noqonno, waxan arkaynaa in 37113.427 ay la mid tahay 3.71347×1000. 1000 waxay la mid tahay $10 \times 10 \times 10$ ama 10^3.

Tusaale kale, haddii la rabo in 0.0002701 loo qoro habka qormo saynis waxay noqonaysaa 2.701×10^{-4}. 2.701 waa tiro god qudhihi barta jajab tobanlaha bidix ka xigo afarta taban (—4) ee tobanka ku jibbaarani waxay tilmaamaysaa inta god ee barta midig loo raray.

Haddii aan u fiirsanno xidhiidhka ka dhexeeya jabjab tobanlaha, jibbaarrada iyo qormada sayniska, waxan arkaynaa in 0.0002701 ay la mid tahay $\frac{2.701}{10000}$ ama $2.701 \times \frac{1}{10000}$. Isla markaa $\frac{1}{10000}$ waxay la mid tahay $1 \times \frac{1}{10^4}$ ama $\frac{1}{10^4}$ waxay la mid tahay 10^{-4}, waayo qeexda tirada ku jibbaran tiro taban ayaa ahayd sida hoos ku qoran:

$a^{-n} = \frac{1}{a^n}$, haddii **a** iyo **n** ay yihiin abyoonayaal togan.

Markaa haddii qeexda aan raacno, 10^{-4} waxay la mid tahay $\frac{1}{10^4}$.

Nakhtiin ahaan, $0.0002701 = \frac{2.701}{10000} = 2.701 \times \frac{1}{10000} =$

$= 2.701 \times \frac{1}{10^4} = 2.701 \times 10^{-4}$

ama $0.0002701 = 2.701 \times 10^{-4}$

Si aad u fahantid sida loogu beddelo tiro u qoran sansaanta jabjab tabanle, tiro u qoran qormo saynis, u fiirso tusaalaha hoos ku yaal. Dhugo sida jibbaarka tobanku uu isku baddelayo.

0.0000534 $= 5.34 \times \frac{1}{100000} = 5.34 \times \frac{1}{10^5} = 5.34 \times 10^{-5}$

0.000534 $= 5.34 \times \frac{1}{10000} = 5.34 \times \frac{1}{10^4} = 5.34 \times 10^{-4}$

0.00534 $= 5.34 \times \frac{1}{1000} = 5.34 \times \frac{1}{10^3} = 5.34 \times 10^{-3}$

0.0534 $= 5.34 \times \frac{1}{100} = 5.34 \times \frac{1}{10^2} = 5.34 \times 10^{-2}$

0.534 $= 5.34 \times \frac{1}{10} = 5.34 \times \frac{1}{10^1} = 5.34 \times 10^{-1}$

5.34 $= 5.34 \times \frac{1}{10^0} = 5.34 \times \frac{1}{10^0} = 5.34 \times 10^0$

53.4 $= 5.34 \times 10 = 5.34 \times 10^1 = 5.34 \times 10^1$

534. $= 5.34 \times 100 = 5.34 \times 10^2 = 5.34 \times 10^2$

5340. $= 5.34 \times 1000 = 5.34 \times 10^3 = 5.34 \times 10^3$

53400. $= 5.34 \times 10000 = 5.34 \times 10^4 = 5.34 \times 10^4$

534000. $= 5.34 \times 100.000 = 5.34 \times 10^5 = 5.34 \times 10^5$

Tusaha kor ku yaal wuxuu muujinayaa sida tiro u qoran sansaanta jajab tobanle loogu beddeli lahaa tiro u qoran qormo saynis. Tusaala ahaan, u fiirso:

0.0534 iyo $5.34 \times 10^{-2} \cdot 5.34 \times 10^{-2}$

waa isla tiradii oo u qoran qormo saynis.

Tusaalooyinka hoos ku shaqeysani waxay muujiyaan sidii tiro u qoran sansaan jajab tobanle loogu beddeli lahaa tiro u qoran qormo saynis.

T u s a a l e 1.

Fogaanta ay q o r r a x d a i y o dhulka isu jiraan waa 93,000,000 mayl. U qor tiradaa qormo saynis.

Furfuris : 93,000,000 mayl $= 9.3 \times 10^7$ mayl

Ogsoonow in 9.3 ay tahay tiro leh god qudha oo bidix ka xiga barta jajab tobanle, todobada ku jibbaaran toban kuna sheegeyso inta god ee barta loo raray bidix.

T u s a a l e 2.

(Tirada Afogaadaro) 602,000,000,000,000,000,000,000 oo malakuyuul baa ku jirta 22.4 litir oo gaas ah. U qor tiradaa qormo saynis,

Furfuris :

602,000,000,000,000,000,000,000, $= 6.02 \times 10^{23}$

T u s a a l e 3.

Cufka Borotoonka ogsajiintu waa 0.000,000,000,000,000,053 maykaroogaraam. U qor qormo saynis.

FUFURIS

$0{,}000{,}000{,}000{,}000{,}000{,}053 = 5.3 \times 10^{-17}$ uu fiirso in -17 ay sheegayso inta god ee barta jajab tobanlaha loo raray xagga midig.

T u s a a l e 4.

U qor 3.83×10^{-3} sansaanta jabjab tobanle.

Furfurid

$3.83 \times 10^{-3} = .00383$

Haddii lagu siiyo tiro u qoran qormo saynis, oo lagu yidhaahdo qor tiradaa adoon isticmaalayn jibbaar, ama lagu yidhaahdo ka dhig tiro u qoran sansaanta jabjab tobanle waxaad samaynaysaa sidan soo socota.

b) Haddii jibbaarka tobanku uu abyoone yahay tabar barta waxaad u raraysaa xagga bidix.

t) Haddii jibbaarka tobanku yahay abyoone togan barta waxaad u raraysaa xagga midigta.

T U S A A L E 5.

U qor 4.05×10^8 sansaan jabjab tobnale.

Furfurid

$4.05 \times 10^8 = 405000000.$

T U S A A L E 6.

U qor tirooyinka soo socda qormo saynis

b) 275.6000
t) 0.00006785
j) 1000000
x) 0.00000001
kh) 567890
d) 6.837
r) 200

Furfuris

b) $275.6000 = 2.756 \times 10^2$
t) $0.00006785 = 6.785 \times 10^{-5}$

j) $1{,}000{,}000 = 1 \times 10^{6}$

x) $0.000{,}000{,}01 = 10 \times 10^{-8}$

d) $6.837 = 6.837 \times 10^{0}$

r) $200 = 2 \times 10^{2}$

waxan nidhi tirada u qoran qormo saynis waa tiro ka weyn ama le'eg kow, kana yar toban laguna dhuftay jibbaar toban. Haddii aad u fiirsatid tusaalaha 6aad, xubinta b, 2.75 way ka weyn tahay kow tobanna way ka yar tahay; sidaas oo kale xubinta t, 6.785 way ka weyn tahay kow, weyna ka yar-tahay toban. Laakiin xubinta j iyo x, 1 wuxu le'eg yahay kow.

Tusaale 7

U qor sansaanta jabjab tobanle

b) 2.753×10^{9}

t) 3.63×10^{-6}

j) 4.078×10^{1}

x) 5.078×18

kh) 1×10^{5}

d) 1×10^{-7}

r) 3×10^{-2}

Furfuris

b) $2.753 \times 10^{9} = 2{,}753{,}000{,}000$

t) $3.63 \times 10^{-6} = 0.000{,}003{,}63$

j) $4.073 \times 10^{-1} = 0.4073$

x) $5.078 \times 10^{0} = 5.079$

kh) $1 \times 10^{5} = 100{,}000$

d) $1 \times 10^{-7} = 0.0000001$

r) $3 \times 10^{-2} = 0.03$

Xusuusnow

Tiro u qoran qormo saynis waa tiro ka weyn ama le'eg kow, kana yar toban oo ay ku dhufsan tahay toban ku jibbaaran ab-yoone. Ama tiro leh god qudha oo eber aan ahayn oo ka xiga bidix barta jajab tobanle.

Haddii lagu yiraahdo tiro u qor qormo saynis, marka hore qor tiradaa, barta jajab tobanlahana waxaad dhigtaa midig-ta godka u bidixeeya ee aan eber ahayn. Dabadeedna isu fiiri tiradii lagu siiyay iyo tan aad haysato. Tiri inta god ee aad soo rartay barta jajab-tobanlaha. Tirada inta god ee aad soo rartay barta jajab tobanluhu waxay ku siinaysaa jib-baarka tobanka lagu dhufanayo tirada dambe. Haddii barta midig aad u rartay, jibbaarku tiro taban ayuu noqonayaa, haddii bidix aad u rartayna wuxuu noqonayaa tiro togan .

Haddii aan rabno in aan u qorno sansaanta jabjab tobanle tiro u qoran qormo saynis, waxan raraynaa barta jajab to-banlaha, tobanka iyo abyoonaha ku jibbaaran ee ku dhufsanna waan ka tageynaa. Jibbaarka tobanku wuxuu inoo sheegaa inta god ee aan barta rarayno, summaddiisuna waxay inoo shee-geysaa xagga loo rarayo. Haddii jibbaarku uu abyoone togan yahay, barta waxan u raraynaa xagga midig; haddii uu abyo-one taban yahayna waxaan u raraynaa xagga bidix.

Laylisyo :

I. U qor tiro kasta qormo saynis.

b) Xawaaraha ilaysku uu hawada ku dhex maro waa 186,000 mayl sakankiiba.

t) Elektoroonka cufkiisu waa :
0.000,000,000,000,000,000,000,91 maykaroogaraam

j) Culaabta dayaxu waa :
73,500,000,000,000,000,000,000 kiloogaraam.

x) Baydhka biyaha ah cufkiisu waa 473 garaam.

kh) Xawaaraha sanqadhu ay birta ku dhex marto waa 5200 mitir sakankiiba.

II. U qor tiro kasta oo hoos ku taal qormo saynis.

b)	453	d)	0.00453
t)	8	r)	0.8
j)	21	s)	0.21
x)	10	sh)	0.01
kh)	100	dh)	0.00001

III. U qor qormo saynis :

1)	4.8370	7)	.8356
2)	030.780	8)	0.0000101
3)	0.004346	9)	0.00000001
4)	4356000000	10)	0.000000600
5)	145670.321	11)	0.70001
6)	47.48	12)	3.456000

IV. Qor tirooyinka hoos ku yaal adiga oo aan isticmaalayn jibbarro

1)	3×10^{8}	6)	9×10^{-3}
2)	4.7×10^{-1}	7)	4.72345×10^{11}
3)	5.435×10^{1}	8)	4.56×10^{0}
4)	6.787×10^{-5}	9)	4.301×10^{3}
5)	1×10^{-9}	10)	8.9×10^{-18}

V. U qor tirooyinka hoos ku yaal sansaanta jabjab tobanle

1)	4.4×10^{1}	6)	2.63×10^{-30}
2)	4.03×10^{2}	7)	8.0747×10^{20}
3)	5.7×10^{3}	8)	9.843×10^{8}
4)	5.7×10^{3}	9)	3.007×10^{-5}
5)	6.0×10^{-3}	10)	7.103×10^{-1}

VI. Tirooyinka hoos ku qoran ka dhig tirooyin afar god oo sugan leh, dabadeedna u qor qormo saynis.

1)	48.037600	6)	43000000
2)	0.00000405034	7)	0.548978
3)	0.0001305807	8)	0.0043356
4)	45678.76000	9)	484647000000
5)	800767.80	10)	4.8470897321

VII. Tirooyinka hoos ku yaal u beddel tirooyin afar god oo sugan leh, dabadeedna u qor sansaanta tobanle.

1)	4.83476×10^{-5}	6)	7.99998×10^{-3}
2)	5.8363×10^{4}	7)	3.66920×10^{5}
3)	8.9097×10^{-3}	8)	3.66920×10^{5}
4)	4.80367×10^{8}	8)	2.7501×10^{-1}
5)	7.06439×10^{-8}	10)	1.8411×10^{0}

VIII. Cabbiraadaha soo socda u beddel sentimitir, jawaabtana u qor qormo saynis.

1)	4 Km	6)	0.000537 dm.
2)	408 Dm	7)	0.00000057 Km
3)	23 mm	8)	0.0000008976 mitirs
4)	0.00453 mm.	9)	4.7Km
5)	8850 mitir	10)	28 Km.

QORMO SAYNIS IYO XISAABFAL

Isugeyn, kalagoyn iyo qormo saynis

Tusaale I :

Isku gee, 4.76×10^{3} iyo 3.678×10^{-4}

Furfuris

$4.76 \times 10^3 = 4760$

$3.678 \times 10^{-4} = 0.0003678$

Markaa

$4.76 \times 10^3 + 3.678 \times 10^{-4} = 4760 + 0.0003678 = 4760.0003678.$

Dabadeedna u qor jawaabta qormo saynis.

Markaa

$4.76 \times 10^3 + 3.678 \times 10^{-4} = 4760.000367 = 4.760000367 \times 10^3$

Haddii lagu yidhaaho isku gee ama kala goo tirooyin u qoran qormo saynis, marka hore tira kasta u qor sansaanta tobanle, dabadeedna sida caadiga ah ugaga shaqee xisaabfalka lagu siiyay. U dambayn, u qor jawaabta qormo saynis.

Tusaale II:

Isugee 3.4467×10^2 iyo 8.968×10^4

$3.4467 \times 10^2 = 344.67$

$8.968 \times 10^4 = 89680$

Markaa $3.4467 \times 10^2 + 8.967 \times 10^4 = 344.67 + 89680 =$

$90024.67 = 9.002467 \times 10^4$

Markaa $3.4467 \times 10^2 + 8.968 \times 10^4 = 9.002467 \times 10^4$

Tusaale III:

$8.92 \times 10^{-2} - 4.537 \times 10^{-3}$

$8.92 \times 10^{-2} = 0.0892$

$4.537 \times 10^{-3} = 0.004537$

Markaa

$8.92 \times 10^{-2} - 4.537 \times 10^{-3} = 0.082 - 0.004537$

$= 0.084663$

$= 8.4663 \times 10^{-2}$

Markaa

$8.92 \times 10^{-2} - 4.537 \times 10^{-3} = 8.4663 \times 10^{-2}$

Ilaa intii aan soo marnay, waxaan isticmaalaynay tirooyin togan ee tirooyin toban maynaan isticmaalin. Qormada Saynisku ma beddesho tiro. Tiradu haddii ay taban tahay, marka loo qoro qormo saynis, tabnaanteeda uun bay ahaan.

Tusaale IV:

U qor qormo saynis, -0.0004783

Furfuris

$-0.0004783 = -4.783 \times 10^{-3}$

Tusaale V:

U qor tiro kasta qormo saynis

1) -4784
2) -0.002387
3) -470.83
4) -4.893

Furfurid

1) $-4784 = -4.784 \times 10^3$
2) $-0.002387 = -2.387 \times 10^{-3}$
3) $-470.83 = -4.7083 \times 10^2$
1) $-4.893 = -4.893 \times 10^0$

Tusaale VI: Fududee

$7.843 \times 10^1 - 6.3443 \times 10^3$

Furfuris

$7.843 \times 10^1 = 78.43$

$6.3448 \times 10^3 = 6344.8$

Markaa

$7.843 \times 10^1 - 6.34 \times 10^3 = 78.43 - 6344.8 =$ ..

$= -6266.37$

$= -6.266337 \times 10^3$

$7.843 \times 10^1 - 6.34 \times 10^3 = 78.43 - 6344.8 = -6266.37$

$= -6.26637 \times 10^3$

L a y l i s y o :

I U qor qormo saynis

1) -48.43
2) -0.0000234
3) -40000
4) -56800
5) -683.7432

II Fududee

1) $4.73 \times 10^5 + 3.843 \times 10^4$
2) $3.4 \times 10^{-3} + 8.99 \times 10^{-3}$
3) $8.99 \times 10^2 + 9.876 \times 10^2$
4) $8.709 \times 10^2 + 9.817 \times 10^{-1}$
5) $9.9009 \times 10^{+3} + 8.773 \times 10^{-2} + 5.67 \times 10^{-3}$
6) $7.839 \times 10^{-2} - 6.293 \times 10^{-3}$
7) $6.7 \times 10^{-2} - 5.7 \times 10^{-2}$
8) $5.93 \times 10^{-5} - 3.08 \times 10^3$
9) $6.73 \times 10^{-3} - 5.006 \times 10^{-2}$
10) $8.11 \times 10^3 - 8.9 \times 10^{-2}$

t) **Isku dhufashada, isu qaybinta iyo qormo saynis**

Xusuuso xeerka jibbaarada isku salka ah.

Haddii **a, m** iyo **n** ay yihiin abyooneyaal.

$a^m \times a^n = a^{m+n}$

$a^m \div a^n = a^{m-n}$

Haddii $a = 10$; $m = 5$; $n = 3$.

$a^m \times a^n = 10^5 \times 10^3 = 10^{5+3} = 10^8$

$a^m \div a^n = 10^5 \div 10^3 = 10^{5-3} = 10^2$

Inagoo ka faa'iidaysanayna xeerka jibbaarrada, waxaan ka shaqayn karnaa tirooyin u qoran qormo saynis oo la isku dhuftay ama la isu qaybiyay.

T u s a a l e I : Fududee

$(3.72 \times 10^5) \times (1.3 \times 10^{-3})$

F u r f u r i s :

$(3.72 \times 10^5) \times (1.3 \times 10^{-3}) = 3.72 \times 1.3 \times 10^5 \times 10^{-3}$

$= 3.72 \times 1.3 \times 10^{5+(-3)}$

$(3.72) \times 10^5 \times 1.3 \times 10^{-3} = 3.72 \times 1.3 \times 10^5 \times 10^{-3}$

$= 3.72 \times 1.3 \times 10^{5+(-3)}$

$= 3.72 \times 1.3 \times 10^2$

$= 4.836 \times 10^2$

Mar haddii ay isku dhufashadu kala hormari karto, tobnaha jibbaaran ayaan dhinac marin karnaa, dabadeedna xeerka jibbaarrada ayaan isticmaali karnaa, sida kor ku muujisan.

T u s a a l e II : Fududee

$(8.97 \times 10^3) \times (9.63 \times 10^2)$

Furfurid

$$8.97 \times 10^3 \times 9.63 \times 10^2 = 8.97 \times 9.63 \times 10^3 \times 10^2$$
$$= 8.97 \times 9.63 \times 10^{3+2}$$
$$= 8.97 \times 9.63 \times 10^5$$

Taranta 8.97 iyo 9.63 waa 86.4711; u qor 86.4711 qormo saynis. Markaa $86.4711 = 8.64711 \times 10^1$

Dabadeedna waxaan odhanaynaa

$$(8.97 \times 10^3) \times (9.63 \times 10^2) = 8.97 \times 9.63 \times 10^5$$
$$= 86.4711 \times 10^5$$
$$= 86.4711 \times 10^5$$
$$= 8.64711 \times 10^1 \times 10^5$$
$$= 8.64711 \times 10^{1+5}$$
$$= 8.64711 \times 10^6$$

Tusaale II

Ka shaqee $(1.44 \times 10^5) \div (3.6 \times 10^3)$

Furfurid

$$(1.44 \times 10^5) \div (3.6 \times 10^3) = \frac{1.44 \times 10^5}{3.6 \times 10^3}$$

$$= \frac{1.44 \times 10^{5-3}}{3.6}$$

$$= \frac{1.44 \times 10^2}{3.6}$$

$$= 0.4 \times 10^2$$
$$= 4 \times 10^{-1} \times 10^2$$

$$= 4 \times 10^{-1+2}$$
$$= 4 \times 10^1$$

Haddii lagu yidhaaho isku dhufo ama isu qeybi tirooyin u qoran qormo saynis marka hore isku gee jibbaarrada tobnaha haddii ay isku dhufsan yihiin, haddii ay isu qaybsan yihiinna kala goo jibbaarrada, marka xigga isku dhufo ama isu qaybi tirooyinka hadhay, jawaabtana u qor qormo saynis. Jibbaarka toban ee hore kuugu soo baxay, iyo ka dambe isu gee.

Layliyo :

I Fududee

1) $(4.83 \times 10^5) \times (9.31 \times 10^{-8})$
2) $(9.2 \times 10^3) \times (1.5 \times 10^2)$
3) $(8.6 \times 10^{-5}) \div (2.2 \times 10^{-7})$
4) $(2.56 \times 10^3) \div (3.2 \times 10^{-3})$
5) $(4.64 \times 10^{-3}) \div (8 \times 10^{-4})$
6) $(1.2 \times 10^{-5}) \div (9.6 \times 10^6)$
7) $(4.8 \times 10^2) \div (2.5 \times 10^{-4})$
8) $(3.32 \times 10^{-3}) \div (2.1 \times 10^7)$
9) $(4.84 \times 10^{-5}) \div (2.1 \times 10^{-3})$
10) $(1.4 \times 10^7) \div (1.4 \times 10^{-8})$

LOGARDAMKA CAADIGA AH

Qeex :

Tiro kasta waxa loo qori karaa toban tiro ku jibbaaran. Jibbaarka tobanka waxa la yidhaa logardamka caadiga ah ee tirada. Tobanka waxa la yidhaa salka logardamka.

Tusaale ahaan, u fiirso tusaha hoos ku yaal :

$100,000 = 10^5$

$10,000 = 10^4$

$1,000 = 10^3$

$100 = 10^2$

$10 = 10^1$

$1 = 10^0$

$0.1 = 10^{-1}$

$.01 = 10^{-2}$

$.001 = 10^{-3}$

Tusaha kor ku yaal waxaan ka arkaynaa in 10,000 loo qori karo 10^4. Afarta (4) oo ah jibbaarka tobanka waxa weeye logardamka caadiga ee 10,000. Tobanku waa salka logardamka. Sidaas oo kale 0.001 waxa loo qori karaa 10^{-3}. Saddexda taban (-3) oo ah jibbaarka tobanku waa logardamka 0.001 waxa loo qoraa sida hoos ku taal.

$$\text{Log}_{10}\ 10,000 = 4$$

$$\text{Log}_{10}\ 0.001 = -3$$

Waxana loo akhriyaa logardamka 100,000 ee sal toban waa 4; logardamka 0.001 ee sal toban waa -3, logardamka waa la soo gaabiyaa oo waxa la yidhaa Log.

Tusaalaha I

Raadi logardamka caadiga ah ee 1,000,000

Furfurid

1,000,000 waxay la mid tahay 10^6

Markaa, logardamka caadiga ah ee 1,000,000 waa 6.
ama

$\text{Log}_{10}\ 1,000,000 = 6$

Tusaalaha II

Raadi Logardamka caadiga ah ee 0.0001

Furfurid

0.0001 wuxuu la mid yahay 10^{-4}

Markaa Logardamka Caadiga ah ee 0.0001 waa -4 ama

$\text{Log}_{10}\ 0.0001 = -4$

Waxaan ka arkaynaa tusaalooyinka kor ku qoran in uu Logardamku yahay jibbaarka tobanka marka tirada loo qoro tiro toban ku jibbaaran. Haddii lagu yidhaahdo raadi tiro logardamkeeda, marka hore waxad ka dhigtaa tirada, toban tiro ku jibbaaran. Jibbaarka tobanka ayaa ah Logarkamka Caadiga ah ee tirada.

Laylisyo :

Raadi Logardamka Caadiga ah ee

1) 10

2) 100

3) 0.01

4) 0.0001

5) 0.000001

6) 1,000,000

7) $\frac{1}{10}$

8) $\frac{1}{1000}$

9) 1

10) 1,000,000,000.

Waxan nidhi Logardamka caadiga ah ee 1000 waa 3.

ama $\text{Log}_{10}\ 1000 = 3$. Waxaanan u akhrinaa Logardamka 1000 ee sal toban waa 3. Haddaba looma baahna in aan nidhaah-

no «Logardamka Caadiga ah»; waxan odhanaynaa «Logardamka» oo kaliya. Tusaale ahaan, waxaan odhanaynaa Logardamka 1000 waa 3 waxaanan u qoraynaa, Log 1000 = 3. Tobankii salka u ahaa looma baahna in lagu hoos qoro. U fiirso tusaha hoos ku qoran.

$$\text{Log } 10 = 1$$

$$\text{Log } 1 = 0$$

$$\text{Log } 100 = 2$$

$$\text{Log } 0.001 = -3$$

$$\text{Log } \frac{1}{100} = \text{Log } 0.01 = -2$$

Haddii la yidhaaho Log 100 = 2, waxaan u fahmaynaa in Logardamka Caadiga ah ee 100, ama Logardamka 100 sal toban uu yahay 2. Hadda ka hor, waxaan sheegnay sida loo raadiyo Logardamka tirooyinka loo qori karo toban abyoone ku jibbaaran. Bal u fiirso tirooyinkii aan Logardamkooda sheegnay oo dhan.

Mid walba waxa loo qori karayey toban abyoone ku jibbaaran. Haddaba, sidee loo heli karaa Logardamka tirocyinka kale. Inta aynaan taa bilaabin, bal aan u fiirsanno Logardamka kow iyo Logardamka toban. Logardamka 1 waa 0, Logardamka 10 waa 1. Mana jiro abyoone u dhexeeya 0 iyo 1. Markaa, Logardamka tirocyinka u dhexeeya 1 iyo 10 waxay noqonayaan tirooyin ka weyn eber kana yar kow. Sidaas oo kale, waxaan arki karnaa in logardamka tirocyinka u dhexeeya 10 iyo 100 ay noqonayaan tirocyin ka weyn 1, kana yar 2, waayo Logardamka 10 waa 1, Logardamka 100 waa 2.

Tirooyinka loo qori karo toban tiro ku jibbaaran, Logardamkooda dhib yaraan baa loo heli karaa. Sidaan hore u soo sheegnay, laakiin — tirooyinka kale Logardamkooda korka lagama sheegi karo. Markaa, Culimadu way raadiyeen Logardamka tiro kasta, waxayna ku qoran yihiin tuse gaar ah oo la yidhaaho tusaha Logardamka.

Tusaale ahaan, Logardamka 2 marka tusaha laga fiiriyo

waa 0.3010. U fiirso in 0.3010 ay tahay tiro jajab tobanle ah oo ka weyn 0 kana yar 1.

Waxan odhan karnaa haddii logardamka 2 uu yahay 0.3010, 2 waxay la mid tahay 10 ku jibbaaran 0.3010 ama $2 = 10^{0.3010}$, 20 waxa loo qori karaa 2×10 ama $10^{0.3010} \times 10^1$ waayo 2 ayaa la mid ah $10^{0.3010}$. Haddii aan xeerarkii jibbarrada eegno, $10^{0.3010} \times 10^1$ waxay la mid tahay $10^{1+0.3010}$. Markaa $20 = 10^1 \times 10^{0.3010} = 10^{1+0.3010}$. Markaa Logardamka 20 waa $10^{1+0.3010}$. Bal u fiirso tirada 0.002. Waxaan arki karnaa in $0.002 = 2 \times 10^{-3}$; laakiin 2×10^{-3} waxay la mid tahay $10^{0.3010} \times 10^{-3}$. Haddii aan xeerarkii jibbaarrada raacno $10^{0.3010} \times 10^{-3} = 10^{-3+0.3010}$. Markaa Logardamka 0.002 waxa uu yahay $-3 + .3010$.

Waxaan tusaalooyinka kor ku qoran ka arki karnaa in Logardamka tiro kasta laga dhigi karo abyoone loo geeyay tiro jabjabtobanle ah. Logardamka inta abyoone ah waxa la yidhaa abyan inta jabjab tobanle ahna waxa la yidhaa qurub.

Tusaalihii hore, Logardamka 2 wuxuu ahaa 0.3010, eberku waa abyan, .3010 waa qurub; Logardamka 20 waxa uu ahaa $1 + .3010$, 1 waa abyan, .3010 na waa qurub. Logardamka 0.002 wuxuu ahaa $-3 + .3010$; -3 waa abyan .3010na waa qurub.

Bal u fiirso in qurubka Logardamka 2,20 iyo 0.002 uu isla mid yahay laakiin abyanka Logardamkoodu uu kala duwan yahay.

Bal aad ugu fiirso tusaha hoos ku yaal adoo ogsoon in $2 = 10^{0.3010}$

Tiro	Qormo Saynis	Log.	Abyan	Qurub
0.0002	$2 \times 10^{-4} = 10^{0.3010} \times 10^{-4} = 10^{-4+.3010}$	$-4 + .3010$	-4	.3010
0.002	$2 \times 10^{-3} = 10^{0.3010} \times 10^{-3} = 10^{-2+.301}$	$-3 + .3010$	-3	.3010
0.02	$2 \times 10^{-2} = 10^{0.3010} \times 10^{-2} = 10^{-2+.301}$	$-2 + .3010$	-2	.3010
0.2	$2 \times 10^{-1} = 10^{0.3010} \times 10^{-1} = 10^{-1+.301}$	$-1 + .3010$	-1	.3010
2.0	$2 \times 10^{0} = 10^{0.3010} \times 10^{0} = 10^{0+.301}$	$-0 + .3010$	-0	.3010
20	$2 \times 10^{1} = 10^{0.3010} \times 10^{1} = 10^{1+.301}$	$1 + .3010$	1	.3010
200	$2 \times 10^{2} = 10^{0.3010} \times 10^{2} = 10^{2+.301}$	$2 + .3010$	2	.3010
2000	$2 \times 10^{3} = 10^{0.3010} \times 10^{3} = 10^{3+.301}$	$3 + .3010$	3	.3010

Tusaha waxan ka arki karnaa in abyanka Logardamka tirooyinka kor ku qorani uu yahay jibbaarka toban marka tirada loo qoro qormo saynis. Abyanku waa abyoone togan ama taban sidaan hore u soo sheegnay, laakiin qurubku waa jabjab-tobanle oo ka weyn eber. Logardamka tiradu waa wadarta abyanka iyo qurubka.

Abyan Raadin

Haddii lagu yidhaaho raadi Logardamka tiro, marka hore waxaad raadisaa abyanka Logardamka. Markaad tirada u qorto qormo saynis, jibbaarka tobanka ayaa ah abyanka Logardamka.

Tusaale I:

Raadi abyanka Logardamka 417.3.

Furfuris

417.3 waxay noqonaysaa marka qormo saynis loo qoro 4.173×10^2. Abyanka Logardamka 417.3 waa 2.

Tusaale II:

Waa maxay abyanka Logardamka tirooyinka hoos ku yaal 41314; 87; 293.4; 8432; 5,000,000; 0.0002134; 5.617; 0.7; 0.00813; 0.0000001; 8; 6; 1

Furfuris

Tiro	Qormo Saynis	Abyanka Logardamka
4131.4	4.1314×10^3	3
87	8.7×10^1	1
293.4	2.934×10^2	2
8,432	8.432×10^3	3
5,000,000	$5. \times 10^6$	6
0.0002134	2.134×10^{-4}	-4
5.617	5.617×10^0	0
0.7	7×10^{-1}	-1
0.00813	8.13×10^{-3}	-3
0.000,0001	1×10^{-6}	-6
8	8×10^0	0
9	9×10^0	0
1	1×10^0	0

In kasta oo ay jiraan siyaabo kale oo loo raadin karo abyanka Logardamka waxa ugu wanaagsan habka qormo saynis. Mar labaad ogsoonow in abyanka Logardamka ee tiro uu yahay jibbaarka tobanka marka tirada loo qoro Qormo Saynis.

Laylisyo :

Raadi abyanka Logardamka ee tirooyinka hoos ku yaal :

1) 43447
2) 48.45
3) 145.678
4) 0.0007685
5) 4
6) 32
7) 3.2
8) 320
9) 4.456
10) 44.56
11) 0.0000484
12) 0.484
13) $\frac{1}{5}$
14) $\frac{1}{2}$
15) $3\frac{2}{25}$
16) $1\frac{8}{40}$
17) $4\frac{1}{3}$
18) 13.5
19) 1.33
20) $\frac{1}{1,000,000}$

Xusuus :

Inta aanad raadin abyanka Logardamka, ka dhig jabjabtobanle tirooyinka jabjabyada ah.

Qurubka :

Sidii aan horay u sheegnay, waxa jira tuse sheegaya Logardamka tirocyinka aan loo qori karin toban abyoone ku jibbaaran, sida 2, 20, 34. Tusuhu wuxuu inoo sheegaa qurubka Logardamka laakiin abyanka sidii aan horey u sheegnay ayaa loo raadiyaa. Hoos waxa ku yaal tuse yar oo ah qayb laga soo guuriyay tusaha Logardamka.

										1 2 3	4 5 6	7 8 9
x	0	1	2	3	4	5	6	7	8	9	FARAQ	
50	.6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1 2 3	4 5 6 7 8
51	.7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1 2 2	3 4 5 6 6 7
52	.7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1 2 2	3 4 5 6 6 7
53	.7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1 2 2	3 4 5 6 6 7

Jooq-u-taxa O

Tusaha Logardamku wuxuu leeyahay seddex qaybood, qaybta koowaad oo ay ku qoran yihiin tirooyin leh laba god oo ka bilaabma 10 kuna dhammaada 99. Qaybtaasi waxay ka kooban tahay hal joogutax oo kaliya. Qaybta labaad waxay ka kooban tahay toban joogutax, kuwaas oo ah kuwa ku hoos qoran tirooyinka 0,1, ilaa 9. Qaybta saddexaad, oo tusayaasha oo dhammi ayna wada qorin waa qaybta erayga «faraq» uu ku dul qoran yahay ee ka kooban sagaalka joogutax.

Haddii aan tusaha kor ku qoran aan dib ugu soo noqonno qaybta hore ee tusuhu waa joogutaxa ay «x» ku dul qoran tahay ee tirooyinka 50, 51, 52, yio 53 ay ku jiraan. Qaybta labaad waa ta ku xigta ee tobanka joogutax ka kooban, ta saddexaadna waa ta ugu dambaysa ee «faraq» ku qoran yahay.

Sida tusaha looga akhriyo qurubka

Ka soo qaad in lagu yidhaahdo sheeg qurubka Logardamka 5. Ugu horayn tiro kasta oo Logardamkeeda la rabo waxaad ka dhigaysaa tiro leh afar god oo sugan.

Marka xiga waxaad u qoraysaa qormo saynis. Markaa 5 waxaad ka dhigaysaa 5.000×10^0. Labada god ee bidix u soo xiga waxaad ka eegeysaa qaybta kowaad ee tusaha, godka ku

xigana waxaad ka eegaysaa qaybta labaad ee tusaha, godka afraad ee tirada waxaad ka eegaysaa, qaybta saddexaad ee tusaha. Haddaba, marka aan qurubka 5 rabno waxan u qoraynaa 5.000×10^0. Labada god ee bidix u xigaa waa 5.0, ta saddexaadna waa eber, ta afaraadna waa eber. Qaybta kowaad ee tusaha waxad ka helaysaa 50, qaybta labaad waxaad ka helaysaa joogutaxa uu eber ugu sarreeyo. Ta afaraadna eber ma leh. Markaa qurubka 5.000 waxa weeye tirada ku qoran halka ay ku kulmaan jiifutaxa ay 50 ku jirto iyo joogutaxa qaybta labaad ee 0 ugu korreeyo.

										1 2 3 . 4 5 6 7 8 9
x	0	1	2	3	4	5	6	7	8	9	FARAQ
50	.6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1 2 3 4 4 5 6 7 8
51	.7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1 2 2 3 4 5 6 6 7
52	.7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1 2 2 3 4 5 6 6 7
53	.7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1 2 2 3 4 5 6 6 7

Tusaha kor ku yaal waxan ka arkaynaa in tiradaasi ay tahay .6990

Sidaas oo kale haddii lagu yidhaaho raadi qurubka 51.2, marka hore 51.2 waxaad u qeraysaa 5.120×10^1. 51 waxaad ka eegaysaa qaybta kowaad ee tusaha, 2na waxaad ka eegaysaa qaybta labaad ee tusaha. Qurubka 52.2 wuxuu noqonayaa tirada ku qoran halka ay ku kulmaan jiifutaxa uu 51 ku jiro iyo joogutaxa uu 2 ugu korreeyo. Markaa, qurubka 51.2 waa .7093

										1 2 3 4 5 6 7 8 9
x	0	1	2	3	4	5	6	7	8	9	FARAQ
50	.6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1 2 3 4 4 5 6 7 8
51	.7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1 2 2 3 4 5 6 6 7
52	.7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1 2 2 3 4 5 6 6 7
53	.7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1 2 2 3 4 5 6 6 7

Jiif-u-taxa 51

Joog-u-taxa 2

T u s a a l e I

Raadi qurubka 0.00537

Furfuris

0.00537 waxa loo qori karaa 5.370×10^{-3}.
Jiifutaxa 53 iyo joogutaxa 7 meesha ay ku kulmaan marka aan tusaha ka fiirinno waxaa ku qoran tirada .7300. Markaa, qurubka 0.00537 waa .7300.

T u s a a l e II

Raadi qurubka Logardamka 52900.

Furfuris

52900 marka laga dhigo afar god oo sugan, loona qoro qormo saynis, waxay noqonaysaa 5.290×10^1. Meesha ay ku kulmaan jiifutaxa 52 iyo joogutaxa 9 waxa ku taal tirada 7235. Markaa qurubka 52900 waa .7235.

T u s a a l e III

Doon qurubka Logardamka 52.87

Furfuris

Marka 52.87 laga dhigo afar god oo sugan, ee loo qoro qormo saynis waxay noqonaysaa 5.287×10^1. Sidii aan soo sheegnay, labada god ee 5.287 ee bidix u xiga, oo ah 5.2 waxa laga fiirinayaa qaybta kowaad ee tusaha, godka saddexaad oo 8 ahna waxa laga eegayaa qaybta labaad ee tusaha. Jiifutaxa 52 iyo joogutaxa 8 waxay ku kulmaan meesha ay ku qoran tahay tirada 7226. Haddana waxaad eegeysaa meesha ay ku kulmaan jiifutaxa 52 iyo joogutaxa 7 ee qaybta saddexaad ee tusaha. Halka ay ku kulmaan waxa ku qoran tirada 6. Marka waxaad isu geysaa 7226 iyo 6. Waxay isku noqdeen 7232. Tirada .7232 waxa weeye qurubka 52.87.

										1 2 3 4 5 6 . 7 8 9
x	0	1	2	3	4	5	6	7	8	9	FARAQ
50	.6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1 2 3 4 4 5 6 7 8
51	.7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1 2 2 3 4 5 6 6 7
52	.7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1 2 2 3 4 5 6 6 7
53	.7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1 2 2 3 4 5 6 6 7

Jiif-u-taxa 52

Joog-u-taxa 8

Joog-u-taxa 7

Mar kale xusuuso, in marka la rabo qurubka Logardamka [illegible] in tirada marka hore laga dhigo 4 god oo sugan, loona q[illegible] qormo saynis. Labada god ee tirada bidix ugu xiga waxa l[illegible] raadiyaa qaybta koowaad ee tusaha logardamka, godka ku xiga- na waxa laga raadiyaa qaybta labaad ee tusaha, ka midigta ugu xigana waxa laga raadiyaa qaybta saddexaad ee tusaha. Markaa qurubka Logardamku wuxuu noqonayaa, tirada ku qoran meesha ay ku kulmaan jiifutaxa labada god ee hore iyo joogutaxa godka saddexaad oo loo geeyay tirada ku qoran meesha ay ku kulmaan jiifutaxa labada god ee hore iyo joogutaxa godka afaraad oo laga helo qaybta saddexaad ee tusaha Logardamka.

Tusaale IV

Raadi qurubka Logardamka 51.968

Furfuris

Waxaad ka dhigta 51.968 tiro leh afar god oo sugan. Waxay noqonaysaa 51.97. U qor qormo saynis. Waxay noqonaysaa 5.197×10^1. Haddii aan tusihii fiirinno, waxaan arkaynaa in jiifutaxa 51 iyo joogutaxa 9 ee qaybta labaad ay inna siinayaan tirada 7152. Jiifutaxa 51 iyo joogutaxa 7 ee qaybta saddexaad waxay ina siinayaan tirada 6. Wadarta 7152 iyo 6 waa 7158. Marka qurubka Logardamka 51.97 waa .7151.

Laylisyo :

Raadi qurubka Logardamka tiroeyinka.

I. 1) 5
2) 8
3) 9
4) 52
5) 60
6) 0.5
7) 0.0008
8) 8000
9) 0.06
10) 6

II. 1) .00706
2) 706000
3) 89.3
4) 0.0000893
6) 4
7) 40
8) 4000
9) 0.000004

III. 1) 0.008101
2) 0.8011
3) 0.00009999
4) 9999000
5) 4.534
6) 4834
7) 483.4
8) 4.834
9) 5001
10) 6070

IV. 1) 0.41078
2) 0.52332
3) 0456748
4) 0.0004976503
5) 4.05478
6) 405.47
7) 0.00100789
8) 1000
8) 10027
10) 1001.343

Logardam

Logardamka tiro, sidaan horey u sheegnay, waa wadarta abyanka iyo qurubka. Markaa haddii aan rabno in aan helno logardamka tiro, marka hore tiradaan ka dhigaynaa afar god oo sugan, marka xigana waxaynu u qoraynaa qormo saynis. Abyanka iyo qurubka Logardamka ee tirada mid walba waxan.u raadinaynaa sidii aan horey u soo sheegnay; wadarta abyanka iyo qurubku waxay inna siinaysaa Logardamka tirada.

Tusaale :

Raadi Logardamka 52870

Furfuris

Marka aan tirada u qorno qormo saynis waxay noqonaysaa [illegible] 10^4. Abyanka tiradani waa 4. Qurubka waxaad ka raadisaa tusaha. Waxa uu qurubku noqonayaa .7232. Markaa, Logardamka 52870 waa 4 + .7232. Waxa loo qori karaa 4.7232.

Tusaale :

Doon Logardamka tirooyinka

52.9, 5290, .000529, 5.29, 5290000

Furfuris

Tiro	Qormo Saynis	Abyan	Qurub	Logardam
52.9	5.29×10^{1}	1	.7235	$1 + .7235 = 1.7235$
5290	5.29×10^{3}	3	.7235	$3 + .7235 = 3.7235$
.000529	5.29×10^{-4}	-4	.7235	$-4 + .7235 =$?
5.29	5.29×10^{0}	0	.7235	$0 + .7235 = 0.7235$
.529	5.29×10^{-1}	-1	.7235	$-1 + .7235 =$?
5290000	5.29×10^{6}	6	.7235	$6 + .7235 = 6.7235$

Haddii aad u fiirsatid tusaalaha kor ku yaal, waxaad arkaysaa in qurub iyo abyan wadartoodu ay tahay barta jajab-tobanle oo loo dhaxaysiiyo abyanka iyo qurubka marka uu abyanku abyoone togan yahay, laakiin haddii uu abyoone taban yahay, sidaan soo sheegnay looma qori karo, waayo $(-3) + (0.324)$ iyo -3.324 islâ mid maaha. -3.324 waxay la mid tahay $(-3) + (-0.324)$; qurubku tiro taban maaha se waa tiro togan. Markaa, $(-3) + (0.324)$ waxa loo qoraa 3.324. Jiitinta 3 kor ka saarani waxay sheegaysa in abyanku uu yahay tiro taban, qurubkuna uu yahay tiro togan. Waxa kale oo loo qori karaa $7.324 - 10$ ama 6.324; abyanka oo ah $\bar{3}$ wuxu la mid yahay $7 - 10$ ama -3. sidaas oo kale $6 - 9$ waxay la mid tahay -3. $\bar{3}.324$ ma loo qori karaa $2.324 - 5$? Haa, waayo $2 - 5$ waxay la mid tahay -3.

Tusaale :

Waa imisa Logardamka 532.4

Furfuris

$532.4 = 5.324 \times 10^{+2}$

Log 532.4 = 2.7261

Tusaale :

Sheeg Logardamka 0.0005324.

Furfuris

$0.0005324 = 5.324 \times 10^{-4}$

Log 0.0005324 = $\bar{4}$.7261

ama $6.7261 - 10$

Laylisyo

Raadi Logardamka tirooyinkan :

1)	4534	8)	0.0048719	15)	0.000613
2)	23.47	9)	48997.6	16)	1
3)	41.73	10)	0.00056998	17)	10089
4)	0.4173	11)	16.000,000	18)	1.099
5)	417300	12)	1,000,000,000,	19)	0.400097
6)	410.8	13)	2	20)	44.44
7)	42.743	14)	0.0005		

Lidlogardam

Ceex :

Haddii lagu siiyo Logardamka tiro, tirada waxa la yidhaa lidka Logardamka waxaana loo soo gaabiyaa, lidlog.

Marka la raadinayo lidka logardamka, waxa jira tuse qora lidka logardamka. Sidii tusihii logardamka oo kale, tusaha lidloggu wuxuu leeyahay saddex qaybood. Qaybta hore, tirooyin laba god leh oo ka bilaabma .00 kuna dhamaada .99 ayaa ka qoran. Qaybta labaad iyo qaybta saddexaad waxay u eg yihiin qaybihii tusaha Logardamka ee ku beegan. Qurubka logardamka lagu siiyay wuxuu ka siinayaa lidlogga abyankuna waxay kuu sheegaysaa meesha ay bartu ku dhacayso.

Hoos waxa ku yaal qayb tusaha lidlog ka mid ah :

										1 2 3	4 5 6	7 8 9
x	0	1	2	3	4	5	6	7	8	9	FARAQ	
.08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0 1 1	1 1 2	2 2 3
.09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0 1 1	1 1 2	2 2 3
.10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0 1 1	1 1 2	2 2 3
.11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0 1 1	1 2 2	2 2 3
.12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0 1 1	1 2 2	2 2 3

Kaba dhig in lagu yidhi raadi lidka logardamka 2.1273. 2.1273 waa logardamka, markaa 2 waa abyan, .1273 waa qurub. Tusaha lidlogga waxa laga helaa qurubka. Markaa, qaybta kowaad ee tusaha lidlog waxaad ka helaysaa .12. Jiifutaxa .12 iyo joogutaxa 7 ee qaybta labaad ee tusaha lidlog waxay ku siinayaan tirada 1340. Jiifutaxa .12 iyo joogutaxa 3 waxay ku siinayaan tirada 1. Wadarta 1340 iyo 1 waa 1341. Markaa lidlogga 2.1273 waa 1.341×10^2. Had iyo jeer, lidlogga aad tusaha ka heshid waxaad u qaadanaysaa tiro u qoran qormo saynis, oo jibbaarka tobankuna uu yahay abyanka logardamkii lagu siiyay. (Ogsoonow, haddii lagu yidhaa raadi lidlogga tiro, inay tiradaasi tahay logardam). Ugu dambayn, tiradaa u qoran qormo saynis, waxaad ka dhigaysaa tiro u qoran sansaanta jabjab-tobanle. Markaa 1.341×10^2 waxay noqonaysaa 134.1.

Markaa lidlog $2.1273 = 1.341 \times 10^2 = 134.1$

T u s a a l e :

Raadi lidlog $\bar{4}.1138$

Furfuris

Tusaha lidlog ee kor ku qoran marka aan fiirinno, jiifutaxa .11 ee qaybta kowaad iyo joogutaxa 3 ee qaybta labaad waxay ku kulmaan meesha ay ku qoran tahay 1297. Meesha ay ku kulmaan jiifutaxa .11 iyo joogutaxa 8 ee qaybta saddexaad ee tusaha lidlog waxa ku qoran 2. Wadarta 1297 iyo 2 waa 1299. Markaa lidlog 4.1138 waa 1.299×10^{-4}. Marka aan tiradaa ka dhigno tiro u qoran sansaanta jabjab-tobanle waxay noqonaysaa 0.0001299. Markaa, lidlog 4.1138 = 0.0001299.

T u s a a l e :

Waa imisa lidlog 4.0124

Furfuris

Jiifutaxa .01 ee qaybta kowaad ee tusaha lidlog iyo joogutaxa 2 waxay ku siinayaan tirada 1028. Jiifutaxa .01 iyo joogutaxa 4 ee qaybta saddexaad ee tusaha lidlog waxay ku siinayaan 1. Wadarta 1028 iyo 1 waa 1029. Markaa lidlog 4.0124 waa 1.029×10^4 ama 10290

T u s a a l e :

Raadi lidlog 0.0008

Furfuris

Jiifutaxa .00 ee qaybta kowaad iyo joogutaxa 0 ee qaybta labaad waxay ku siinayaan 1000. Jiifutaxa .00 iyo joogutaxa 8 ee qaybta saddexaad waxay ku siinayaan 2. Wadarta 1000 iyo 2 waa 1002. Marka lidlog 0.0008 waxa uu y a h a y 1.002×10^0 ama 1.002.

Waxad qoraysaa lidlog 0.0008 = 1.002.

L a y l i s y o

Raadi lidlogga tiro kasta oo hoos ku qoran :

1)	1.0607	4)	$\bar{4}.3030$	8)	4.7774
2)	2.4742	5)	$\bar{1}.4100$	9)	6.4669
3)	5.8395	6)	$\bar{2}.0013$	10)	5.8383
		7)	$\bar{7}.1010$	11)	3.9999
12)	$\bar{2}.4800$	17)	$7.0121 - 8$	21)	$4.7474 - 4$
13)	1.2000	18)	$4.477 - 6$	22)	$1.9074 - 4$
14)	0.2131	19)	$0.4900 - 1$	23)	1.0000
15)	0.0001	20)	$0.8494 - 3$	24)	$\bar{4}.0000$
16)	2.2131				

Ku shaqaynta Logardamka

Logardamku wuxuu inoo fududeeyaa isku dhufashada iyo isu qaybinta tirooyinka waaweyn, isla markaana wuxuu inoo suuragaliyaa raadinta jibbaarka iyo xididka jibbaarka tirooyinka.

1. Logardamka iyo iskudhufasho

Xusuuso xeerarka jibbaarrada. Haddii **m** iyo **n** ay yihiin tirooyin, **b** ay tahay tiro abyoone ah,

(1) $b^m \times b^n = b^{m+n}$.

(2) $(b^m) \div b^n = b^{m-n}$.

(3) $(b^m)^n = b^{m\,n}$

(4) $(b^m)^{\frac{1}{n}} = b^{\frac{m}{n}}$

Hadda, bal mar labaad aan ku celino qeexdii Logordamka. Logardamka tiro waa jibbaarka tobanka marka tirada loo qoro toban tiro ku jibbaaran. Tusaale ahaan Logardamka 50 waa 1.6990. Intaa micnaheedu waxay tahay: 50 wuxuu la mid yahay $10^{1.6990}$. Sidaas oo kale, Logardamka 240 waa 2.3802 waxay tahay, $240 = 10^{2.3802}$.

Markaa 50×240 waxaa loo qori karaa $10^{1.6990} \times 10^{2.3802}$ Laakiin labada tiro salkoodu waa isla mid oo waa 10. Markaa, waxan leenahay $10^{1.6990} \times 10^{2.3802} = 10^{1.6990+2.3802} = 10^{4.0792}$ Haddii 50×240 ay le'egtahay $10^{4.0792}$, markaa 4.0792 waa Logardamka 50×240.

Log $(50 \times 240) = 4.792 = 1.6990 + 2.3802 =$ Log 50 + Log 240. Halkaa waxaan ka arkaynaa in Logardamka taranta laba tiro uu le'eg yahay logardamkii tirooyinka oo la isu geeyey. Guud ahaan: Log (ab) = Log a + Log b. Haddii **a** iyo **b** ay yihiin tirooyin togan.

Dib aynu ugu noqonno taranta 50 iyo 240.

$50 \times 240 = 12000$. Ma jirtaa si kale oo aan u heli karno 12000 ? Haa, waayo, L o g a r d a m k a 12000 ama Log

$(50 \times 240) = 4.0792$, markaa waan heli karnaa tirada Logardamkeedu yahay 4.0972. Tirada Logardamku y a h a y 4.0792 waa lidlogga 4.0792. Tusaha lidlog wuxuu ina siinayaa in lidlog 4.0972 = 12000. Mararka qaarkood, tirada ugu dhaw ayaa la qaataa.

T u s a a l e :

Isku dhufo 4.157 iyo 36.92

Log (4.157×36.92) = Log 4.157 + Log 36.92

Log 4.157 = 0.6188

Log 36.92 = 1.5672

Log (4.157×36.92) = 2.1860

4.157×36.92 = lidlog 2.1860

= 153.5

T u s a a l e :

Isku dhufo (700.8×0.00148)

Log (700.8×0.00148) = Log 700.8 + Log 0.00148

Log 700.8 = 2.8456

Log 0.00148 = $\bar{3}.1703$

Log $(700.8 \times 0.00148) = 0.0159$

700.8×0.00148 = Lidlog 0.0159

= 1.037

T u s a a l e :

Isku dhufo $4.130 \times 0.083 \times 4.33$

Log $(4.13 \times 0.083 \times 4.33)$ = Log 4.13 + Log 0.083 + Log 4.33

Log 4.13 = 0.6160

Log 0.083 = 2.9191

Log 4.33 = 0.6365

Log (4.13 × 0.083 × 4.33) = 0.1716

4.13 × 0.083 × 4.33 = Lidlog0.1716

= 1.485

Laylisyo :

I. Raadi taranta tirooyinkan isku dhufsan adoo isticmaalaya Logardam.

1. 814 × 925
2. 26.3 × 15.3
3. 3.08 × 473
4. 813 × 41.74 × 0.4347
5. 6.27 × 6.27
6. 13.78 × 13.78 × 13.78
7. 29 × 42.3
8. 916 × 3.18
9. 63.5 × 0.83
10. 0.00083 × 0.298
11. 0.00998 × 0.08998
12. 4.49 × 0.0056
13. 478.4 × 0.003947
14. 43.44 × 0.00023
15. 320 × 320 × 320
16. 4.7 × 4.7 × 9.99
17. 0.09 × 4.7 × 0.0099
18. 83.33 × 4.414
19. 99 × 99 × 0.00099
20. 47.47 × 88.88 × 0.0000015

II. Haddii lagu siiyey Logardamka 2 = 0.3010, Logardamka 3 = 0.4771, iyo Logardamka 5 = 0.6990.

Raadi Log adoon tuse isticmaalayn,

1) Log (2 × 2)
2) Log (2 × 3)
3) Log (2 × 8)
4) Log 20
5) Log 30
6) Log 300
7) Log 6000
8) Log 0.00015
4) Log 0.0027
10) Log 48

III. Raadi lidlogga jawaabaha su'aalaha (II)

VI. Log a + Log b = Log (ab)

Sansaanta kor ku qoran oo kale u qor :

1. Log 2 + Log 5
2. Log 2.34 + Log 20
3. Log 4.48 + Log 50
4. Log 2.23 + Log 1.1
5. Log 2.34 + Log 22

Logardamka iyo Isku qaybinta

Haddii Logardamka 240 uu yahay 2.3802, Logardamka 8 uu yahay 0.9031, $240 = 10^{2.3802}$; $8 = 10^{0.9031}$. $240 \div 8$ waxay le'eg tahay $10^{2.3802} \div 10^{0.9031}$. Laakiin, waxaan ognahay in $10^{2.3802} \div 10^{0.9031} = 10^{2.3802-0.9031} = 10^{1.4771}$.

Markaa, waxaan odhan karnaa $240 \div 8 = 10^{1.4771}$. Laakiin, qeexdii Logardamku waxay leedahay mar haddii $(240 \div 8) = 10^{1.4771}$, 1.4771 waa Logardamka (240 ÷ 8) ama 30. Marka, 30 wuxu la mid yahay Lidka Logardamka ee 1.4771.

Markaa, 30 waxaan heli karnaa innagoon isku qaybin 240 iyo 8.

Guud ahaan :

Log (m ÷ n) = Log m − Log n.

U fiirso shaqada hoos ku qoran:

Log (240 ÷ 8) = Log 240 − Log 8

Log 240 = 2.3802

Log 8 = 0.9031

Log (240 ÷ 8) = 1.4771

∴ 240 ÷ 8 = Lidlog 1.4771

Haddii tusaha lidlogga aad ka eegtid lidlog 1.4771 waxaad heli 30. ∴ 240 ÷ 8 = Lidlog 1.4771

= 30

Tusaale :

Isku qaybi 63.15 iyo 425 adoo isticmaalaya Logardam

$$\text{Log } \frac{63.15}{425} = \text{Log } 63.15 - \text{Log } 425$$

Log 63.15 = 1.8004

Log 425 = 2.6284

Log (63.15 ÷ 425) = 1.1720

$\frac{63.15}{425}$ = Lidlog 1.1720

= 0.1486

Tusaale :

Isku qaybi 91.38 iyo 0.035 adoo isticmaalaaya Logardam.

Log (91.38 ÷ 0.035) = Log 91.38 − Log 0.035

Log 91.38 = 1.9608

− Log 0.035 = 2.5441

Log (91.38 ÷ 0.035) = log 3.4167

= 2611

Tusaale :

Haddii Log 2 = 0.3010 Log 5 = 0.6990, raadi

b) Log $2^1/_2$ t) Log $12^1/_2$

Furfuris

b) Log $2^1/_2$ $= \text{Log } \frac{5}{2} = \text{Log } 5 - \text{Log } 2$

$= 0.6990 - 0.3010 = 0.3980$

Log $2^1/_2 = 0.3980$

t) Log $12^1/_2$ $= \text{Log } \frac{25}{2}$

$= \text{Log } (\frac{5 \times 5}{2}) = \text{Log } 5 + \text{Log } 5 - \text{Log } 2$

$= 0.6990 + 0.6990 - 0.3010$

$= 1.3980 - 0.3010$

$= 1.0970$

Markaa Log $12^1/_2 = 1.0970$

Tusaale :

Fududee adoo isticmaalaya Logardam

$$\frac{8.32 \times 14.76}{38.49}$$

Furfuris

$$\text{Log } \left\{\frac{8.32 \times 14.76}{38.49}\right\} = \text{Log } 8.32 + \text{Log } 14.76 - \text{Log } 38.49$$

Tiro	Log
8.32	0.9201
14.76	1.1691 +
8.32 × 14.76	2.0892
38.49	1.5853 −
$\frac{8.32 \times 14.76}{38.49}$	0.4939

$$\text{Log } \frac{8.32 \times 14.76}{38.49} = 0.4939$$

$$\frac{8.32 \times 14.76}{38.49} = \text{Lidlog } 0.4939 = 3.118$$

Laylisyo :

I. Ka shaqee adoo isticmaalaya Logardam

1. $\frac{715}{324}$
2. $\frac{625}{29.1}$
3. $\frac{4.32}{497}$
4. $\frac{804}{1.73}$
5. $\frac{2.266}{0.022}$
6. $\frac{41.7 \times 1.84}{3.84}$
7. $\frac{47.8 \times 56.83}{43.4 \times 13.2}$
8. $\frac{13.22 \times 1.414}{0.002 \times 31.4}$
9. $\frac{314}{41.2 \times 47.8}$
10. $\frac{24}{44 \times 8.5}$

II. Haddii Log 2 = 0.3010
Log 3 = 0.4771
Log 5 = 0.6991
Log 7 = 0.8451

Raadi adoon isticmaalayan tuse.

1) $\text{Log } \frac{35}{3}$
2) Log 13.5
3) Log 17.5
4) Log 0.00105
5) Log 4.2
6) $\text{Log } \frac{8.4 \times 1.5}{21}$
7) $\text{Log } \frac{12}{5}$
8) $\text{Log } \frac{14}{15}$
9) $\text{Log } \frac{1}{14}$
10) $\text{Log } \frac{3 \times 2}{5}$

III. Buuxi meelaha madhan.

1) Log 2 − Log 3 = Log (−)
2) Log 4 + Log 5 − Log 2 = Log (−)
3) Log 4 + Log 7 − Log 12 = Log (−)
4) Log 19 − Log 6 + Log 8 = Log (−)
5) Log 33 − (Log 11 + Log 2) = Log (−)

Jibbaarka iyo xididka jibbaarka oo Logardam lagu isticmaalayo

Logardamka 49 waa 1.6902, Logardamka 7 waa 0.8451. Maxaa ka dhexeeya Log 49 iyo Log 7 ? 49 waa 7^2 ama 7×7 Markaa, Log (49) = Log (7×7) = Log 7 + Log 7 = 0.8451 + 0.8451 = 1.6902. Waxan arkayna in Log (49) = Log 7^2 = 2 Log 7 = 2×0.8451 = 1.6902 Bal u fiirso Log 81 iyo Log 3. Log 81 = 1.9085, Log 3 = 0.4771 Log 81 = Log 3^4, bal u fiirso $4 \times 0.4771 = 1.9084$. Ma odhan karnaa Log 81 = Log 3^4 = 4 Log 3 ? Haa, waayo Log 81 = Log $(3 \times 3 \times 3 \times 3)$ = Log 3 + Log 3 + Log 3 + Log 3 = 4 Log 3.

Guud ahaan, haddii lagu weydiiyo Logardamka b^n waxan odhan karnaa waxay la mid tahay n Log b.

Tusaale :

Raadi Logardamka 2^3. haddii Log 2 = 0.3010

Furfuris

$\text{Log } 2^3 = 3 \text{ Log } 2 = 3 \times 0.3010 = 0.9030$

Tusaale :

Raadi Logardamka 23.47^5

$\text{Log } 23.47^5 = 5 \text{ Logardamka } 23.47$

$= 5 \times 1.3705$

$= 6.8525$

$\therefore \text{Log } 23.45^5 = 6.8525$

Tusaale :

Fududee adoo isticmaalaya Logardam, 21.4^7

Furfuris

$\text{Log } 21.4^7 = 7 \text{ Log } 21.4$

$= 7 \times 1.3304$

$= 9.3128$

$21.4^7 = \text{Lidlog } 9.3128$

$= 2,055,000,000$

Haddii laguu sheego in Logardamka 64 uu yahay 1.8062, ma heli karnaa Logardamka 8 ? Haa, waayo, 8 waxay le'eg tahay $\sqrt{64}$ ama $64^{1/2}$

Marka $\text{Log } 8 = \text{Log } 64^{1/2}$

$= \frac{1}{2} \text{ Log } 64$

$= \frac{1}{2} \times 1.8062 = 0.9031$

Tusaale :

Raadi Logardamka $\sqrt[3]{729}$

Furfuris

$\text{Log } \sqrt[3]{729} = \text{Log } 729^{1/3}$

$= \frac{1}{3} \text{ Log } 729$

$= \frac{1}{3} \times 2.8627$

$= 0.95423$

$\text{Log } \sqrt[3]{729} = 0.9542$

Tusaale :

Ka shaqee adoo isticmaalaya Logardam su'aasha hoos ku qoran :

1. $\sqrt[5]{3125}$

Furfuris

$\text{Log } \sqrt[5]{3125} = \text{Log } (3125)^{1/5}$

$= \frac{1}{5} \text{ Log } 3125$

$= \frac{1}{5} \times 3.4950$

$= 0.6990$

$\text{Log } \sqrt[5]{3125} = 0.6990$

$\sqrt[5]{3125}$ = Lidlog 0.6990

= 5.0000

Laylisyo :

I. Raadi jibbaarka ama xididka kolba ka lagu weydiiyay

1. $(345)^2$
2. $(6.05)^2$
3. $(1.76)^3$
4. $(3.16)^4$
5. $(1,240)^2$
6. $(1.2)^2$
7. $(1.5)^3$
8. $(3.04)^4$
9. $(44.83)^4$
10. $(.00312)^3$
11. $\sqrt{144}$
12. $\sqrt{1.44}$
13. $\sqrt[4]{6.25}$
14. $\sqrt[3]{0.0125}$
15. $\sqrt[3]{0.0000216}$
16. $(81.81)^5$
17. $(18.8)^{\frac{3}{2}}$
18. $\sqrt{(41.4)^2}$
19. $\sqrt{(0.0021)^5}$
20. $\sqrt[9]{18.47}$
21. $\sqrt[10]{(8400000)^2}$
22. $(\frac{1}{4})^4$
23. $(\frac{1}{2})^5$
24. $\sqrt[2]{(\frac{1}{4})^3}$
25. $\sqrt[2]{(0.0027)^2}$

II. Haddii Logardamka 729 = 2.8627

Log 625 = 2.7959

Log 1024 = 3.0103,

Raadi Logardamka adoon isticmaalayn tuse:

1. Log 3
2. Log 0.0027
3. Log 8100
4. Log 5
5. Log 125
6. Log 16
7. Log 5120
8. Log 0.002
9. Log .9
10. Log .50

III. Fududee

1. Log (a.b)
2. Log $(a \div b)$
3. Log a^n
4. Log $a^{\frac{m}{n}}$
5. Log $\sqrt[5]{a}$
6. Log $\sqrt[6]{a^5}$
7. Log $(a^n.b^m)$
8. Log $(a^x \div b^y)$

Waxa dhici karta in isla su'aal qudha ay ku jiraan isku dhufasho iyo qaybin, jibbaar iyo xidid jibbaar. Bal tusaaleyaashaas hoos ku yaal u fiirso.

TUSAALE

Qiimee $7.23 \times \sqrt{\frac{(4.31)^3}{(2.49)^2}}$

Furfuris:

$$\text{Log } 7.23 \times \sqrt{\frac{(4.31)^3}{(2.49)^2}} =$$

$$= \text{Log } 7.23 + \text{Log } \sqrt{\frac{(4.31)^3}{(2.49)^2}}$$

$$= \text{Log } 7.23 + \frac{1}{2} \text{ Log } \frac{(4.31)^3}{(2.49)^2}$$

$$= \text{Log } 7.23 + \frac{1}{2} (3 \log 4.31 - 2 \log 2.49)$$

$$= \text{Log } 7.23 + \frac{3}{2} \text{ Log } 4.31 - \text{Log } 2.49$$

Tiro		Log
7.23		0.8591
$\sqrt{(4.31)^3}$	$\frac{3}{2} \times 0.6345$	$\frac{1.9035}{2} = 0.9517$
$7.23 \times \sqrt{(4.31)^3}$		1.8108
2.49		0.3962
$7.23 \times \sqrt{\frac{(4.31)^3}{(2.49)^2}}$		1.4146
$\text{Log } 7.23 \times \sqrt{\frac{(4.31)^3}{(2.49)^2}}$		1.4146
$7.23 \times \sqrt{\frac{(4.31)^3}{(2.49)^2}}$	Lidlog	1.4146

LAYLISYO

Adoo isticmaalaya Logardam, ka shaqee su'aalaha hoos ku qoran:

1. $\sqrt{\frac{1.728}{0.035}}$ 2. $\sqrt{\frac{2.73}{27.3}}$ 3. $\sqrt{\frac{826}{8.26}}$

4. $21.27 \times \frac{\sqrt{48.36}}{\sqrt[3]{729.}}$

5. $\frac{\sqrt{1.44}}{\sqrt[10]{1.024}} \times 48.4$

6. $41.7^2 \times \sqrt[3]{9.31}$

$$\frac{(0.413)^3 \times \sqrt{41.2}}{3.12}$$

8. $\sqrt{\frac{2.31^2 \times \sqrt[3]{125}}{21.4}}$

9. $(23.4 \times 4.48 \times 5.73) \div 81$

10. $(2.3) \times 0.004) \div (31 \div 0.0000163)$

CUTUB V

TIRIGNOOMETERI

Xiddigta innoogu dhawi waxay inoo jirtaa 4.1 sannad ilays (Sannad ilays waa fogaanta ilaysku socdo muddo sannad ah iyadoo uu sekenkiiba goynayo 186,000 mayl). Markaa 4.1 sannad ilays wuxu la mid yahay, haddaynnu kiiloomitir ku sheegno, 38,400,000,000 km. Haddaba sideebaa loo qiyaasay fogaanta intaa le'eg? Waxa lagu soo saaray qaybta xisaabta ee loo yaqaan tirignoometeri. Taas oo ah :

Xaqiiqooyin iyo xeerar ku saabsan xidhiidhka ka dhexeeya saddexagallada dhinacyadooda iyo xaglahooda. Waxa kale oo tirignoometeriga lagu isticmaalaa warshadaha, sahaminta dhulka iyo sayniskaba.

Saddexagallo Xagal Qumman

b. Aragtiinka Baytagoras

Hore waxaynnu u niqiin in saddexda dhinac ee saddexagalka xagasha qummani ay xidhiidh leeyihiin, taasoo ahayd in shakaalka (dhinaca u dheer) oo laba jibbaarani uu le'eg yahay wadarta labajibbaarrada ee labada dhinac ee kale.

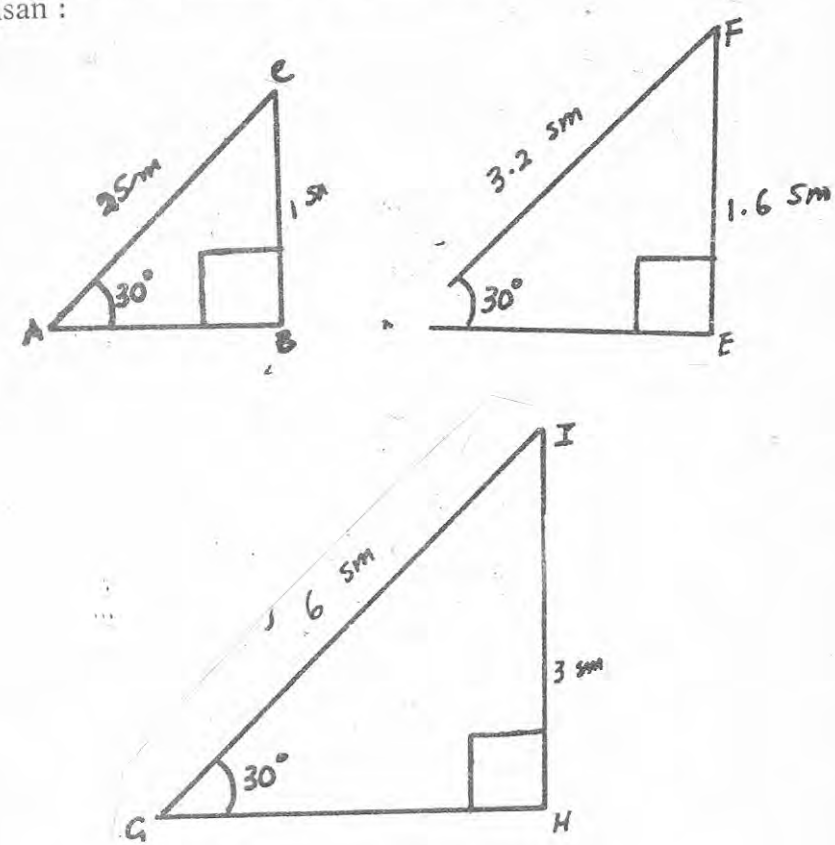
$$s^2 = a^2 + b^2$$

Jidka kor ku qorani wuxuu inoo suurta gelinayaa in aynnu dhinaca maqan raadin karno haddii aynnu haysanno labada dhinac ee kale. Jidkan horeba waynnu u ogayn oo waa aragtiinkii Baytagoras, ee aynnu jidad kale raadino.

t. Saamiyada Tirignoometeriga.

Haddii dhawr saddexagal oo xagal qummani ay xagal fiiqan iska le'eg yihiin, markaa waa inay kulli isku qaab noqdaan. Waxana la yidhaahdaa saddexagallo isu eg. Waayo hore ay-

aynnu u qaadannay, in haddii laba saddexagal is xaglo le'ekaadaan ay markaa isu eg yihiin. Sidaa daraadeed laba saddexagal xaglo qumman oo kastaa haddii ay isu eg yihiin, saamiyada laba dhinac ee midkood waa inuu le'ekaadaa saamiga dhinacyada ka kale ee kuwaa la gudboon, sida shaxankan ku muujisan :



$$\frac{BC}{AC} = \frac{FE}{DF} = \frac{IH}{GI}$$

ama $\frac{1}{2} = \frac{1.6}{3.2} = \frac{3}{6}$

$$\frac{1}{2} = \frac{1}{2} = \frac{1}{2}$$

Waad aragtaa in ay saamiyaashaasu iswada le'eg yihiin. Kulligoodna waa «dhinaca ka soo horjeeda xagasha fiiqan ee 30° ah oo loo qaybshay shakaalka».

XUSUUS : saddexda dhinac waxaynu had iyo jeer ku kala magacaabaynaa :

1) **Shakaal** = dhinaca ugu dheer ee xagasha qumman ka horjeeda.
2) **Deris** = dhinaca xiga xagasha fiiqan ee lagu siiyo.
3) **Horjeede** = dhinaca xagasha fiiqan ee lagu siiyo ka soo horjeeda.

Sayn :

Haddaba saa[illegible]yaasha isle'eg ee aynu kor ku sheegnay waa madoorsoomaya[illegible], waxana la yidhaahdaa sayn soo gaabintan (sin).

Q[illegible]xid :

Sayn : Saddexagal kasta oo xagal qumman saynka xagashiisa fiiqani waa dhinaca xagasha ka soo horjeeda oo loo qaybiyay shakaalka
$\text{sayn} = \frac{\text{Horjeede}}{\text{Shakaal}}$

Xagal kastana waxa u gaar ah sayn aan isbeddelin. Hore waynu u ogayn in Saynka 30° uu yahay $\frac{1}{2}$. Haddaba saynka xagal ah 40° waxaynu ka heleynaa tusaha buugga ugu dambeeya, wuxuuna noqonayaa 0.6428 oo loo qori :

$$\sin 40^\circ = 0.6428$$

Kosayn :

Isla xagasha 40° waxa kale oo ay leedahay saami kale oo madoorsoome ah, waana saamiga laba dhinac oo la isu qaybiyay.

Qeexid :

Saddexagal kasta oo xagal qumman kosayn (cos) xagaashiisa fiiqani waa dhinaca xagasha la derisa oo loo qaybshay shakaalka
$\cos = \frac{\text{Deris}}{\text{Shakaal}}$

Matalan kosaynka xagasha fiiqan ee 40° waa 0.7660 sida tusaha ku taal. Waxana loo qoraa :

$$\cos 40^\circ = 0.7660$$

Taanjant :

Sida saynka ama kosaynka ayaa Taanjantkuna (tan) u yahay saami laba dhinac oo ka mid ah dhinacyada saddexagal xagal qumman.

Qeexid :

Tanjantka xagasha fiiqan ee saddexagal xagal qummani waa dhinaca xagasha ka soo horjeeda oo loo qaybshay dhinaca la deriska ah.
$\text{Tan } A^\circ = \frac{\text{Horjeede}}{\text{Deris}}$

Matalan taanjantka 40° waa .8391 sida tusaha ku taal waxana loo qoraa :

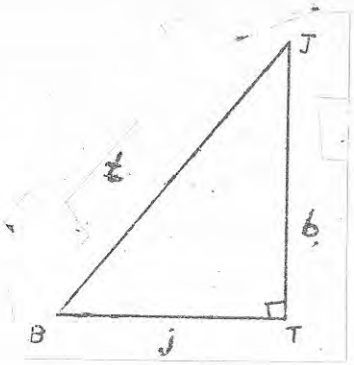
$$\tan 40^\circ = .8391$$

Haddaba haddii b, t, j, ay yihiin saddexda dhinac ee saddexagalka hoos ku yaal :

$$\frac{b}{t} = \sin B$$

$$\frac{j}{t} = \cos B$$

$$\frac{b}{j} = \tan B$$



t. Baadidoonka Saamiyada.

Tusaha buugga gadaal kaga yaalla waxaynu ka heli karnaa saamiyada saynka, kosaynka iyo taanjantka xaglaha fiiqan ilaa intii ku siman 89 digrii.

Tusaale :

1) Soo saar saynka 27°.

Furfurid :

Tusaha ka eeg meesha 27° ku taallo, dabadeed midigteeda joogutaxa saynka (sin) ka akhri .4540. U qor :

Sin 27° = 0.4540

2) Baadidoon taanjantka 31°.

Furfurid :

Markaad hesho meesha 31° ay ku taal, 0.6009 ka akhri joogutaxa saddexaad ee «tan» kor kaga qoran tahay. U qor :

Tan 31° = .6009

3) Baadidoon kosaynka 85°.

Furfurid :

Raac tallaabooyinkii hore :

Cos 85° = 0.0872

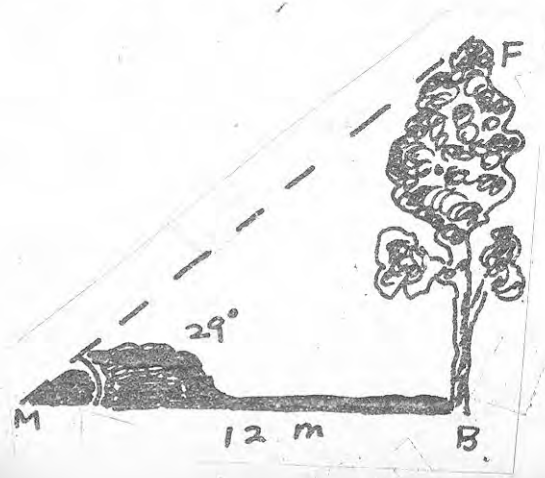
Laylisyo :

Baadidoon saamiyada xaglaha hoos ku qoran, adoo isticmaalaya tusaha.

1. Sin 4°
2. Cos 46°
3. Tan 20°
4. Cos 80°
5. Sin 60°
6. Tan 15°
7. Cos 45°
8. Sin 45°
9. Tan 45°
10. Sin 1°

Ku shaqaynta Saamiyada Tirignoometeriga

Haddii aynu doonno inaan ogaanno qiyaasta joogga geedkan, j, innagoo taagan meel geedka u jirta 12 mitir. Waxaynu u baahan nahay inaan helno qiyaasta xagasha ∠FMB ee aynu geedka sare ugu eegaynno. Haddaba innagoo isticmaa-



xagal-beeg, haddaynu helno in ∠FMB ay tahay 29°, waxaynu ogaanaynaa in

$$\frac{j}{12} = \tan 29°$$

ama $j = 12 \times \tan 29°$

$j = 12 \times .5543$

$j = 6.6516$

$j = 6.7$ m.

6.7 m. waa joogga geedka.

Sidaas oo kale ayaynu ballaadhka webigana, u soo saari karnaa. Ka dhig inuu balladhka webigu yahay x mitir.

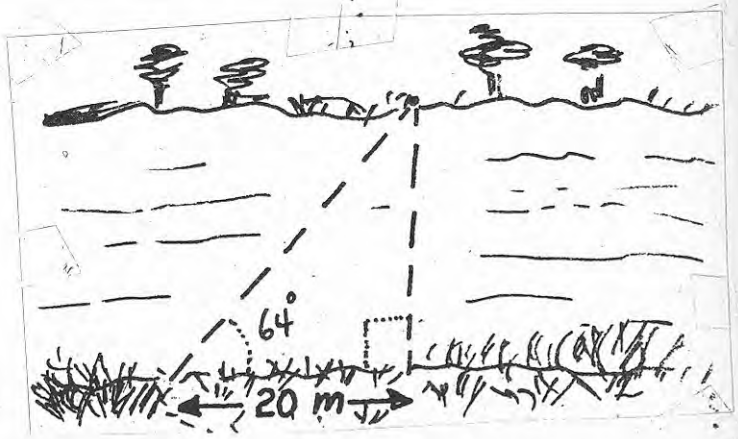
$$\tan 64° = \frac{x}{20}$$

$x = \tan 64° \times 20$ m.

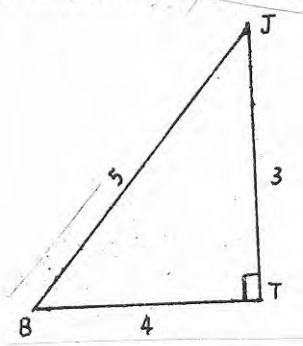
$x = 2.0503 \times 20$

$x = 40.10060$

$x = 40$ m.



Saamiyada tirignoometerigu had iyo jeer kuma koobna xagal keliya, waayo, saddexagalka xagasha qummani **wuxu leeyahay** laba xaglood oo fiiqan. Markaa labaduba **waxay leeyihiin** saddex saami (sin, cos iyo tan) oo kala duwan. Matalan saddexagalka xaglihiisa fiiqan saamiyadoodu **waa kuwan**:



1) $\sin \angle B = \frac{\text{Horjeede}}{\text{Shakaal}} = \frac{3}{5} = 0.6$

2) $\cos \angle B = \frac{\text{Deris}}{\text{Shakaal}} = \frac{4}{5} = 0.8$

3) $\tan \angle B = \frac{\text{Horjeede}}{\text{Deris}} = \frac{3}{4} = 0.75$

4) $\sin \angle J = \frac{\text{Horjeede}}{\text{Shakaal}} = \frac{4}{5} = .8$

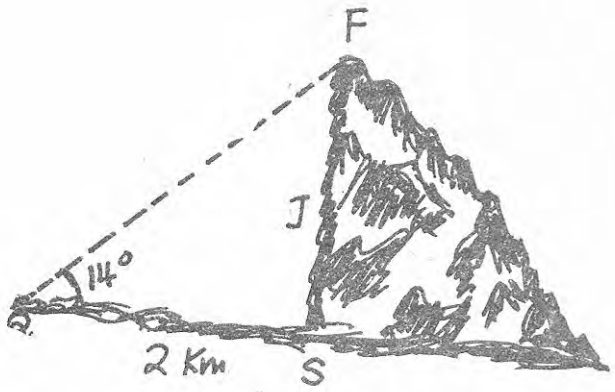
5) $\cos \angle J = \frac{\text{Deris}}{\text{Shakaal}} = \frac{3}{5} = .6$

6) $\tan \angle J = \frac{\text{Horjeede}}{\text{Deris}} = \frac{4}{3} = 1.33$

j. Xaglo Dhacsan iyo xaglo kacsan.

Qof baa istaagay meel buur dhinaceed u jirta 2 Km isagoo doonaya inuu ogaado joogga buurta. Wuxuu markaa

ogaaday ∠ SQF inay tahay 14°. Sidan ayuu dabeed ku soo saaray joogga j, ee buurta:



$$\tan 14^\circ = \frac{\text{j km.}}{\text{2 km.}}$$

$$\text{j} = 2 \times \tan 14^\circ$$

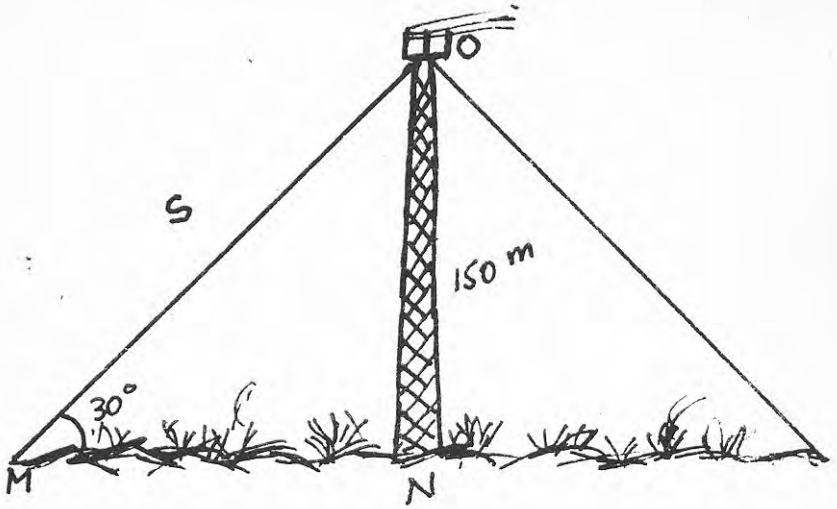
Markaa j km. $= 2 \times .2493$ km.

$= .4986$ km.

$= 498.6$ mitir

ama mitirka ugu dhaw waa 499 m.

Haddaba xagasha SQF ee sare qofku u eegayay waxa la yidhaahdaa xagal kacsan. Haddii, matalan, qofkaasi, uu joogi lahaa buurta figteeda sare, oo uu hoos u soo eegi lahaa halka uu immika istaagay (2 km. meel u jirta salka buurta), xagasha uu hoos u soo eegi laha waxay iyana noqon lahayd 14°. Waayo QS iyo MF waa laba xarriiqood oo barbaarro ah; markaa ∠ MFQ iyo ∠ FQS waa laba xaglood oo talantaalli ah oo isle'eg (xusuuso astaamihii xarriiqaha barbarrada ah iyo wadaajiyaha). Xagasha MFQ ee hoos loo soo eegayana waxa la yidhaahdaa xagal dhacsan.



Tusaale :

Haddii nin Injineerihi uu doonayo inuu taago birta taararka oo dhererkeedu yahay 150 m. uu doonayona inuu dhulka ugu xidho xadhko si xagasha kacsan ee xadhkuhu ay u noqoto 30°, xadhko intee dherer laale'eg ayuu u baahanayaa ?

Furfurid :

Dhererka xadhig waliba wuxuu la mid yahay shakaalka saddexagalka, S. Haddaba :

$$\text{Sin } 30^\circ = \frac{150}{S}$$

$$S = \frac{150}{\text{Sin } 30^\circ}$$

$$= \frac{150}{0.5}$$

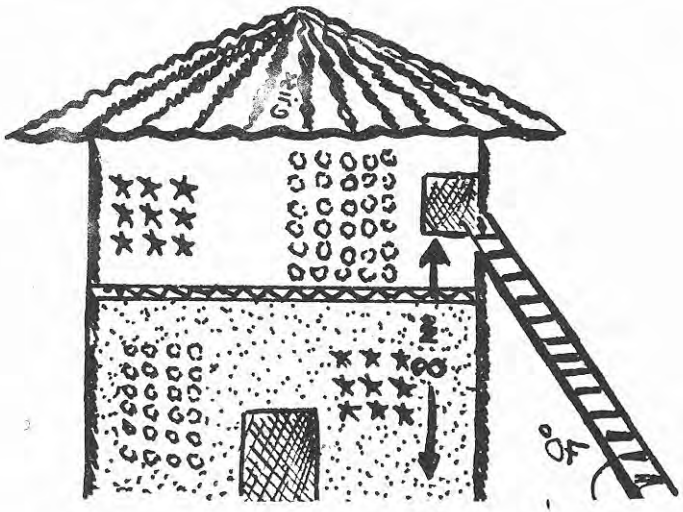
$$= 300 \text{ m.}$$

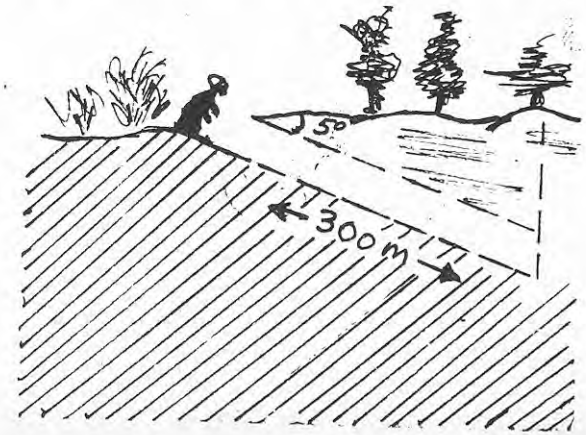
Laylisyo :

Furfur su'aalaha hoos ku qoran.

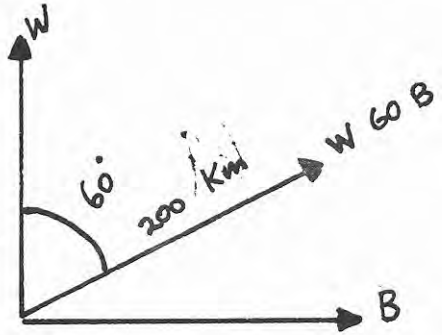
1) Intee ayuu dherer le'ekaanayaa sallaan la doonayo in uu gaadho daaqad (dariishad) dhulka ka sarraysa S m. haddii xagasha kacsan ee sallaanku ay tahay 70° ?

2) Haddii nin macdan-qote ahi uu galo god dhererkiisu yahay 300 m. xagasha uu godka hoos ugu gelayaana ay tahay 5°, intee in le'eg ayuu markaa ninku ooga-da dhulka ka hooseeyaa ?

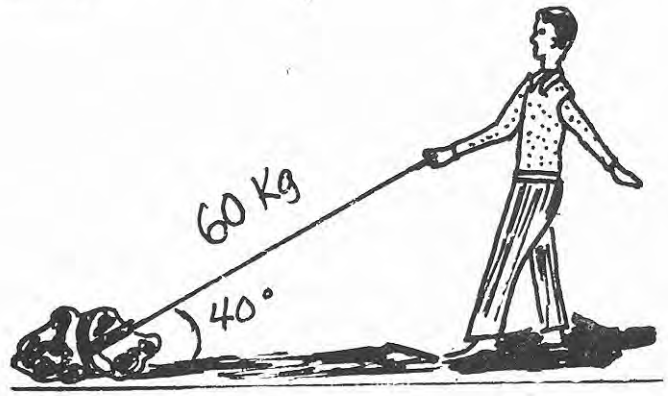




3) Markab baa ka baxay dekad isagoo u jeeda W 60° B (60° ayuu bari ka xigaa waqooyiga). Marka uu jihadaa u socdo 200 km. dhinaca bari immisa km. ayuu u socday ?



4) Nin baa xadhig ku jiidaya alaabo culus, isagoo istic-maalaya xoog 60° kg. ah. Haddii xadhigu dhulka la sameeyo xagal kacsan oo 40° ah, waa immisa xoogga runta ah ee alaabta gudub u jiidayaa; (eeg muujinta).



5) Haddii geed jooggiisu yahay 5 m. fallaadhaha ilays-ka qorraxduna ay dhulka la sameeyaan xagal dhac-san oo 64° ah, waa maxay dhererka hadhka geedku ?

6) Dayuurad baa dhulka kaga kacday xagal 15° ah. Markay xagashaa tooskeeda 1000 m. u socoto, imisa mitir ayay dhulka ka sarraysaa ?

CUTUB VI

LAYLI GUUD :

XISAABTA DUGSIYADA DHEXE

Laylisyo : NAQTIIN I

1) Haddii wadarta saddex tiro oo idil ay tahay 678, laba biiro ay yihiin 216 iyo 198, raadi inta ay tahay biirada qarsooni.

2) Asal madoorshaha isugeyntu waa maxay ? Tiro haddaan eber ka go yno maxaan helnaa ?

3) Haddii ardayda dugsigu ay 346 tahay uu arday waliba bixiyo 14 shilin, waa imisa lacagta dugsigu haystaa ?

4) Xasan wuxu haystaa 29 shilin, Cumarna wuxuu haystaa intaa lix laabkeed. Lacagta uu Cumar haystaa inteebay dheer tahay ta Xasan haysto.

5) 4880 shilin baa loo qaybiyey 16 shaqaale ah. Midkiiba imisuu helay ?

6) Qor tirooyinka dhabanka ah ee 10na ka badan, 30na ka yar.

7) Qor tirooyinka kisiga ah ee 40na ka badan, 56na ka yar.

8) Sheeg tirooyinka kuwa dhaban ah, kuwa kisa ah iyo kuwa mutuxan :

   1, 2, 3, 4, 5, 6, 7, 8, 11, 13, 15, 17, 19, 20, 21, 24, 29.

9) Qor tirooyinka mutuxan ee eber ka weyn, soddonna ka yar.

10) Tirooyinka soo socda mid walba u dhig sansaanta tarantа isirradeeda mutuxan :

i) 28	vi) 105
ii) 32	vii) 2196

iii) 29	viii) 1028
iv) 65	ix) 582
v) 80	

11) Raadi isirrada ay wadaagaan 72 iyo 64.

12) Qor ururka dhufsaneyaasha ay wadaagaan 12 iyo 18.

13) Raadi I.W.W. lammaanayaashani :

i) 12; 24	vi) 4; 5
ii) 36; 18	vii) 15; 26
iii) 48; 42	viii) 88; 55
iv) 17; 29	ix) 48; 54
v) 436; 981	x) 63; 28

14) Waa maxay dhufsane u yaraha ay wadaagaan 6 iyo 8.

15) Raadi Dh. Y. W. lammaanayaashani :

i) 2; 3	vi) 12; 24
ii) 4; 6	vii) 12; 36
iii) 7; 10	viii) 8; 9
iv) 6; 9	ix) 13; 19
v) 5; 10	x) 1; 2

16) Ka dhig jajab ma qumaneyaal tirooyinka dhafan ee hoos ku qoran :

i) $1\frac{2}{3}$	iii) $13\frac{21}{22}$
ii) $3\frac{4}{7}$	iv) $4\frac{7}{8}$

17) Raadi tirooyinka dhafan ee u dhigma jajab ma qamanayaashan :

i) $\frac{121}{12}$ iii) $\frac{127}{5}$

ii) $\frac{7}{2}$ iv) $\frac{347}{100}$

18) Jajabyadan soo socda mid walba u qor 5 magac oo kale oo u leeyahay :

i) $\frac{1}{2}$ ii) $\frac{2}{3}$ iii) $\frac{12}{5}$ iv) $\frac{6}{90}$ v) $\frac{14}{7}$

19) Waa maxay jajabyo isudhigmaa? Tusaalooyin keen?

20) Raadi tirooyinka weedhahan soo socdaa ay ku rumoobeyaan :

i) $\frac{1}{2} = \frac{?}{4}$ v) $\frac{9}{?} = \frac{81}{18}$ viii) $\frac{6}{8} = \frac{15}{?}$

ii) $\frac{8}{4} = \frac{48}{?}$ vi) $\frac{?}{15} = \frac{121}{180}$ ix) $\frac{12}{15} = \frac{?}{20}$

iii) $\frac{6}{2} = \frac{?}{10}$ vii) $\frac{7}{9} = \frac{?}{27}$ x) $\frac{9}{6} = \frac{24}{?}$

iv) $\frac{?}{7} = \frac{24}{42}$

21) Isugee jajabyadan :

i) $\frac{7}{13} + \frac{1}{13} + \frac{2}{13}$ vi) $\left[\frac{2}{3} + \frac{1}{5}\right] + \frac{1}{6}$

ii) $\frac{1}{5} + \frac{4}{15}$ vii) $\frac{2}{3} + \left[\frac{1}{5} + \frac{1}{6}\right]$

iii) $1\frac{2}{3} + 2\frac{3}{5}$ viii) $\left[\frac{2}{3} + \frac{1}{2}\right] + \frac{3}{4}$

iv) $12\frac{1}{2} + 3\frac{1}{3}$ ix) $\frac{2}{3} + \left[\frac{1}{2} + \frac{3}{4}\right]$

v) $2\frac{4}{9} + 3\frac{5}{12} + 1\frac{5}{6}$ x) $\frac{4}{15} + \frac{1}{5}$

22) Raadi tirooyinka ka maqan weedhahan.

i) $\frac{2}{5} + b = \frac{3}{5}$

ii) $\frac{3}{8} + t = \frac{7}{8}$

iii) $\frac{7}{12} + x = \frac{1}{2}$

iv) $1\frac{1}{2} + d = \frac{7}{4}$

v) $y + \frac{7}{8} = \frac{14}{16}$

23) Kala goo jajabyadan :

i) $2\frac{1}{2} - 1\frac{1}{2}$ vi) $\left[1\frac{1}{2} + \frac{3}{4}\right] - \frac{3}{4}$

ii) $3\frac{3}{4} - 1\frac{1}{4}$ vii) $1\frac{7}{24} - \frac{9}{24}$

iii) $9\frac{2}{3} - 5\frac{1}{1}$ viii) $\frac{9}{24} - 1\frac{7}{24}$

iv) $15\frac{3}{4} - 6\frac{1}{8}$

v) $5\frac{3}{5} - \frac{33}{10}$

ix) $\left[7\frac{2}{3} - 5\frac{1}{4}\right] - 1\frac{1}{6}$

x) $7\frac{1}{3} - \left[5\frac{1}{4} - 1\frac{1}{6}\right]$

24) Isku dhufo jajabyadan :

i) $\frac{2}{3} \times \frac{9}{10}$

ii) $3 \times \frac{5}{6}$

iii) $2 \times \frac{1}{2} \times \frac{3}{5}$

iv) $1\frac{1}{2} \times 1\frac{3}{5}$

v) $\frac{9}{7} \times \frac{7}{3}$

vi) $\frac{5}{6} \times \frac{4}{5} \times \frac{1}{2}$

25) Isu qaybi jajabyadan :

i) $6\frac{1}{8} \div 1\frac{1}{3}$

ii) $12\frac{1}{5} \div \frac{10}{3}$

iii) $12 \div \frac{1}{3}$

iv) $\frac{1}{3} \div 12$

iv) $\left[\frac{3}{3} \div \frac{1}{2}\right] \div \frac{3}{5}$

vi) $\frac{2}{3} \div \left[\frac{1}{2} \div \frac{3}{5}\right]$

26) Fududee :

i) $\dfrac{3\frac{1}{2}}{3\frac{1}{4}} \div \dfrac{\frac{3}{5}}{1\frac{1}{2}}$

ii) $\dfrac{3\frac{4}{5} - 1\frac{3}{10}}{2\frac{3}{5} \div \frac{1}{2}} \times \frac{8}{21}$

iii) $3\frac{3}{4} + 4\frac{7}{8} - 6\frac{1}{4} \times 1\frac{1}{3} + \frac{5}{6}$

iv) $\frac{3}{7} - \frac{2}{7} \times 1\frac{1}{2} + 2$

v) $2\frac{1}{2} - 1\frac{1}{2} \times \frac{3}{2} + \frac{1}{3}$

27) Weelbaa muggiisu yahay $3\frac{3}{4}$ litir. Imisa litir oo kale ayaa buuxin kara haddii ay ku jiraan $1\frac{1}{8}$ litir.

28) Ninbaa siiyey lacagtiisa badhkeed aabbihii. 800 shilin ayaa u soo hadhay. Imisay lacagtiisu ahayd?

29) Jajab walba u dhig sansaanta jajab tobanle.

i) $\frac{7}{10}$

ii) $\frac{8}{100}$

iii) $\frac{19}{10}$

iv) $\frac{4}{10000}$

v) $\frac{16}{1000}$

vi) $\frac{750}{100,000}$

30) Isugee :

i) 0.6 + 3 iv) .141 + 141.

ii) 6.64 + 8.5 v) 2.374 + 134.2 + 13.42

iii) .9 + 13 vi) 1.02 + 1.321 + 141.3

31) Haddii Cumar uu joeggiisu yahay 174 sm., Cabdina joeggiisu yahay 125 sm., imisay kala dheer yihiin ?

32) Qolka Xasan bedkiisu waa 18.62 m^2. Qolka Aadanna bedkiisu waa 21.53 m^2. Imisay bededka labadaa qol is dheer yihiin ?

33) Isku dhufo :

i) 1.4 × 1.2 iv) 12.13 × 1.12

ii) 20 × .8 v) 0.00713 × 0.3

iii) 1.44 × 2.9 vi) 713 × 0.003

34) Isu qaybi :

i) 12.6 ÷ 6 iv) 0.13 ÷ 0.65

ii) 12.6 ÷ 0.6 v) 0.6 ÷ 7.5

iii) 0.486 ÷ 0.03 vi) 4.242 ÷ 21

35) U rog tirooyinka tirada idil ee ugu dhow :

i) 3.8 iv) 46.7

ii) 45.63 v) 59.8

iii) 132.453 vi) 15.879

36) Arday baa xaashi dheerkeedu yahay 7.93 sm. u kala gooyay saddex jeex oo isle'eg. Jeexiiba waa imisa dhererkiisu ?

37) Baabuur baa la saaray 20 focsto oo mid walba culayskeedu yahay 124.212 Kg. waa imisa culayska baabuurka la saaray ?

38) Wiil baa xoolihiisii badhkood hooyadii siiyay. Intii soo hadhay marka saddex meelood loo qaybiyo meel ahaan wuxuu siiyay aabbihii. Waxa u soo hadhay 800 shilin. Imisuu markii hore haystay.

39) Nijaar ayaa qori dhererkiisu yahay 17.64 sm. u kala

gooyay 7 meelood oo isle'eg. Waa imisa dhererka qayb walba ?

40) Faadumaa soo gadday 4.25 Kg. oo bariis ah iyo 1.75 Kg. oo hilib ah. Waa imisa lacagta ka baxday Faadumo haddii 1 Kg. oo bariis ahi yahay 2.35 shilin, 1 Kg. hilib ahina uu yahay 3.75 ?

41) Raadi qiimaha :

i) 5 hg. 7 dg. + 8 kg. 7 hg. 6 g. — 6 hg. 2 dg. 5g.

ii) (5 dg. 7 g. 2 dg.) × 5

iii) (5 Kg. 3 hg. 4 dg. 6 g.) ÷ 6

42) Raadi qiimaha :

i) 3 km. 4 m. 3 dm. 2 cm. + 9 km. 7 m. 4 dm. 2 sm.

ii) (3 km. 5 dm. 4 m. 2 sm.) × 9

iii) (7 km. 6 hm. 5 dm. 4 sm. 5 mm.) ÷ 5

43) Imisa kumi baa ku jira. 2 shilin ?

» taano » » » 3 gini ?

» gini » » » 60 shilin ?

» shilin » » » 2 gini 4 shilin 6 kumi ?

» senti » » » 2 shilin 4 kumi

44) Haddii derbi uu ka kooban yahay 35 saf oo leben ah, halkii lebenana jooggiisu yahay 7.6 sm. imisuu noqonayaa joogga derbigu mitir ahaan ?

45) Raadi :

i) 2 maal. 3 saac. 43 miridh + 13 maal. + 23 saac. + 33 miridh

ii) (3 sano 180 maalmood 20 saac.) × 5

iii) (6 sano 350 maalmood) ÷ 6

iv) 2 maalmood 13 saac. — 1 maalin 20 saac.

i) (3 saac. 41 miridh 8 sekan) ÷ 4

46) Ka dhig boqolley jajabka hoos ku yaal.

i) $\frac{1}{4}$ iv) $\frac{1}{5}$

ii) $\frac{1}{2}$ v) $1\frac{1}{5}$

iii) $\frac{1}{8}$ vi) $\frac{7}{5}$

47) Ka dhig boqolley jajab tobanlaha hoos ku qoran.

i) 0.52 iv) 0.07

ii) 1.52 v) 0.7

iii) 0.032 iv) 1.9

48) U rog jajab tobanle boqolleyda hoos ku qoran:

i) 7% iv) 65%

ii) 25% v) 0.1%

iii) 175% vi) 0.32%

49) Ka dhig jajab boqolleyda hoos ku taal.

i) 50% iv) 12.5%

ii) 75% v) $33\frac{1}{3}\%$

iii) 125% vi) 35%

50) Axmed baa seyladda geeyay 240 midh oo ukun ah. 75% buu gaday. Imisa hal buu gaday ? Boqolkiiba intee hadhsan ?

51) Jaamac buu miisaankiisu noqday 60 Kg. markii u bukooday. Waxa ka dhacay 20% miisaankiisii. Imisuu ahaa miisaankiisu markii hore ?

52) Fasal bay 6 gabdhood ku jiraan. Fasalkaa 80% waa wiilal. Waa imisa wiilalka fasalka ku jiraa ? Imisa arday baa fasalka dhigta ?

53) Nin macdaarra ah ayaa 20 shaadh midkiiba ku iibiyey 25 shilin. Wuxuu ka macaashay 25%. Imisuu shaadhkiiba soo siistay ?

54) 4 dugsi baa waxa ku kala jira 254, 320, 300 iyo 290 arday. Raadi tirada celceshan ee ardayda ku jirta dugsigiiba.

55) Baabuur baa Xamar iyo Jowhar oo 90 Km. isku jira 4.5 saacadood u kala socday. Raadi xawaaraha celceliska ah ee baabuurkaas?

56) **Afar wiil baa jooggooda celceliska ahi uu ahaa 1.7 m.** Cali oo jooggiisu yahay 1.2 m. ayaa ku soo kordhay. Waa imisa joogga celceliska ah ee 5 ta wiil ?

57) 24 arday baa da'dooda celceliska ahi ay tahay 19 sananadood. Xasan markuu ku soo biiray da'dooda celceliska ahi waa 19.2 sannadood. Xasan waa imisa jir ?

58) Baabuur baa xawaarihiisa celceliska ahi uu ahaa 25 mayl/saacad muddo 10 saacadood ah. 4 ta saacadood ee hore waa 30 mayl/saacad. 6 da saacadood ee dambe, waa imisa xawaaraha baabuurku ?

59) Waddan baa kulkiisa celceliska ah ee lixda bilood ee hore uu yahay 20° sentigireyd, bishiiba, kulka celceliska ah ee lixda bilood ee dambana uu yahay 30° sentigireyd bishiiba. Waa imisa kulka celceliska ah ee bishiiba haddii sanadka oo dhan la isku qaado ?

60) Raadi laba jibbaarrada tirooyinkan :

i) 25 iv) 12.1

ii) $7\frac{1}{4}$ v) 0.0003

iii) 1.25 vi) 0.012

61) Soo saar xididka laba jibbaarka **tirooyinkan,** adigoo isticmaalaya isireyn.

i) 169 iv) 14641

ii) 629 v) 12321

iii) 6561 vi) 5625

62) i) Waa maxay labajibbaarane ?

ii) Waa maxay laydi ?

iii) Sheeg wuxuu yahay saddexagal ?

63) Sheeg jidka lagu helo wareegga labajibbaaranaha.

» » » » » laydiga.

» » » » bedka labajibbaaranaha.

» » » » » laydiga.

» » » » » saddexagal.

64) Raadi wareegga labajibbaaranaha dhererka dhinacyadiisu ay yihiin 4.14 sm.

65) Raadi wareegga laydiga dhererkiisu yahay 2 m. 9 mm. ballaadhkiisuna yahay 1 m. 7 dm. 4 sm.

66) Waa imisa dhererka dhinaca labajibbaaranuhu haddii wareeggiisu yahay 104 sm.

67) Waa imisa dhererka laydigu haddii ballaadhkiisu yahay 21 sm. wareeggiisuna 90 sm.

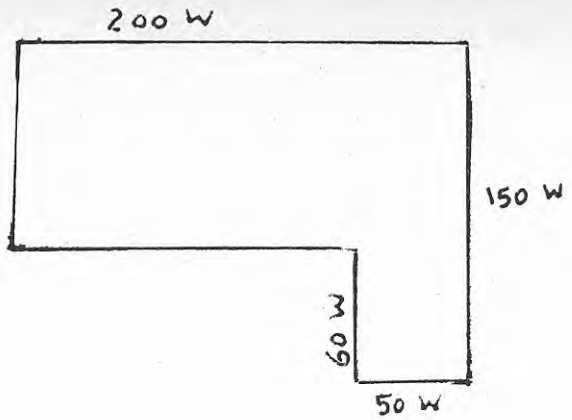
68) Raadi ballaadhka beerta wareeggeedu yahay 3.6 km. dhererkeeduna 1.7 km.

69) Waa imisa wareegga saddexagal dhinacyadiisu yihiin 1 m. 20 sm., 2 m. 90 m., 1 m. 7 mm.

70) Waa imisa wareegga laydiga dhererkiisu yahay 1 mitir ballaadhkiisuna 9 sm.

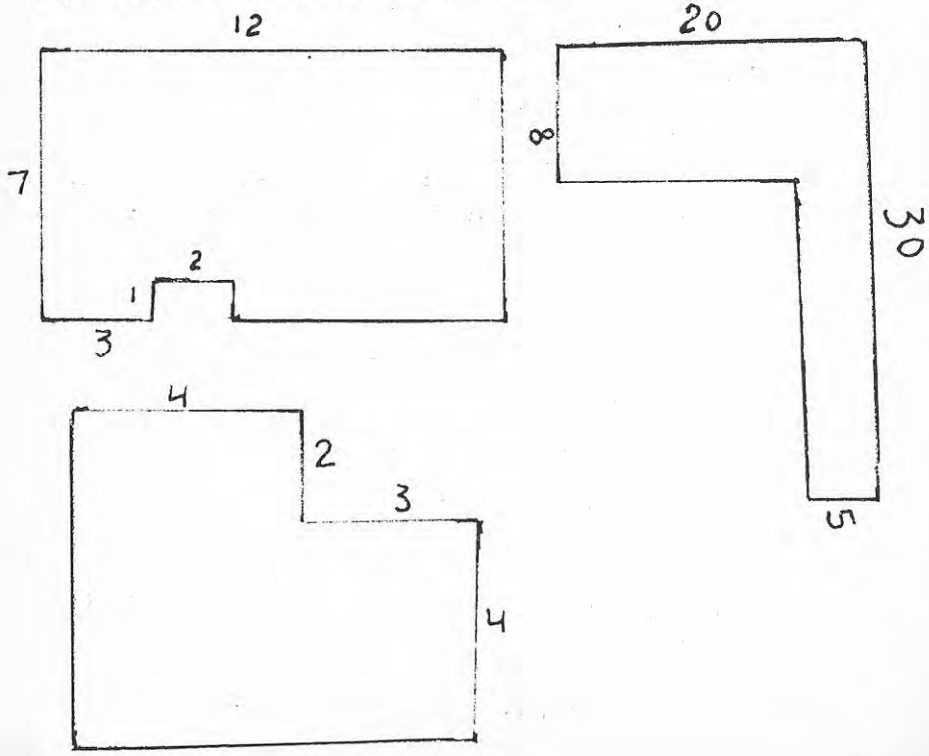
71) Waa imisa bedka dermo dhererkeedu yahay 2 m. 3 sm. **ballaadhkeeduna yahay 1 m? Jawaabta ku sheeg sm^2.**

72) Ku raadi waar labajibbaaran, bedka beerta hoos ku taswiiran.



73) Harqad miis baa ballaadhkeedu yahay 1.6 m. dhererkeeduna yahay 2.15 m. Waa imisa bedkeedu haddii lagu doono (b) mitir labajibbaaran (t) sentimitir labajibbaaran.

74) Raadi bededka hoos ku taswiiran.



75) Raadi bedka saddexagal salkiisu yahay 70 m. jooggiisuna 21 m. ?

76) Waa imisa bedka saddexagal jooggiisa iyo salkiisu ay kala yihiin 2 m. 6 dm. iyo 1 m. 4 dm. 6 sm. siday u kala horreeyaan.

77) Sheeg salka saddexagal bedkiisu yahay 124 m^2. jooggiisuna yahay 8 m.

78) U beddel litiro, desilitiro, sentilitiro, iyo mililitiro :

i) 5 l. 4 sl.
ii) 2 kl.
iii) 1.25 l.
iv) 130 ml.
v) 140 sl.
vi) 16 l. 2 ml.

79) Kiiloolitirka biyaha ahi waa imisa sentilitir.

80) U rog litiro :

i) 2 galaan
ii) 3 gl. 2 K. 2 b.
iii) 8 gl. 3 K. 1 b.

Laylisyo : NAQTIIN II

1) Sheeg weedhahan soo socda astaamaha isku dhufashada ama isugeynta tirooyinka tirsiimo ay waafajisan yihiin.

i) $(8+3) + 12 = 8 + (3+12)$
ii) $(8+3) + 12 = 12 + (8+3)$
iii) $(3+6) + (11+7) = (11+7) + (3+6)$
iv) $5 \times (15\times4) = (5\times15) \times 4$
v) $36 \times (2\times4) = (2\times4) \times 36$
vi) $(3\times5) \times (6\times2) = (6\times2) \times (3\times5)$

2) Dhammee weedhahan soo socda si ay u tusaan kala dhig:

i) $3 \times (7+2) = \square$
ii) $4 \times (6+5) = \oplus$

iii) $(4+8) \times 7 = \triangle$
iv) $(5+19) \times 22 = \otimes$

3) Xarriiqda tirada ku muuji in :

i) $3 \times (5+3) = (3\times5) + (3\times3)$
ii) $7 + (6+11) = (7+6) + 11$
iii) $12 \times (4+2) = (12\times4) + (12\times2)$
iv) $(8\times4) \times 2 = 8 \times (4\times2)$

4) Waxaad ku muujisaa xariiqda tirada xeerka (b) kala hormarinta isugeynta (t) kala hormarinta isku dhufashada (j) hormagelinta isugeynta (x) kala dhigga isku dhufashada.

5) Xarriiqda tirada waxaad ku muujisaa :

i) $b>4$
ii) $t<-3$
iii) $j\geq7$
iv) $6< k <8$
v) $-2< k <2$
vi) $-3< k <3$

6) Adoo isticmaalaya astooyinka dheelliga hadba tii habboon, waxaad qortaa :

i) b way ka weyn tahay x.
ii) t waxay ka weyn tahay -2 waxayna ka yar tahay 5.
iii) d waxay ka yar tahay ama le'eg tahay eber waxayna ka weyn tahay -6.
iv) g waxay u dhexaysaa m iyo n.

7) Adoo raacaya habka qaybiska iyo celcelinta, waxaad soo saartaa xididka labajibbaarka.

i) 529
ii) 368
iii) 40
iv) 169
v) 2128
vi) 19.74

8) Waa imisa dhinaca labajibbaarka uu bedkiisu yahay 640 m^2.

9) Soo saar xididka labajibbaarka :

i) 0.000169 iii) 0.7634

ii) 21.48 iv) 0.08481

10) Warfaa aqal buu ku iibiyey 17,634 shilin. Markii u bixiyey 150 shilin oo dillaal ah haddii uu helay 300 shilin oo macaash ah, imisuu aqalku ku joogay ?

11) Nin baa alaabo soo siistay 480 shilin kuna iibiyay 420 shilin. Boqolkiiba imisuu ku khasaaray ?

12) Saacad lagu iibiyay 250 shilin ayaa laga macaashay boqolkiiba 5 shilin. Qiimaha gadashada saacaddu imisuu ahaa ?

13) 25 juunyadood oo midkiiba la siistay 300 shilin ayaa laga macaashay boqolkiiba sagaal shilin. 3 juunyadood way qoyeen. Intii hadhay middiiba 310 shilin ayaa lagu gaday. Imisaa boqolkiiba laga macaashay ?

14) Magaalo ayaa dadka ku nooli ay yihiin 500,000. Haddii sannadkiiba ay ku koredho 4%, laba sannadood dabadeed intee ku nool magaalada ?

15) Kabo la soo siistay 90 shilin ayaa markay iibsami weeyeen lagu gaday 81 shilin. Boqolkiiba imisaalagu khasaaray ?

16) Haddii 600 shilin la dhigtay Banki bixinaaya sannadkii dulsaar ah 3% oo lacagtuna tiillay bankiga muddo 3 sannadood ah, soo saar dheefta fudud.

17) 200 shilin ayaa la dhigtay Banki bixiya dulsaar ah 3% sannadkii. Laba sannadood dabadeed ayaa laga qaatay 800 shilin. 5 sannadood dheefta laga helayaa waa imisa ?

18) 600 shilin oo qof la amaahiyay 5 sannadood ayaa keentay hanti ah 690 shilin. Boqolkiiba dulsaarku waa intee ?

19) Lacag baan dhigtay banki bixinaaya dulsaar ah 4% sannadkii. Markii 5 sannadood lacagtii ii tiillay bankiga hantidaydii waxay noqotay 3600 shilin. Soo saar inta aan dhigtay ?

20) Cali baa banki bixiya dulsaar ah 4% sannadkii, 700 Sh. dhigtay. Imisa sannadood dabadeed bay hantida Cali noqonaysaa 770 shilin ?

21) Raadi dheef korka laga helayo 200 shilin oo muddo 3 sannadood taallay banki bixiya 5% sannadkii.

22) Waa imisa dheef korka laga heli karo lacag 3560 shilin, oo taallay muddo $2\frac{1}{2}$ sannadood ah banki dulsaarkiisu yahay 2% sannadkii.

23) Raadi hantida iyo dheef korka laga helay :

b) 600 shilin muddo 3 sannadood ah haddii dulsaarku uu ahaa 4% sannadkii.

t) 604.70 shilin muddo $1\frac{1}{2}$ sannadood ah haddii dulsaarku uu ahaa 5% sannadkii.

j) 600 shilin muddo 3 sannadood ah haddii dulsaarku yahay $2\frac{1}{4}$% sannadkii.

x) 1105.70 shilin muddo 2 sannadood ah haddii dulsaarku yahay $3\frac{1}{4}$% sannadkii.

24) Intey is dheeryihiin dheefta fudud iyo dheef korka laga helay :

b) 385 shilin muddo 3 sannadood ah haddii dulsaarku yahay 4% sannadkii.

t) 1045 shilin muddo $2\frac{1}{2}$ sannadood ah haddii dulsaarku yahay 5% sannadkii.

j) 246 shilin muddo $3\frac{1}{2}$ sannadood ah haddii dulsaarku yahay $2\frac{1}{2}\%$ sannadkii.

25) Isticmaal xeerka dheef korka.

b) raadi hantida haddii 300 shilin uu dulsaarkoodu yahay 5% sannadkii muddo 2 sannadood ah.

t) raadi hantida haddii 650 shilin uu dulsaarkeedu yahay $4\frac{1}{2}\%$ sannadkii muddo 2 sannadood ah.

j) 580 shilin uu dulsaarkoodu yahay 3% sannadkii muddo 3 sannadood ah.

26) U rog sal shan :

i) 6 iv) 104
ii) 5 v) 173
iii) 25 vi) 273

27) U rog sal laba :

i) 9 iv) 63
ii) 17 v) 89
iii) 19 vi) 147

28) U rog sal toban iyo laba :

i) 13 iv) 207
ii) 12 v) 576
iii) 144 vi) 2174

29) U rog sal toban :

i) $(10101)_2$ iv) $(101)_2$
ii) $(1000)_2$ v) $(111)_2$

iii) $(100111)_2$ vi) $(1101)_2$

30) U rog sal toban :

i) (4033) iv) (3124)
ii) $(4001)_5$ v) $(1004)_5$
iii) $(204)_5$ vi) $(131)_5$

31) Haddii t = toban, k = toban iyo kow, u rog sal toban :

i) $(t3kl)_{12}$ iv) $(281)_{12}$
ii) $(943)_{12}$ v) $(346)_{12}$
iii) $(109)_{12}$ vi) $(149)_{12}$

32) Soo saar wadartooda :

i) $(101)_2 + (1001)_2 + (111)_2$
ii) $(4321)_2 + (444)_2 + (3012)_2$
iii) $(tk19)_2 + (988)_2 + (k97)_2$

33) Tiro qudha ka dhig :

i) $(39t4)_{12} - (2kt5)_{12}$
ii) $(430)_5 + (213)_5 - (304)_5$
iii) $(1101)_2 - (1011)_2$
iv) $(tk9t)_{12} - (901)_{12}$

34) Isku dhufo :

i) $(101)_2 \times (11)_2$ iv) $(1204)_5 \times (102)_5$
ii) $(1001)_2 \times (101)_2$ v) $(t90k)_{12} \times (97)_{12}$
iii) $(4234)_5 \times (12)_5$ vi) $(ktkk)_{12} \times (19)_{12}$

35) Baabuur baa saacaddii jara 60 Km. Fogaan intee le'eg buu goynayaa $12\frac{1}{2}$ saacadood ?

36) Baabuur ayaa $2\frac{1}{4}$ saacadood u kala socdey Xamar iyo Jowhar oo 90 Km. isu jira. Waa imisa xawaaraha baabuurkaasi ?

37) Imisa saacadood ayuu ku qaadanayaa baabuurka xawaarihiisu yahay 20 mayl saacaddiiba, in uu ku gaaro meel 76 mayl jirta ?

38) Faras baa magaalo jirta 50 Km. ku gaadhay 2 saacadood, faras kalena magaaladii wuxuu ku gaadhay $2\frac{1}{2}$ saacadood. Labada faras xawaarahoodu intey is dheer yihiin ?

39) Banki baa dadka lacag dhigtay muddo toddobaad ah ay ahaayeen :

Sabti	Axad	Isniin	Salaasa	Arbaca	Khamiis	Jimce.
12	2	7	6	4	5	0

Ku muuji «garaaf» jiitimeed.

40) Magaalo ayaa roobkii helay sannadkii hore uu ahaa :

Jan.	Feb.	Maarso	Abriil	Mey	Juun	Luulyo	Agosto
110"	12"	18"	24"	28"	30"	26"	24"

Sebt.	Oktoobar	Nofembar	Diisambar.
21"	18"	11"	8"

Ku muuji «garaaf» xarriiqeed.

41) Wasaaradda Waxbarashada lacagteeda siday u bixisay baa hoos ku taal.
40% mushaharo, 25% buugag, 10% cuntada dugsiyada Hoyga, 15% xafiisyadeed, 5% dugsiyada hagaajintooda, 5% waxyaabo kale. Ku muuji «garaaf» goobo.

42) Ku muuji habka kullammada laydi :

i)

A	−4	−3	−2	−1	0	1	2	3	4
B	3	2	1	0	−1	−2	−3	−4	−5

ii) (1, 2), (2, 4), (3, 6), (4, 8), (5, 10), (6, 12), (7, 14).

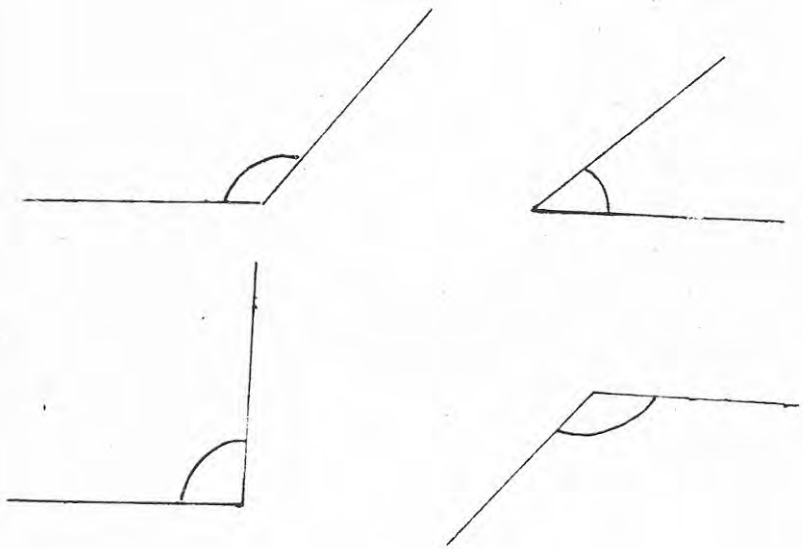
iii) (1, 5), (2, 9), (3, 13), (4, 17), (5, 21),

iv) (3, 3), (−4, 3), (4, 5), (6, 7), (8, 7).

43) Lammaane xaglo ah oo deris ahi ma noqon karaan lammaane xaglo ah oo foodsaar ah ?

44) i) Cabbir xaglahan :

ii) Guuri xaglaha.



45) Waa maxay :

i) Xaglo food saar ah.

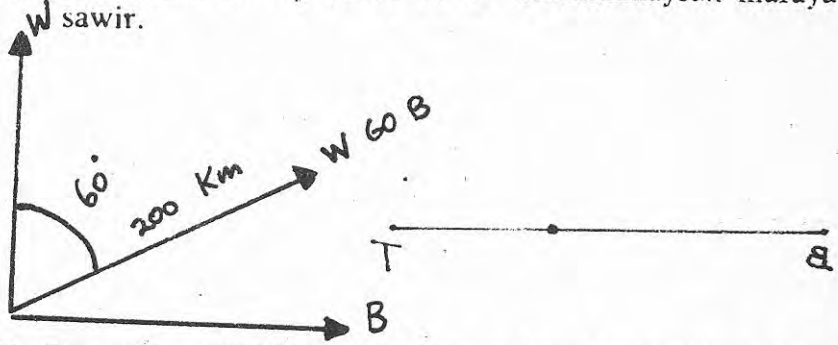
ii) Xagal qumman.

iii) **Xagal dacsan.**

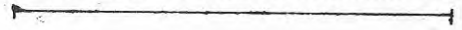
iv) Xaglo deris ah.

46) i) Samee xarriijin 6 sm. Dabadeedna kala badh.
ii) Samee xarriijin 4 hiish ah. Dabadeedna kala badh.

47) Qeotomaha xarriijinta ee barta calaamadaysan maraya sawir.



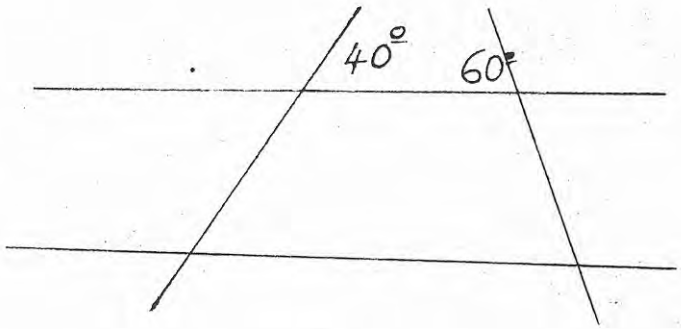
48) Qeotomaha xarriijinta hoos ku taal ee barta dibadda ku taal maraya sawir.



49) i) Sawir xagal 45° ah adoo isticmaalaya goobeeye iyo mastarad.

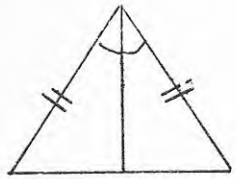
ii) Sawir xagal $22\frac{1^\circ}{2}$ ah adoo isticmaalaya goobeeye iyo mastarad.

50) Xaglaha aan cabbirkooda lagu siin raadi.

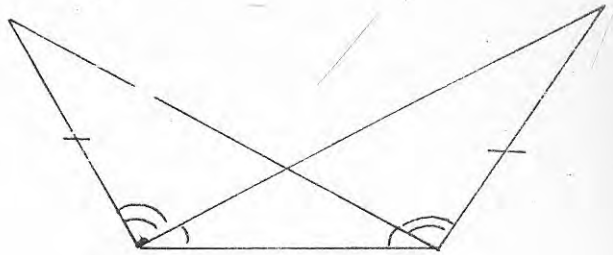


51) Jaantusyadan hoos ku yaal, saddexagallada wada sooda ma isku sargo'an yihiin ? Hadday haa tahay sheeg sababta :

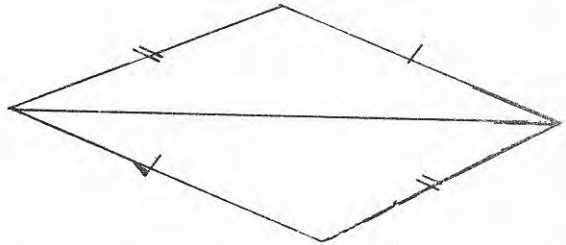
(i)



(ii)



(iii)



52) BTJX waa laydi. BT = 17 sm. TJ = 8 sm. Waa intee xaglogooyaha TX ?

53) KLMN waa laydi. KL = 12 sm. KM = 13 sm. Raadi KN ?

54) Sallaah ku tiirsan daaqad 8 m. dhulka ka sarraysa ayaa guntiisu u jirta 15 sm. gidaarka. Waa intee dhererka sallaanku ?

55) Waa maxay :

i) Saddexagal xagal fiiq ah
ii) » qumman.
iii) » xagal furan.
iv) » labaale ah.
v) » siman.

56) Adigoo goobeeye iyo mastarad isticmaalaya samee :

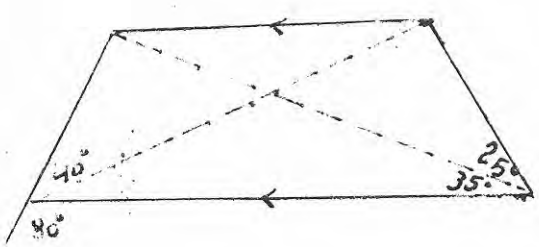
i) Xagal 60°

ii) Saddexagal siman.

57) Waa imisa xagal dibaddeeda saddexagal siman ?

58) Soo saar xaglaha maqan :

(i)



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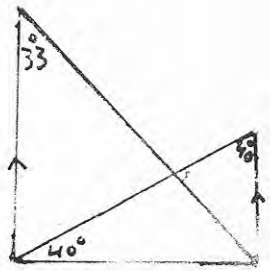


59) Samee labajibbaarane dhinacyisu yahay 3 sm.

60) i) Waa imisa cabbiraadda xagal gudeed kasta ee toddoba-geesle hufan ?

ii) Waa imisa cabbiraadda xagal gudeed kasta 5 geesle hufan ?

iii) Waa imisa cabbiraadda xagal gudeed kasta ee 10 geesle hufan ?

iv) Waa imisa cabbiraadda xagal gudeed kasta ee 12 geesle hufan ?

61) Raadi meeriska goobada gacankeedu yahay $3\frac{1}{2}$ sm.

62) Haddii gacanka shaagga baaskiilka Cabdullaahi uu yahay 42 hiish, intee fuudh buu socday marka uu shaaggu wareegay 10 goor.

63) Soo saar bedka goobada gacankeedu yahay 14 sm.

64) Raadi bedka goobada meeriskeedu yahay 220 m.

65) Soo saar bedka goobada dhexroorkeedu yahay 7 sm..

66) Raadi gacanka goobada bedkeedu yahay 420 m^2.

67) Raadi gacanka goobada bedkeedu yahay 1386 sm^2.

68) Raadi meeriska goobada bedkeedu yahay 616 $fuudh^2$.

69) Berkad, bedka salkeedu yahay 169 m^2., joogeeduna yahay 9 m. ayaa biyo ka buuxda. Waa imisa mugga biyaha berkada ku jiraa ?

70) Raadi mugga laydi malaasan oo cabbirka dhinacyadiisu yihiin, 12 sm., 8 sm. iyo 3 sm.

i) Raadi mugga laydi malaasan oo cabbirka dhinacyadiisu yihiin, 12 sm., 8 sm. iyo 3 sm.

ii) Sheeg jidka lagu helo mugga afar geesle malaasan.

71) i) Sheeg jidka lagu helo mugga dhululubo.

ii) Dhululubaa gacanka salkeedu yahay 4 m., joogeeduna yahay 7 m. Raadi mugga dhululubadaa.

72) Haddii dhululubo dhererkeedu yahay 14 sm. muggeedna yahay 704 sm^3. waa intee gacankeedu.

73) Soo saar B.

i) $B : 4 = 9 : 2$

ii) $6 : 4 = 9 : B$

iii) $1\frac{1}{2} : B = 1 : 3$

Laylisyo : NAQTIIN III.

1) Qor weedh tiro oo (b) run ah (t) been ah.

2) Waa maxay weedh furani ?

3) Kala sheeg weedh furan iyo odhaah.

4) Sheeg urur rumeedka weedhahan furan :

b) $6x + 3 = 27$

t) $2x - 3 = 15$

j) Isagu waa Madaxweyne ku xigeenka J.D.S.

x) $2 + x = 0$

5) Doorsoome iyo madoorsame maxay kala yihiin ?

6) Weedhan raadi urur **rumeedkeeda adigoo la kaashanaya** horaadka lagu siiyay.

b) $3x + 5 = 11$ $\quad D = \{1, 2, 3, \ldots . 20\}$

t) $4x + 5 - 6$ $\quad D =$ Tiro lakab.

j) $\frac{4}{x} = 7$ $\quad D =$ Abyooneyaal.

x) $3x + 5 = 17$ $\quad D = \{1, 2, 3, \ldots . 10\}$

kh) $4x = 5$ $\quad D =$ Tiro idil.

7) Goormay laba isle'eg isudhigmaan.

8) Lammaanayaashan isle'egyada ah kuwee baa isudhigma.

b) $7x + 2x = 13$ iyo $4x - 1 = 11$

t) $4x + 5 = 6$ » $7x + 7 = 18$

j) $2x - 30 = ?$ » $x + 7 = 22$

x) $\frac{3x}{2} = 6$ » $5x + 19 = 39$

kh) $x + 3 = 7$ » $x - 3 = 5$

9) Kala sheeg weedh tiro iyo weedh furan.
Ma dhici kartaa in weedh xisaabeed furan la helo? Keen tusaale.

10) Sheeg dhowr lammaane horsan oo run ka dhiga isle'egta : $2x + 3y = 7$

11) Dhammaystir lammaaneyaashan horsan si ay uga mid noqdaan urur rumeedka $3x + 2y = 40$.

(1,), (,5), (,17). (5,), (,9).

12) Furfur isle'egyadan wadajira :

b) $10x + 4y = 56$
$3x + 4y = 42$

t) $7x + 3y = 56$
$4x + 5y = 55$

j) $4x + 3y = 41$
$2x - 5y = 1$

x) $3f + 2d = 5$
$f - d = 5$

kh) $3x + y = 0$
$x + 2y = 1$

13) Laba tiro oo idil oo isku xiga ayay wadartoodu tahay 83. Sheeg labadaa tiro ?

14) Odaybaa ka weyn inankiisa 18 sano. Wadarta da'doodu waa 58. Waa imisa jir odaygu ?

15) 6 qalin iyo 10 mastaradood baan ku iibsan karaa 13 shilin, isla markaa 20 qalin iyo 12 mastaradood waxan ku iibsan karaa 22 shilin. Waa imisa qiimaha mastaraddu ?

16) Laydi baa wareeggiisu yahay 40 mitir. Dhererku wuxuu le'egyahay ballaadhkoo la afar laabay. Waa imisa dhererka laydigu ?

17) Fasal baa 29 arday ku jiraan. Gabadh baa fasalkii loo soo beddelay. Imika tirada wiilashu waa saddexlaabka tirada gabdhaha. Imisa wiil baa fasalka ku jira ?

18) Oday baa 18 sannadood ka weyn inankiisa. 20 sannadood dabadeed, saamiga da'da odayga iyo ta inanku waa 8 : 5. Waa imisa da'da odeygu iyo ta inankuba ?

19) Laba tiro oo kisi ah oo isku xiga bay wadartoodu tahay 64. Raadi labadaa tiro ?

20) Wadarta laba tiro waxay le'eg tahay faraqooda oo la afar laabay. Labanlaabka ka weyni wuxuu le'egyahay seddaxlaabka ka yar oo 4 loo geeyay. Raadi labada tiro.

21) Xadhig baa laba gobol loo kala jaray. Labada gobol midkood baa ka kale 6 mitir ka dheer, seddexlaabkiina ah. Gobol walba dhererkiisu waa imisa ?

22) Nin baa da'diisu tahay labanlaabka da'da wiilkiisa. 10 sannadood dabadeed, wiilka da'diisu waxay noqonaysaa intii da'da aabbihii ahayd 10 sannadood ka hor. Waa intee da'doodu imika ?

23) Tiro la seddexlaabay baa 3 dheer afarlaabka tiro kale. Labanlaabka tirada hore iyo saddexlaabka ta dambe ayaa isle'eg. Raadi labada tiro ?

24) Tiro labo god leh ayay tirada godka kowaad tahay seddexlaabka tirada godka tobnaad. Marka godadka la kala beddelo, tirada cusub ayaa 18 dheer tii hore. Raadi tirada.

25) Wareegga laydi waa 50 mitir, dhererkuna 4 mitir buu ka weyn yahay ballaca oo labanlaaban. Raadi ballaca laydiga.

26) 5 sannadood dabadeed wiil baa da'diisu noqonaysaa labanlaabka da'diisii afar sannadood horteed. Imika waa imisa jir wiilku ?

27) Fududee :

b) $a^3 b^2 \times a^4 b^3 \div a^6 b^7$

t) $a^2 \cdot a \cdot b \cdot c \div a^4 b^2$

j) $\left\{ (a^3 \div a^4) \div a^3 \right\} \cdot a^7$

x) $a^2 \cdot bc + ab^2 c$

kh) $(a^2 + ab)$

28) Fududee :

b) $\dfrac{3^4 \times 3^3}{2^3 \times 2^2}$

t) $\dfrac{2^3 \times 3}{2^2 \times 3^2}$

j) $\dfrac{5^4 \times 3^5}{5^3 \times 9^2}$

x) $\dfrac{4^2 \times 3^5}{2^5 \times 9^2}$

29) Fududee :

b) $(a^2 \cdot b^3)^2 \div a^3 b^2 c$

t) $(a^2 b^2 c^2 \div a^2 b^2 c)^4$

j) $\dfrac{(a^3 b^3 \div cd^4) \times (c^2 \cdot d^3)^4}{(a^2 b^3)^5 \div a^5 b^8}$

x) $\left\{ (a^2 b^3 c \div ab)^5 \div abc^2 \right\} \div a^6 b^{11} c^7$

kh) $a \cdot a \cdot a \cdot a \cdot b^2 \cdot c^2 \div a^3 b^2 c^2$

30) Soo saar taranta masalocyinka soo socda.

b) $(-b t^2) \cdot (4b^4 k^2)^3 s^3$

t) $(-4bt^2)^3 \times 8(bt)^2$

j) $(-k)^4 \cdot (k^2 r^2)^3 \cdot (-r)^3$

x) $(0.4 s^3 t^2)^3 \cdot (-0.3 s^2 t^5)^2$

31) Fududee :

b) $x^2 (x^3 + 5) + x^2 (x + 7)$

t) $4 b^2 t (b^3 t^4 - {}^2b^2 t + 4)$

32) Soo saar wadartooda :

b) $4x (3x + 4) - (11x^2 + 4x + s)$

t) $5 (3r - 2) - (4 + d)$

33) Taran kasta u qor sida ugu sahlan.

b) $(x + 4) \cdot (2x + 3)$

t) $(t + 6) \cdot (j + 4)$

34) Fududee :

b) $\dfrac{16x^2 + 4x}{2x}$

t) $\dfrac{2a - 5 + a^2 + a^3}{a + 2}$

j) $(4x^2 - 6x + x^3) \div (x - 2)$

x) $\dfrac{(2x + 4)^2 - (3x^2 + 32)}{x - 42}$

35) Raadi L.W.W. haltibixyada hoos ku qoran :

b) $48x^3y^3$ iyo $32x^2y^5$

t) $42x^2y^3w$; $28x^3y^2w^4$; $35x^5y^4w^3$

j) $72s^2t^3f^2$; $198s^3t^3f^3$; $54s^3t^2g^3$

x) $72s^2t^3f^4w^5$; $40s^3t^2w$

36) Raadi isirrada mutuxan ee :

b) 1008

t) 792

37) Haltibix kasta, raadi isirkiisi labaad :

b) $462x^2y^3 = 33^2y$ (. . . . . .)

t) $42x^2y^2w^5 = 14xy^2w^2$ (. . . . . .)

j) $\dfrac{1}{3}x^2y^2 = 5xy$ (. . . . . .)

x) $\dfrac{3}{5}xy^3 = \dfrac{4}{7}x^2y$ (. . . . . .)

38) Raadi isirrada haddii ay suurtowdo :

b) $x^2 + ab + bx + ax$

t) $m^2n + m^2 + 5n + 5m$

j) $x^3 - 21 - 3x^2 + 7x$

x) $7a^2 \cdot 8 + 98ab$

39) Raadi taranta :

b) $(x + \dfrac{1}{2})$ $(x - \dfrac{1}{2})$

t) $(3r - 7)$ $(3r + 7)$

x) $(5m - \dfrac{3}{7})$ $(5m + \dfrac{3}{7})$

40) Raadi isirrada :

b) $\dfrac{9}{16}x^2y^2 - 25$

t) $-64x^2 + 121y^2$

j) $\dfrac{1}{4}x^4y^2 - \dfrac{4}{9}$

x) $a^6b^4t^2 - 49x^2$

kh) $16x^2 - \dfrac{1}{36}$

41) Raadi isirrada, deetana hubi :

t) $7x^2 - 63y^2$

j) $144x^2 - 24x + 1$

x) $25 - 15x + 9x^2$

kh) $x^2 + 3x$

42) Raadi isirka maqan ee tibxaale kasta oo hoos ku qoran :

b) $x^4 + x^3 - 4x - 4$; isir $(x + 1)$

t) $x^6 - y^6$; isir $(x - 1)$

j) $b^2 + 3bt^2 + 3b^2t + t^3$; isir $(b + t)$

43) Qeex erayada soo socda :

b) Isir

t) Tibix

j) Tibaax

x) Tibix saabley ah

kh) Tibix toosan

d) Madoorsame

r) Doorsoome

s) Isireyn

sh) Seddextibix

44) Fududee jajabyadan adoo mid walba sheegaya qiimaha doorsoomuhu aanu qaadan karayn :

b) $\frac{2y}{7} \times \frac{14}{3y}$

t) $\frac{a - 4}{a + 2}$

j) $\frac{x^2 - 12x + 35}{2x - 14} \times \frac{x - 2}{x^2 - 5x}$

x) $\frac{(m + 1) \cdot (m^2 - 25)}{(m^2 + 6m + 5)}$

kh) $\frac{(t + 1)^2}{4t^2 + 8t + 4}$

45) Fududee xisaabahan hoos ku qoran :

b) $(x^2 + 4x + 4) \div (x^2 + 2x + 1)$

t) $(8 - 2a^2) \div (a^2 + a - 6)$

j) $(b^2 - 4b + 3) \div (b^2 - 3b)$

x) $(2x^2 - 128) \div (a^2 - 16a + 64)$

kh) $\left\{xy \div wt\right\}$

46) Ma run baa mise waa been :

b) Haddii laba saddexagal ay isku sargo'an yihiin, isla markaa way isu eg yihiin.

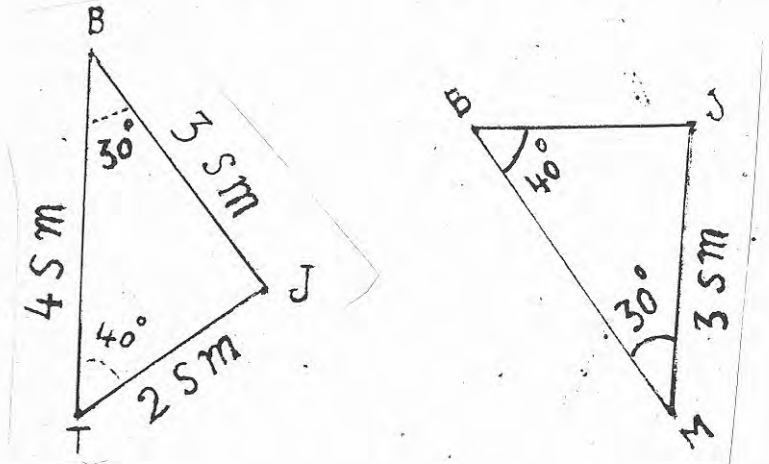
t) Haddii labo saddexagal isu eg yihiin, way isku sargo'an yihiin.

j) Haddii labo saddexagal oo qumman mid walba uu leeyahay xagal 40°, labada saddexagal way isu egyihiin.

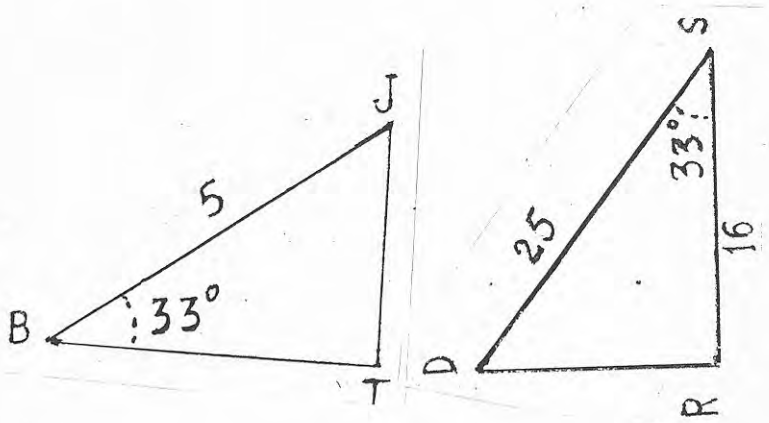
x) Laba saddexagal way isu eg yihiin haddii saamiga dhinacyadooda isku beegani ay isle'eg yihiin.

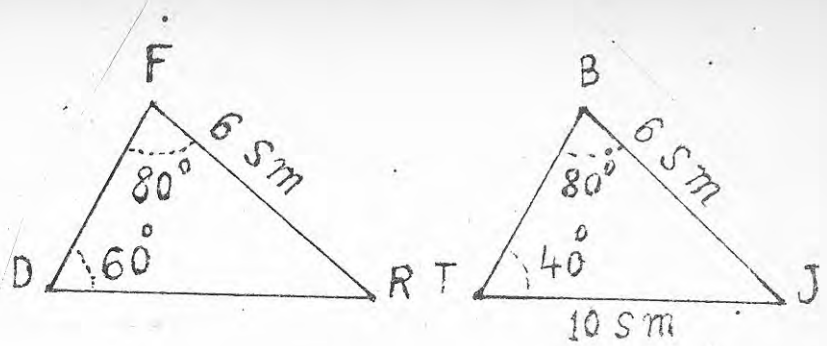
47) Lammaanayaashani saddexagallada ahi ma isu eg yihiin? Haddii ay haa tahay, raadi dhinacyada maqan :

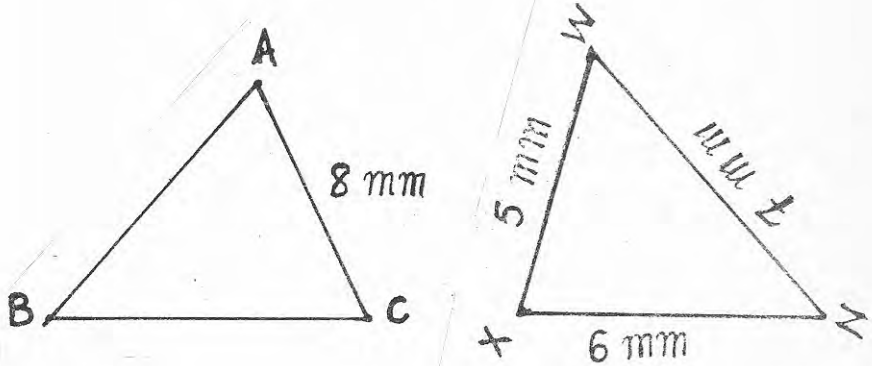
b.



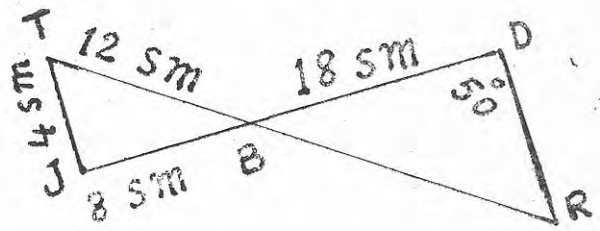
t.







kh.



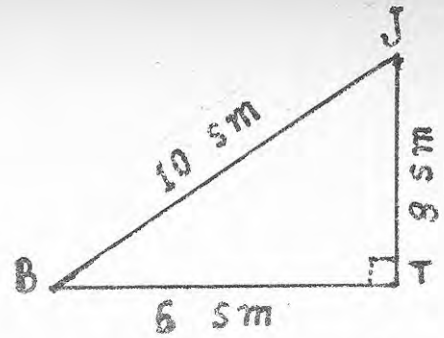
48) Raadi dhererka hadhka tiir dhererkiisu yahay 8 mitir, haddii isla ammintaa hadhka daar 20 mitir ah uu dhererkiisu yahay 30 mitir ?

49) Saddexagalka qumman ee hoos ku yaal, RT = 6 mitir, JT = 8 mitir, BJ = 10 mitir.
Raadi :

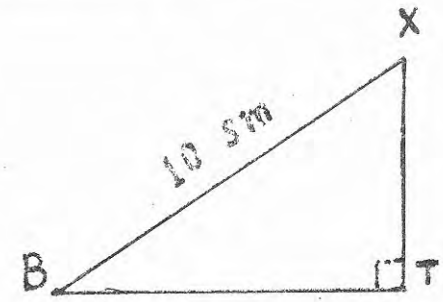
b) Tan < B

t) Sin < B

j) Cos < B



50) Shaxanka hoos ku yaal, haddii sin < B uu yahay 0.5000, waa intee dhererka XT ?



51) Sallaan 20 fdh. ah ayaa lagu tiiriyay gidaar jooggiisu yahay 12 fuudh. Haddii gunta sallaanku ay 16 fdh. u jirto gidaarkaa, raadi xagasha u dhaxaysa sallaanka iyo (b) dhulka (t) gidaarka.

Laylisyo : NAQTIIN IV

1) b) Maxaa hakadyada si aad ah loogu baahan yahay marka urur kutirsaneyaashiisu tirooyin yihiin la qorayo ?

t) Hakadyo ma loo baahan yahay marka aan haysanno urur kutirsaneyaashiisu ay taswiiro yihiin ?

2) Erayo ku tilmaan ururrada hoos ku yaal :

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

t) {b, d, r, g, l, m, n}

j) {Soomaaliya, Itoobiya, iyo Jabuuti}

x) {rag, dumar}

kh) {Hargeysa, Gabilay, Berbera, Boorama, Saylac}

d) {1, 3, 5, ...}

r) {1, 2, 3, 4, 6, 12}

s) {5, 10, 15, 20, ...}

sh) {Laascaanood, Eyl, Garoowe}

3) Tax kutirsaneyaasha ururradan :

b) Ururka gobollada J.D.S.

t) Ururka dhufsaneyaasha 3 ee ka yar 24.

j) Ururka mutuxannada 40 ka yar.

x) Ururka xoghayeyaasha J.D.S. ee ku jira G.S.K.

kh) Ururka ardayda fasalkaaga ee safka hore fadhiista.

d) Ururka afafka aad dugsiga ku dhigatid.

r) Ururka tirooyinka idil ee 10 le'eg ama ka yar.

s) Ururka tirsiimo ee toban ka yar.

sh) Ururka abyooneyaasha togan ee toban ka yar.

dh) Ururka maalmaha todobaadka ee shaqal ka bilowda.

4) Waa maxay urur madhani ? Kuwee baa urur madhan ah.

b) Ururka Madaxweynayaasha J.D.S. ee 90 jir ah.

t) Ururka isirrada saddex ee 2 ka yar.

j) Ururka geela J.D.S. ee laba kurus leh.

x) { 0 }

5) Urur kasta oo hoos ku yaal, sheeg inta kutirsane ee uu leeyahay.

b) {1, 2}

t) { }

j) { o }

x) { 115 }

kh) {0, 13, 0.005}

6) Haddii labo dhinac oo laydi ay isku sargo'an yihiin, ma odhan karnaa way isle'eg yihiin ?

7) Ma run baa mise waa been.

b) Boosaaso = Xarunta Gobolka Bari ee J.D.S.

t) Jabuuti = Xarunta dalka Soomaaliyeed ee Faransiisku gumeysto.

j) Xamar = Magaalo ku taal Dalka J.D.S.

x) Madaxweyne = Siyaad

kh) $\frac{4 + 6}{2} = 1 + 4$

8) Waa maxay labo urur baa isudhigma ? Ma isudhigmaan lammaanka ururrada ahi ?

b) $\{b, t, j, r\}$, $\{1, 0, 10, \frac{5}{7}\}$

t) $\{0\}$, $\{41, \frac{1}{2}\}$

j) $\{\{\quad\}, \{0\}, \{1\}, \{0, 1\}\}$ iyo $\{\text{Cali, Cumar, Axmed, Cabdi}\}$

9) Raadi hormooyinka ururradan :

b) $\{5, 7\}$

t) $\{b, t, x\}$

10) Raadi isutagga ururradan :

b) $\{2, 3, 5, 6\}$ iyo $\{3, 5, 7, 8\}$

t) $\{0\}$ iyo $\{1\}$

j) $\{5, 6, 7, 8\}$ iyo $\varnothing$

x) $\{5, 6, 7, 8\}$ iyo $\{6, 7\}$

kh) A = ururka tirsiimada ee 5 ka yar iyo ururka tirooyinka idil ee 9 ka yar.

11) Raadi dhextaalka ururradan.

b) Ururka isirrada 80 iyo ururka isirrada 64

t) $\{b, t, j, x\}$, $\{j, l, 2, b\}$

j) $\{1,2,3,4,5,6,7,8,9,10\}$ iyo $\{2,4,6,8,10,12,14,16,18\}$

12) Ka shaqee masalooyinka hoos ku yaal haddii

B $\{1, 2, 3, 4, 5\}$, T = $\{0, 1, 3, 5, 7, 9, 11\}$

iyo J = $\{0\}$

b) B $\cap$ T

t) B $\cup$ J

j) (T $\cap$ B) $\cup$ J

x) (T $\cap$ B) $\cap$ J

kh) (B $\cup$ T) $\cap$ J

13) Waa maxay :

t) Urur duleed

b) Urur guud

j) Dhextaal urur

x) Isutag urur.

14) Furfur isle'egyadan soo socda :

i) $|x| + 2|x| = 9$ iv) $|x| + |-7| = 7$

ii) $|x| - 4 = 0$ v) $|x| - |-5| = 8$

iii) $\left|\frac{x}{2}\right| + 3|x| = 14$

15) **Samee** xarriiq tiro, dabadeedna ku muuji tirocyinka soo socda :

i) -3

ii) $-2\frac{1}{2}$

iii) $2\frac{1}{2}$

iv) 4

16) Sawir sallax kaartis, dabadeedna ku muuji baraha kulannadocda lagu siiyay :

b) $(-1, 3)$ d) $(-1, 0)$

t) $(2, 3)$ r) $(0, 1)$

j) $(4, -5)$ s) $(7, 0)$

x) $(-3, -6)$ sh) $(0, 5)$

kh) $(3, 7)$ dh) $(-7, 6)$

17) Samee garaafka isle'egyada toosan ee hoos ku yaal :

b) $y = x$ d) $x = 3$

t) $y = 2x + 3$ r) $y = -5$

j) $y = \frac{1}{2}x - 5$ s) $y = 2$

x) $y = \frac{2}{3}x + 4$ sh) $x = -1$

kh) $x - y = 3$ dh) $x + y = 0$

18) Furfur isle'egyadan wadajira adoo isticmaalaya habka garaafka.

b) $y = 2x + 3$
$y = x + 1$

j) $2x - y = 0$
$x = 3$

t) $x + y = 0$
$x - 2y = 3$

x) $x - y = 0$
$x + y = 0$

19) Qeex :

b) Tiiro

t) Tikraar

j) Madoorsoome

x) Kulan

20) Adoo isticmaalaya jidka tiirada, raadi tiirada isle'egyadan toosan.

b) $x + y = 0$

t) $x - y = 0$

j) $4x - y = 5$

x) $4x + y = 5$

kh) $4x + 2y = 5$

21) Korka ka sheeg tiirada isle'egyadan toosan :

b) $y = 3x + 5$

t) $y = -5x + 6$

j) $2y = -4x - 3$

x) $3y = 2x + 9$

kh) $-6y = 4x - 12$

22) Raadi tikraarka isle'egyadan toosan :

b) $2x + 3y = 6$

t) $5x - 8y = 4$

23) Raadi isle'egta xarriiqda toosan ee tiiradeedii iyo bar ku jirta laguu sheegay.

b) (5, 10) . . . . . m = 2

t) (2, 11) . . . . . n = 3

24) Raadi isle'egta xarriiqda toosan ee marta baraha kulannadoocda lagu siiyay.

b) (−2, 4); (2, −1)

t) (4, 0); (0, 2)

25) Raadi isirradda tibaax kasta :

b) $12x^2 - 8x - 15$

t) $m^2 + 2mn - 360n^2$

j) $s^4 - 4s^2$

x) $81y^3 - 9y^5$

kh) $4 - 12s + 9s^2$

26) Furfur :

b) $(x + 2)(x - 3) = 0$

t) $(2x - 1)(3x + 4) = 0$

j) $x^2 - 25 = 0$

x) $y^4 - 9y^2 = 0$

kh) $x(x + 1)(x + 3) = 0$

27) Furfur isle'egyada saabley adoo la kaashanaya isireyn.

b) $x^2 - 7x - 8 = 0$

t) $x(x + 1) + (x + 2)(x + 3) = 42$

j) $21b^3 - 12b^2 - 9b = 0$

x) $x^2 + 4 = 5x$

kh) $x^2 - 14x + 24 = 0$

28) Furfur isle'egyadan adoo isticmaalaya jidka isle'egta saabley.

b) $6x^2 - 7x - 3 = 0$

t) $3x^2 - 7x + 4 = 0$

j) $2x^2 - 9x + 9 = 0$

x) $x^2 - 17x + 16 = 0$

kh) $4x^2 + 5x = 26$

29) Furfur isle'egyadan, dabadeedna hubi :

b) $\frac{3}{8x^2} - \frac{5}{4x} + 1 = 0$

t) $\frac{1}{2} - \frac{1}{t} - \frac{4}{t^2} = 0$

30) Wadarta tiro iyo labajibbaarkeeda ayaa ah 56. Raadi tirada ?

31) Bed laydi ayaa ah 100 mitir oo labajibbaaran. Ballacu 15 mitir buu dhererka ka yar yahay. Raadi ballaca iyo dhererka laydiga.

32) Raadi labada abyoone ee isku xiga ee wadarta labajibbaarkoodu tahay 61.

33) Laydi baa dhererkiisu ka weyn yahay afarlaabka ballaciisa 3 sm. Bedkiisu waa 10 sm^2. Raadi aaddimihiisa.

34) Da'da Cali waa labajibbaarka da'da Xaawa. 8 sannadood kaddib, da'da Cali waxay noqonaysaa da'da Xaawa oo la labanlaabay. Cali waa imisa jir hadda ?

35) Labajibbaarka abyoone oo la labanlaabay baa 3 ka yar 7 laabka abyoonahaa. Raadi abyoonaha.

36) Raadi aaddimaha saddexagalka bedkiisu yahay 42 sm . haddii wadarta jooggiisa iyo salkiisu ay yihiin 19 sm^2.

37) Wadarta labajibbaarka laba abyoone togan oo isku xiga ayaa ah 100. Raadi abyooneyaashaa ?

38) Wadarta tiro iyo labajibbaarkeeda oo la labanlaabay waa 78. Raadi tirada ?

39) Faraqa dhererka iyo ballaca laydi waa 8 sm. bedkiisuna waa 105 sm^2. Raadi dhererkiisa iyo ballaciisa.

40) Raadi joogga iyo salka saddexagal haddii wadartoodu tahay 18 sm. bedkiisuna yahay 40 sm^2.

41) Tirada u qoran qormo saynis maxay kaga duwan tahay tirada caadiga ah ?

42) U qor qormo Saynis tirooyinka hoos ku qoran :

b) 14.32

t) 247.8

j) 0.00003214

x) 3.413

kh) 7789000

43) Ka shaqee xisaabaha hoos ku qoran :

b) $(1.008 \times 10^{-5})\ (3.3 \times 16^{6})$

t) $(4.96 \times 10^{-2})\ (8.2 \times 10^{-5})$

j) $(4.824 \times 10^{-3}) \div (9.648 \times 10^{-5})$

x) $(1.421 \times 10^{5}) \div (3.5 \times 10^{-5})$

kh) $(5.2 \times 10^{-5})\ (7.5 \times 10^{8})$

44) Ka dhig tiro sansaanta jajab tobanle u qoran :

b) 4.052×10^{-3}

t) 3.412×10^{5}

45) Raadi Logardamka tirooyinkan adigoon tuse isticmaalayn :

b) 1

t) 0.01

j) 1000

x) $\frac{1}{10}$

kh) 1,000,000,000

46) Raadi abyanka Logardamka ee

b) 4234

t) 0.000047689

j) 4.678

x) 1000

kh) 29.13

47) Adigoo la kaashanaya tusaha Logardamka, raadi qurubka tirooyinkan :

b) 4.123

t) 2000

j) 41.34

x) 47.47

kh) 0.0007219

48) Raadi Logardamka tirooyinka hoos ku qoran :

b) 0.4342

t) 0.0001542

j) 423.1

x) $(44.3)^{3}$

kh) $\sqrt{1.48}$

49) Haddii Log 3 = 0.4771, Log 5 = 0.6990 iyo Log 7 = 0.8451, raadi Logardamka tirooyinkan adigoon isticmaalayn tuse Log.

b) 350

t) 225

x) $\sqrt{147}$

kh) $\sqrt{(735)^{3}}$

50) Raadi Logardamka tirooyinkan :

b) $\dfrac{86 \times 0.45}{57.4}$

t) $\dfrac{48.7}{(83.8)\quad(3.14)}$

j) $\dfrac{\sqrt{34.7}}{2.981}$

x) $\dfrac{57.26}{\sqrt[3]{0.382}}$

TUSE

SAYN KOSAYN TAANJANT

A°	SIN A	COS A	TAN A	A°	SIN A	COS A	TAN A
1	0.0175	0.9998	0.0175	45	0.7071	0.7071	1.0000
2	0.0349	0.9994	0.0349	46	0.7193	0.6947	1.0355
3	0.0323	0.9986	0.0524	47	0.7314	0.6820	1.0724
4	0.0698	0.9976	0.0699	48	0.7431	0.6691	1.1106
				49	0.7547	0.6561	1.1504
5	0.0872	0.9962	0.0875	50	0.7660	0.6428	1.1918
6	0.1045	0.9945	0.1051	51	0.7771	0.6293	1.2349
7	0.1219	0.9925	0.1228	52	0.7880	0.6157	1.2799
8	0.1392	0.9903	0.1405	53	0.7986	0.6018	1.3270
9	0.1564	0.9877	0.1584	54	0.8090	0.5878	1.3764
10	0.1736	0.9848	0.1763	55	0.8192	0.5736	1.4281
11	0.1908	0.9816	0.1944	56	0.8290	0.5592	1.4826
12	0.2079	0.9781	0.2126	57	0.8387	0.5446	1.5399
13	0.2250	0.9744	0.2309	58	0.8480	0.5299	1.6003
14	0.2419	0.9703	0.2493	59	0.8572	0.5150	1.6643

A°	SIN A	COS A	TAN A	A°	SIN A	COS A	TAN A
15	0.2588	0.9659	0.2679	60	0.8660	0.5000	1.7321
16	0.2756	0.9613	0.2867	61	0.8746	0.4848	1.8040
17	0.2924	0.9563	0.3057	62	0.8829	0.4695	1.8807
18	0.3090	0.9511	0.3249	63	0.8910	0.4540	1.9626
19	0.3256	0.9455	0.3443	64	0.8988	0.4384	2.0503
20	0.3420	0.9397	0.3640	65	0.9063	0.4226	2.1445
21	0.3584	0.9336	0.3839	66	0.9135	0.4067	2.2460
22	0.3746	0.9272	0.4040	67	0.9205	0.3907	2.3559
23	0.3907	0.9205	0.4245	68	0.9272	0.3746	2.4751
24	0.4067	0.9135	0.4452	69	0.9336	0.3584	2.6051
25	0.4226	0.9063	0.4663	70	0.9397	0.3420	2.7475
26	0.4384	0.8988	0.4877	71	0.9455	0.3256	2.9042
27	0.4540	0.8910	0.5095	72	0.9511	0.3090	3.0777
28	0.4695	0.8829	0.5317	73	0.9563	0.2924	3.2709
29	4848	8746	5543	74	9613	2756	3.4874
30	0.5000	0.8660	0.5774	75	0.9659	0.2588	3.7321
31	0.5150	0.8572	0.6000	76	0.9703	0.2419	4.0108
32	0.5299	0.8480	0.6249	77	0.9744	0.2250	4.3315
33	0.5446	0.8387	0.6494	78	0.9781	0.2079	4.7046
34	0.5592	0.8290	0.6745	79	0.9816	0.1908	5.1446
35	0.5736	0.8192	0.7002	80	0.9848	0.1736	5.6713
36	0.5878	0.8090	0.7265	81	0.9877	0.1564	6.3138
37	0.6018	0.7986	0.7536	82	0.9903	0.1392	7.1154
39	0.6293	0.7771	0.8098	84	0.9945	0.1045	9.5144
40	0.6428	0.7660	0.8391	85	0.9962	0.0872	11.4301
41	0.6561	0.7547	0.8693	96	0.9976	0.0698	14.3007
42	0.6691	0.7431	0.9004	87	0.9986	0.0523	19.0811
43	0.6820	0.7314	0.9325	88	0.9994	0.0349	28.6363
44	0.6947	0.7193	0.9657	89	0.9998	0.0175	57.2900

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11	·0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	4	8	11	15	19	23	26	30	34
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13	·1139	1173	1206	1239	1271	1303	1335	1367	1399	1430	3	6	10	13	16	19	23	26	29
14	·1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	3	6	9	12	15	18	21	24	27
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16	·2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	3	5	8	11	13	16	18	21	24
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18	·2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	2	5	7	9	12	14	16	19	21
19	·2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	2	4	7	9	11	13	16	18	20
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72	·8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	2	3	4	4	5	5
73	·8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	2	3	4	4	5	5
74	·8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	2	3	4	4	5	5
75	·8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	·8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	5	5
77	·8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	1	2	2	3	3	4	4	5
78	·8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	·8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	1	2	2	3	3	4	4	5
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81	·9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	·9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	·9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	·9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	·9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	·9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	1	1	2	3	3	4	4	5
87	·9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	·9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	·9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	·9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	·9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	·9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	·9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4
94	·9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	·9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	·9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	·9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	·9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	0	1	1	2	2	3	3	4	4
99	·9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	0	1	1	2	2	3	3	3	4
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

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·00	1000	1002	1005	1007	1009	1012	1014	1016	1019	1021	0	0	1	1	1	1	2	2	2
·01	1023	1026	1028	1030	1033	1035	1038	1040	1042	1045	0	0	1	1	1	1	2	2	2
·02	1047	1050	1052	1054	1057	1059	1062	1064	1067	1069	0	0	1	1	1	1	2	2	2
·03	1072	1074	1076	1079	1081	1084	1086	1089	1091	1094	0	0	1	1	1	1	2	2	2
·04	1096	1099	1102	1104	1107	1109	1112	1114	1117	1119	0	1	1	1	1	2	2	2	2
·05	1122	1125	1127	1130	1132	1135	1138	1140	1143	1146	0	1	1	1	1	2	2	2	2
·06	1148	1151	1153	1156	1159	1161	1164	1167	1169	1172	0	1	1	1	1	2	2	2	2
·07	1175	1178	1180	1183	1186	1189	1191	1194	1197	1199	0	1	1	1	1	2	2	2	2
·08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0	1	1	1	1	2	2	2	3
·09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0	1	1	1	1	2	2	2	3
·10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0	1	1	1	1	2	2	2	3
·11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0	1	1	1	2	2	2	2	3
·12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0	1	1	1	2	2	2	2	3
·13	1349	1352	1355	1358	1361	1365	1368	1371	1374	1377	0	1	1	1	2	2	2	3	3
·14	1380	1384	1387	1390	1393	1396	1400	1403	1406	1409	0	1	1	1	2	2	2	3	3
·15	1413	1416	1419	1422	1426	1429	1432	1435	1439	1442	0	1	1	1	2	2	2	3	3
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·17	1479	1483	1486	1489	1493	1496	1500	1503	1507	1510	0	1	1	1	2	2	2	3	3
·18	1514	1517	1521	1524	1528	1531	1535	1538	1542	1545	0	1	1	1	2	2	2	3	3
·19	1549	1552	1556	1560	1563	1567	1570	1574	1578	1581	0	1	1	1	2	2	3	3	3
·20	1585	1589	1592	1596	1600	1603	1607	1611	1614	1618	0	1	1	1	2	2	3	3	3
·21	1622	1626	1629	1633	1637	1641	1644	1648	1652	1656	0	1	1	2	2	2	3	3	3
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·25	1778	1782	1786	1791	1795	1799	1803	1807	1811	1816	0	1	1	2	2	2	3	3	4
·26	1820	1824	1828	1832	1837	1841	1845	1849	1854	1858	0	1	1	2	2	3	3	3	4
·27	1862	1866	1871	1875	1879	1884	1888	1892	1897	1901	0	1	1	2	2	3	3	3	4
·28	1905	1910	1914	1919	1923	1928	1932	1936	1941	1945	0	1	1	2	2	3	3	4	4
·29	1950	1954	1959	1963	1968	1972	1977	1982	1986	1991	0	1	1	2	2	3	3	4	4
·30	1995	2000	2004	2009	2014	2018	2023	2028	2032	2037	0	1	1	2	2	3	3	4	4
·31	2042	2046	2051	2056	2061	2065	2070	2075	2080	2084	0	1	1	2	2	3	3	4	4
·32	2089	2094	2099	2104	2109	2113	2118	2123	2128	2133	0	1	1	2	2	3	3	4	4
·33	2138	2143	2148	2153	2158	2163	2168	2173	2178	2183	0	1	1	2	2	3	3	4	4
·34	2188	2193	2198	2203	2208	2213	2218	2223	2228	2234	1	1	2	2	3	3	4	4	5
·35	2239	2244	2249	2254	2259	2265	2270	2275	2280	2286	1	1	2	2	3	3	4	4	5
·36	2291	2296	2301	2307	2312	2317	2323	2328	2333	2339	1	1	2	2	3	3	4	4	5
·37	2344	2350	2355	2360	2366	2371	2377	2382	2388	2393	1	1	2	2	3	3	4	4	5
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·40	2512	2518	2523	2529	2535	2541	2547	2553	2559	2564	1	1	2	2	3	4	4	5	5
·41	2570	2576	2582	2588	2594	2600	2606	2612	2618	2624	1	1	2	2	3	4	4	5	5
·42	2630	2636	2642	2649	2655	2661	2667	2673	2679	2685	1	1	2	2	3	4	4	5	6
·43	2692	2698	2704	2710	2716	2723	2729	2735	2742	2748	1	1	2	3	3	4	4	5	6
·44	2754	2761	2767	2773	2780	2786	2793	2799	2805	2812	1	1	2	3	3	4	4	5	6
·45	2818	2825	2831	2838	2844	2851	2858	2864	2871	2877	1	1	2	3	3	4	5	5	6
·46	2884	2891	2897	2904	2911	2917	2924	2931	2938	2944	1	1	2	3	3	4	5	5	6
·47	2951	2958	2965	2972	2979	2985	2992	2999	3006	3013	1	1	2	3	3	4	5	5	6
·48	3020	3027	3034	3041	3048	3055	3062	3069	3076	3083	1	1	2	3	4	4	5	6	6
·49	3090	3097	3105	3112	3119	3126	3133	3141	3148	3155	1	1	2	3	4	4	5	6	6
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

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·50	3162	3170	3177	3184	3192	3199	3206	3214	3221	3228	1	1	2	3	4	4	5	6	7
·51	3236	3243	3251	3258	3266	3273	3281	3289	3296	3304	1	2	2	3	4	5	5	6	7
·52	3311	3319	3327	3334	3342	3350	3357	3365	3373	3381	1	2	2	3	4	5	5	6	7
·53	3388	3396	3404	3412	3420	3428	3436	3443	3451	3459	1	2	2	3	4	5	6	6	7
·54	3467	3475	3483	3491	3499	3508	3516	3524	3532	3540	1	2	2	3	4	5	6	6	7
·55	3548	3556	3565	3573	3581	3589	3597	3606	3614	3622	1	2	2	3	4	5	6	7	7
·56	3631	3639	3648	3656	3664	3673	3681	3690	3698	3707	1	2	3	3	4	5	6	7	8
·57	3715	3724	3733	3741	3750	3758	3767	3776	3784	3793	1	2	3	3	4	5	6	7	8
·58	3802	3811	3819	3828	3837	3846	3855	3864	3873	3882	1	2	3	4	4	5	6	7	8
·59	3890	3899	3908	3917	3926	3936	3945	3954	3963	3972	1	2	3	4	5	5	6	7	8
·60	3981	3990	3999	4009	4018	4027	4036	4046	4055	4064	1	2	3	4	5	6	6	7	8
·61	4074	4083	4093	4102	4111	4121	4130	4140	4150	4159	1	2	3	4	5	6	7	8	9
·62	4169	4178	4188	4198	4207	4217	4227	4236	4246	4256	1	2	3	4	5	6	7	8	9
·63	4266	4276	4285	4295	4305	4315	4325	4335	4345	4355	1	2	3	4	5	6	7	8	9
·64	4365	4375	4385	4395	4406	4416	4426	4436	4446	4457	1	2	3	4	5	6	7	8	9
·65	4467	4477	4487	4498	4508	4519	4529	4539	4550	4560	1	2	3	4	5	6	7	8	9
·66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	2	3	4	5	6	7	9	10
·67	4677	4688	4699	4710	4721	4732	4742	4753	4764	4775	1	2	3	4	5	7	8	9	10
·68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	2	3	4	6	7	8	9	10
·69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	2	3	5	6	7	8	9	10
·70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	2	4	5	6	7	8	9	11
·71	5129	5140	5152	5164	5176	5188	5200	5212	5224	5236	1	2	4	5	6	7	8	10	11
·72	5248	5260	5272	5284	5297	5309	5321	5333	5346	5358	1	2	4	5	6	7	9	10	11
·73	5370	5383	5395	5408	5420	5433	5445	5458	5470	5483	1	3	4	5	6	8	9	10	11
·74	5495	5508	5521	5534	5546	5559	5572	5585	5598	5610	1	3	4	5	6	8	9	10	12
·75	5623	5636	5649	5662	5675	5689	5702	5715	5728	5741	1	3	4	5	7	8	9	10	12
·76	5754	5768	5781	5794	5808	5821	5834	5848	5861	5875	1	3	4	5	7	8	9	11	12
·77	5888	5902	5916	5929	5943	5957	5970	5984	5998	6012	1	3	4	5	7	8	10	11	12
·78	6026	6039	6053	6067	6081	6095	6109	6124	6138	6152	1	3	4	6	7	8	10	11	13
·79	6166	6180	6194	6209	6223	6237	6252	6266	6281	6295	1	3	4	6	7	9	10	11	13
·80	6310	6324	6339	6353	6368	6383	6397	6412	6427	6442	1	3	4	6	7	9	10	12	13
·81	6457	6471	6486	6501	6516	6531	6546	6561	6577	6592	2	3	5	6	8	9	11	12	14
·82	6607	6622	6637	6653	6668	6683	6699	6714	6730	6745	2	3	5	6	8	9	11	12	14
·83	6761	6776	6792	6808	6823	6839	6855	6871	6887	6902	2	3	5	6	8	9	11	13	14
·84	6918	6934	6950	6966	6982	6998	7015	7031	7047	7063	2	3	5	6	8	10	11	13	15
·85	7079	7096	7112	7129	7145	7161	7178	7194	7211	7228	2	3	5	7	8	10	12	13	15
·86	7244	7261	7278	7295	7311	7328	7345	7362	7379	7396	2	3	5	7	8	10	12	13	15
·87	7413	7430	7447	7464	7482	7499	7516	7534	7551	7568	2	3	5	7	9	10	12	14	16
·88	7586	7603	7621	7638	7656	7674	7691	7709	7727	7745	2	4	5	7	9	11	12	14	16
·89	7762	7780	7798	7816	7834	7852	7870	7889	7907	7925	2	4	5	7	9	11	13	14	16
·90	7943	7962	7980	7998	8017	8035	8054	8072	8091	8110	2	4	6	7	9	11	13	15	17
·91	8128	8147	8166	8185	8204	8222	8241	8260	8279	8299	2	4	6	8	9	11	13	15	17
·92	8318	8337	8356	8375	8395	8414	8433	8453	8472	8492	2	4	6	8	10	12	14	15	17
·93	8511	8531	8551	8570	8590	8610	8630	8650	8670	8690	2	4	6	8	10	12	14	16	18
·94	8710	8730	8750	8770	8790	8810	8831	8851	8872	8892	2	4	6	8	10	12	14	16	18
·95	8913	8933	8954	8974	8995	9016	9036	9057	9078	9099	2	4	6	8	10	12	15	17	19
·96	9120	9141	9162	9183	9204	9226	9247	9268	9290	9311	2	4	6	8	11	13	15	17	19
·97	9333	9354	9376	9397	9419	9441	9462	9484	9506	9528	2	4	7	9	11	13	15	17	20
·98	9550	9572	9594	9616	9638	9661	9683	9705	9727	9750	2	4	7	9	11	13	16	18	20
·99	9772	9795	9817	9840	9863	9886	9908	9931	9954	9977	2	5	7	9	11	14	16	18	20
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9