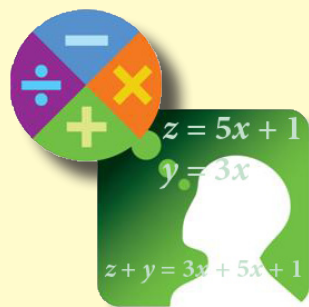


Cutubka

2 aad



FAAHFAAHINTA SHAQADA DOORSOOME YAASHA

UJEEDDOOYINKA CUTUBKA

Cutubkani marka uu dhamaado ardaydu waxay awoodi doonaan:

- Xalinta masalooyinka idinkoo adeegsanaya doorsoomeyaasha.
- Iskudhufashada laba tibxaalaha iyo hal tibixlaha iyo raadinta taranta laba tibxaaleyaasha
- Raadita isiweynaha ay wadaagaan tibaaxaha aljebraad.

TUSMOOYINKA MUHIMKA AH

- 2.1 Faahfaahinta tibxaha aljebraada iyo tibaaxaha
- 2.2 Iskudhufashada laba tibxaaleyaasha
- 2.3 Isir weynaha ay wadaagaan.

Furaha Tibxaha

Sookoobida Cutubka

Nakhtiinka layliska

Qeexid 2.1 *Horgaluhu waa taranta tirooyin iyo sumada xarfaha, taas oo lagu dhufto isir kasta oo lagu siiyey.*

Qeexid 2.2 *Tirada horgalaha ee tibaaxaha aljebraada, waa tirada isirka ee ka muuqata tibaaxaha aljebraad.*

Qeexid 2.3 *Isir waa dhufsanaha ay sameeyaan taranta laba xaddi ama in ka badan.*

Hawl-galka 2.2

Dhammaystir shaxda soo socota adigoo caddeynaya nooca tibaaxaha aljabreed sida hal tibixle, laba tibixle, iyotibxaale.

| | | | | | | |
|----------------------------|-------------|-------|---------------|-----------|-------------|-----------|
| Tibaaxaha aljebraad | x | x^2 | $x^3 + 8xy^2$ | $12x + 5$ | $x + y + z$ | $3x - 5y$ |
| Nooca | Hal tibixle | | | | | |

Qeexid 2.4 *Hal tibixle, waa tibaax aljabreed oo leh hal tibix.*

Laba tibixle waa tibaax aljabreed oo leh laba tibixood.

Tusaale, ahaan hal tibixlaha $3x^2y$, horgalaha x^2 waa $3y$, horgalaha y waa $3x^2$ sidoo kale tirada horgaluhuna waa 3.

Laylis 2.1

1 Caddee keebaa tibaaxaha aljebraad ee soo soosocda ah hal tibixle kuwee ah laba tibixle iyo keebaan labada midna ahayn. Sidookale waxaad caddeysaa tibaaxaha

b xy **t** $\sqrt{x+y}$ **j** $x + \sqrt{x+y}$ **x** $x + y + z$

kh $\frac{xy}{x+y}$ **d** $x(x+y)$ **r** $x^2 + y^2$ **s** $xy + xz + yz$

2 Sheeg tirada horgalaha tibaaxaha aljebraad ee soo socda.

b $3xy$ **t** $-x$ **j** x^3y **x** $\frac{2}{5}xz$

3 Raadi horgalayaasha mid kasta oo isirada lagu siiyey ka midah, sida ay tilmaamayaan tibaaxaha aljebraad.

b xy iyo $3xy^2$ **t** xz^2 iyo $-3xy^2z^3$

j xy^2 iyo $-5x^4y^3z^2$

2.1.1 Isticmaalka doorsoomeyaasha qaaciido ahaana

Waligaa ma isticmaashay qaaciido? ma xusuusan kartaa joometariga ama sayniskaba? Waa maxay qaaciido?

Haddaba, si aan u fahano macnaha qaaciidada iyo ka shaqeysiinteeda waa inaynu isku daynaa qabashada shaqo koo xeedke soo socda.

Shaqo-kooxeedka 2.1

1 Qora, kana dooda qaaciidooyinka aad taqaanaan ee xisaabta, ama maadooyinka kale. Sida qaaciidada bedka, mugga, heerkulka, i.w.m ah.

Sidoo kale waxaad ka doodaan sida qaacidadu shaqaysi.

2 Qaaciidadan joometariga Hooskuqoran N , waxay utaagan tahay tirada xaglo gooyeyaasha geesoole, dhinacyadiisu yihiin “ n ” sidan la inagu siiyey, haddaba $N = \frac{n(n-3)}{2}$. Markaa dhamaystir shaxdan.

| | | | | |
|---------------------------------|---|---|----|----|
| Tirada dhinacyada | 4 | 6 | 10 | 20 |
| Tirada xaglo jooyeyaasha | 2 | | | |

3 Ma fuddahay inaad garatid tirada xaglo qooyeyaasha geesoole leh 100 dhinac adiga oo adeegsanaya qaaciidada suaasha 2? Waxaad ka warantaa adigoo isticmaalayn qaaciidada, hababka dhismaha joometariga iyo tirinta?

Qeexid 2.5 *Qaacidadu waa xeer aljebraad oo lagu qiimeeyo xadiyada. Qaacidadu waa weedh leh laba ama in ka badan oo doorsoomeyaal ah.*

Qaaciidooyinka joometariga ee la isticmaalo waxaa ka mida kuwa lagu xisaabiyo bedadka iyo wareegyada.

Tusaale 1: Jaantusyo0 joometeriyeed ee b ilaa j Bededka “ B ” iyo wareega “ W ” waxaa loo tibiaaxaa tibxo doorsoomeyaal.

b Laydi

$$B = dh \times b$$

$$W = dh \times b$$

$$W = 2dh + 2b = 2(dh + b).$$



Markaa dh waa dhererka laydiga

W waa ballaca laydiga

Qaacidada $B = dh \times b$, waa kuwee doorsoomeyaashu?

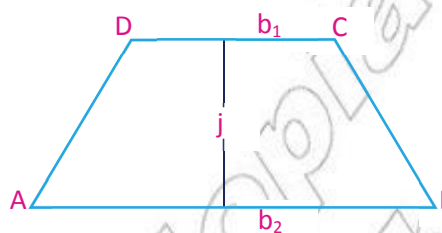
t Koor

$$B = \frac{1}{2}(b_1 + b_2)j$$

$$W = AB + BC + AD + CD$$

marka, b_1 iyo b_2 ay yihiin dhererada dhinacyada

barbarada ah, h waa joogga koorta.



j Goobo

$$B = \pi r^2$$

$W = 2\pi r$, marka “ r ” waa gacanka goobada.



Shaqo-kooxeedka 2.2

Ka dooda mid kasta oo ka mida hawraarahan soo socota, u sameeya qaaciidoo xaddiga loo baahan yahay?

1. x waa 10% ee y
2. Beeroole ayaa, geedo kubeerey beerleh qaab leydi, oo leh “dh”, mitir iyo “b” mitir dherer iyo balac. Haddii geedkastaa ku fadhiyo bed dhan $4m^2$,



Raadi qaaciidada aad ku heleysid tirada geedaha.

Go'aami qiimaha dh iyo b, adigoo kasoo qaadaya beerta meelna ineyna kabanaaneyn.

Tusaale 2: Qaaciidada iskubedelka heer-kullada ee ferenheet dhigrii (F) iyo

dhigrii sentigireedh (C) waa $C = \frac{5}{9}(F - 32)$.

b Waa kee doorsoomaha ku jira qaaciidadu?

t Raadi C° haddii $F = 68^\circ$.



Furfuris:

b Halkan F waa doorsoome

t $C = \frac{5}{9}(F - 32) = \frac{5}{9}(68 - 32) = \frac{5}{9} \times 36 = 5 \times 4 = 20^{\circ}\text{C}.$

Tusaale 3: xisaabi maxsuulka (Natiijada) tibaaxa aljebraad ee soo socda marka lagu siiyo qiimaha doorsoomeyaasha.

b $3x + y$, marka, $x = 2, y = 3$ **t** $3x + y^2$, marka $x = 3, y = 1$

j $\frac{1}{2}(x + y)z$ marka $x = 4, y = 2, z = 5$

Furfuris

b $3x + y = (3 \times x) + y.$

Sidaas darteed marka $x = 2, y = 3$, waxaynu heleynaa

$$3x + y = 3 \times 2 + 3 = 6 + 3 = 9$$

t $3x + y^2 = (3 \times x) + (y \times y).$

Sidaas darteed $x = 3, y = 1$ markaa waxaynu heli

$$3x + y^2 = (3 \times x) + (y \times y) = (3 \times 3) + (1 \times 1) = 9 + 1 = 10$$

j marka $x = 4, y = 2, z = 5$, waxaynu heli

$$\frac{1}{2}(x + y)z = \frac{1}{2}(4 + 2)5 = \frac{1}{2} \times 6 \times 5 = 3 \times 5 = 15$$

Layliiska 2.2

Haddii $a = 1, b = 2, c = 3, d = 4, e = 0$, markaa qiimee tibaaxaha aljebraada ee soo socda.

1 $2b$

2 $3ac$

3 $c + d$

4 $2a + d$

5 $2a + 3b - d$

6 $ab + be$

7 $3bc + d$

8 $4ad - \frac{1}{2}bd$

9 $\frac{abc}{d}$

10 b^2

11 $3c^2$

12 $(3c)^2$

13 $e(a + b)$

14 $c(d - 3e)^2$

15 $2b^2(a + c)$

16 $\frac{2(2a + 3b + 4c)}{d}$

17 \sqrt{d}

18 $2\sqrt{3c}$

- 19 $\sqrt[3]{bd}$ 20 $\sqrt{4c+d}$
- 21 Qaaciidoo yinka soo socda ku furfur doorsoomaha la sheegay.
- b** $B = l \times w, l$ **t** $s = \frac{(u+v)}{2}t, v$ **j** $xy + a = w, y$
- x** $v = u + at, a$ **kh** $B = 4\pi r^2, r$ **f** $B = \pi(R^2 - r^2), r$
- r** $u^2 - v^2 = 2as, s$ **s** $B = \frac{3k + 5m}{2}, k$
- 22 Laydi leh wareeg dhan 62.5 sm. haddii balaciisu la laban laabo, dhererkiisuna la kala badho weereegiisa cusubi waa 72.5 sm. Waa intee bedka laydigu?
- 23 Xisaabi bedka koor leh salalka 4sm iyo 10sm iyo joog, dhan 5sm.
- 24 Barta karka ee biyuhu waa 100°C . Waa imisa dhigrii oo ferenhayt ah heerkulkani?

2.1.2 Doorsoomeyaasha, tibxaha, iyo tibaaxaha

Qaybtii hore waxaynu ku soo baranay sida qaaciidooyinka loogu adeegsado doorsoomeyaasha ku jira qaaciidooyinka waxayna u taagan yihiin xaddiyo. Qayb waxaan ku eegi doonaa sida loo fududeeyo doorsoomeyaasha iyada oo la isticmaalayo xeerar xisaabeedka gaarkood iyo isku ururinata tibxaha isku midka ah.

Hawl-galka 2.3

- 1 **a** qiimee $3((154 - 26) \div 2^4) + 12 \times 3$ oo qor natiijadaado
- b** imisa xisaab falo ayey leedahay su aasha kore (sare)?
- c** Natiijooyinkaaga barbardhig natiijooyinka ay heleen ardayda fasalkaaga.
- d** miyey horsanaanta xisaabfaladu, xisaabintoodu, keeneysaa, kala duwanaansho xisaabeed, ku fiiri jidad kale duwan.
- 2 Qiimee $\frac{\left((x-y)^2 + 3x - \frac{20}{y}\right)}{4}$ haddii $x = 8, y = 5$ imasa xisaab fallo, ayey ka kooban tahay?

Si looga hor tago, xisaabinta maangad ee xisaabfalada, waa in la isticmaalaa xeerka kala horeynta xisaab falada.

Horsanaanta xisaab faladu waa sidan soosocota

- 1 Fiiri qowska, hadii uu jiro, haddii ay u baahan yihiin qiimee, haddii laba qows ay jiraan marka hore ka gudaha ku bilaw.
- 2 Fiiri Jibaarka, haddii ay jibaaran tahay.
- 3 Iskudhufo ama isuqaybi, adigoo ka bilaabaya dhinac bidix una soconaya dhinaca midig.
- 4 Isugee ama kalajar, adigoo kabilaabaya dhinac bidix una soconaya dhinac midig.

Tusaale 1: xisaabi $32 - 4[(3 + 6)^2 \div 3] + 2$

Furfuris: $32 - 4[(3 + 6)^2 \div 3] + 2 = 32 - 4[(9)^2 \div 3] + 2$
 $= 32 - 4[81 \div 3] + 2$
 $= 32 - 4[27] + 2 = 32 - 108 + 2$
 $= -76 + 2 = -74$

Tusaale 2: qiimee tibaaxaha hoos,

Waxaana lagu siiyey: $a = -5, b = 0.25, c = 3, d = 8$

$$(a + c)^2 - bd$$

Furfuris: $(-5 + 3)^2 - (0.25)8 = (-2)^2 - 2 = 4 - 2 = 2$

Hawl-galka 2.4

- 1 Miyey $3 + 4$, lamid tahay $4 + 3$? miyey 4×5 la mid tahay 5×4 ?
Haddii x iyo y ay u taagan yihiin tirooyin maxaad ku gabagabeyn lahayd $x + y$ iyo $y + x$, $y \times x$ iyo $x \times y$? Ma odhan kartaa sidaa.
b $y + x = x + y$? **t** $y \times x = x \times y$?
- 2 Dhul-beereedka cali ayaa leh dhinac 100m oo bari ah iyo 50 m oo wagooyin ah halka dhul-beereedka cibaado uu leeyahay dhinacyo 50 m oo bari ah iyo 100 m oo wagooyi ah. Qofkee ayaa dhul-beereedkiisu leeyahay bed weyn? Sabab?
- 3 Ahmed wuxuu faaiiday 12 birr maalintii Isniinta, 15 birrna maalintii Talaadada. Halka faadumo, ay faa'iiday 15 birr maalintii isniinta, 12 birr na maalintii Talaadada. Qofkee anaa faa'iido badan muddada labada maalmood ah?
Astaan xisaabeed noocee ah ayaa loo isticmaaleyaa halka?

- 4 b** Miyey $x - 2y$ la mid tahay $2y - x$? sabab?
t Miyey $x + 2y$ la mid tahay $2y + x$? sabab?
j Miyey $x - 2y$ la mid tahay $-2y + x$? sabab?

Qeexid 2.6 laba doorsoome oo kasta sida x iyo y , xeerarka soo socdaa waxay ku noqonayaa run.

- 1** Astaanta kala hormarinta ee isugeynta $x + y = y + x$
2 Astaanta kala hormarinta ee iskudhufashada $xy = yx$

Astaantaamaha kala hormarinta waxaan ku dari karnaa tibxo, ama qiimeyaal siday doonto ha u kala horeeyaane. Sidoo kale waxaan kudhufan karnaa tibxo ama qiimeyaal inagoon eegayn kala horeyntooda. Arinkanina wuxuu inaga caawinayaa inaan isugu ururino tibxaha isku midka ah hal dhinac iyadoon loo eegayn horsanaantooda.

Xusuus: Astaanta kala hormarinta ma ogola kala jaridda iyo iskuqaybinta.

Isticmaal xeerarkan soosocda fududaynta tibaaxaha Aljebra.

- 1** $x = 1 \cdot x = 1x$
2 $-x = -1 \cdot x = -1x$
3 $x - x = x + (-x) = 0$ Tiro akasta oo ay x tahay.
4 $x + 0 = 0 + x = x$ Tiro kasta oo ay x tahay.
5 $0 \cdot x = x \cdot 0 = 0$ Tiro kasta oo ay x tahay.
6 $\frac{x}{x} = 1$ haddii ay $x = 0$ Tibaaxdu waxay noqoneysaa maqeeexane.
7 xy waa $x \times y$ islamarkaana xisaab falka udhexeeya x iyo y waa iskudhufasho.
8 Marka aan doorsoome isku mid ah isuga dhufano si noqnoqod ah (dhawr jeer) sida $x \times x =$ waxaynu u qori ama $x \times x = x^2$ halkii aan qori lahayn xx sidoo kale $x \times x \times x = x^3$, halkii aan ka qori lahayn xxx .
9 $a(x + y)$ waa $a \times (x + y)$ sidaas darteed xisaab falka u dhexeeya a iyo $x + y$, waa iskudhufasho.

Tusaale 1: Soo saar bedka laydi dhererkiisu yahay 7 sm, ballaciisuna yahay 5 sm.

Furfuris: $B = dh \times b$

$$B = 7 \text{ sm} \times 5 \text{ sm} = 35 \text{ sm}^2$$

Iskudhufashada tiro iyo hal tibxaale

Marka tiro lagu dhufto hal tibxaale, tirada lagu dhuftay waa tirada horgalaha haltibxaalaha.

Tusaale 2: $-8 \times y = -8y$, $-1 \times y = -y$, $4 \times -y = -4y$, $4 \times (-3xy) = -12xy$

Hawl-galka 2.5

- 1 Isbar-bar dhig qiimayaashan $xy + xz$ iyo $x(y + z)$
 - b** marka $x = 5, y = 6, z = 10$
 - t** marka $x = -25, y = 16, z = 8$
- 2 Isbar-bardhig qiimayaashan $xy - xz$ iyo $x(y - z)$
 - b** marka $x = 12, y = 8, z = 3$
 - t** marka $x = 11, y = -8, z = -4$
- 3 Qor howraar qeexaysa xidhiidhka u dhexeeya
 - b** $xy + xz$ iyo $x(y + z)$
 - t** $xy - xz$ iyo $x(y - z)$

Qeexid 2.7 Saddex doorsoome oo kastaa waxay ku rumoobaan xeerarka soo socda:

i Astaanta kaladhiga iskudhufashada ee isugaynta.

$$x(y + z) = xy + xz$$

ii Astaanta kala dhigga iskudhufashada ee kala jaridda.

$$x(y - z) = xy - xz$$

inkasta oo aan badanaa la isticmaalin astaanta kala dhigga iskudhufashada ee isugeynta waxay inaga caawisaa soo saarida isirka ay wadaagaan wadarta ama kala jarida labo oo aljebro tibaaxood, tanina waxay inaga caawin isugeynta tibxaha isku midka ah.

$$4x + 5x = 4 \times x + 5 \times x = (4 + 5) \times x = 9 \times x = 9x$$

$$3xy^2 + 6x^2y = 3xy \times y + 3xy \times x = 3xy(y + x)$$

Isugeynta tibxaha isku midka ahi waxay kusaleysan yihiin astaanta kala dhigga iskudhufashada ee isugeynta.

Tusaale 1: $x + 5x = 1 \times x + 5 \times x = (1 + 5) \times x = 6 \times x = 6x$

Hadda waxaa la iskugeeyey tirooyinka.

Tusaale 2: $x - 4x = 1 \times x - 4 \times x = (1 - 4) \times x = -3 \times x = -3x$

Marka la isugeynayo tibxaha isku midka ah ma muujineyno astaanta kala dhigga.

Xusuusnow:- $x - 4x = x + (-4)x = 1 \times x + (-4) \times x$
 $x - 4x = x + (-4)x = 1 \times x + (-4) \times x = (1 + (-4))x = -3x$
 ama $x - 4x = 1 \times x - 4 \times x = (1 - 4)x = -3x$

Hawl-galka 2.6

- 1 b** xisaabi wadarta saddexda tibxood ee $1 + 2 + 3$ adoon beddelin Horsanaanta tibxaha, isugeytooda hal jid oo suurtagal ahi waa kooxaynta tibxaha sida $(1 + 2) + 3$. Sidoo kale, $1 + 2 + 3 = 1 + (2 + 3) = 6$.
- t** Waa kee jidka kale ee aan uga shaqeynkarno inaga oo aan bedelin horsanaanta tibxaha.
- j** Isbarbardhig natiijada aa ka heshey “t”, marka loo eego “b”.
- 2** haddii x, y , iyo z ay u taagan yihiin tirooyin miyey $(x + y) + z$ la mid tahay $x + (y + z)$?
- 3** Ku celi masalooyinka **1** iyo **2**, adiga oo isugeynta ku beddelaayo iskudhufasho.

Qeexid 2.8 Saddex doorsoome oo kasta x, y iyo z , run bay ku yihiin xeerarka soo socda.

i Astaanta hormogalinta ee isugeynta.

$$x + (y + z) = (x + y) + z$$

ii Astaanta hormogelinta ee iskudhufashada.

$$x(yz) = (xy)z$$

Tibxaha waa la kooxayn karaa iyadoo la adeegsanaya astaanta hormogelinta ee isugeynta ama astaanta hormogelinta ee iskudhufashada. Waxaad xusuusataa in aanay kooxaoyntu ahayn dib u habayn, markeynu koo xaynayno tibxaha, tibxuhu isma badaleyaan oo waxay ahaanayaa sidoodii, laakiin waxaynu fiirineynaa qowska, hadba xisaab falka ku haboon marka hore.

Tusaale 1: Fiiri $x + 3x + 5x$

Adeegso labadan hab mid ka mid ah

Natiijadu waa:- $(x + 3x) + 5x$ ama $x + (3x + 5x)$

$$x + 3x + 5x = x + (3x + 5x) = x + 8x = 9x$$

Tusaale 2: fududee $x^2 + 3x^2 + 5xy - 2xy$

Fulfuris: isugu ururi tibxaha isku midka ah hal dhinac

$$\text{Sida:- } x^2 + 3x^2 + 5xy - 2xy = (x^2 + 3x^2) + (5xy - 2xy) = 4x^2 + 3xy$$

Tusaale 3: $3 \times 5x = (3 \times 5) \times x = 15 \times x = 15x$

Tusaale 4: $3x \times 12x \times 3y$

$$\begin{aligned} \text{Fulfuris: } 3x \times 12x \times 3y &= (3x \times 12x) \times 3y = 36x^2 \times 3y \\ &= (36 \times 3) \times (x^2 \times y) = 108 \times x^2 y \\ &= 108x^2 y \end{aligned}$$

Layliska 2.3

1 Adigoo adeegsanaya astaanta kala dhigga iskudhufashada ee isugeynta ama kala jaridda.

Raadi wadarahan:

| | | | | | |
|----------|-----------|-----------|---------------|----------|-----------|
| b | $x + 5x$ | t | $3x - x$ | j | $-x - 3x$ |
| x | $x - 11x$ | kh | $x + 5x + 7x$ | | |

2 Ka soo saar isirka ay wadagaan tibaaxaha aljabrada.

| | | | | | |
|----------|------------------|-----------|--------------|----------|----------------|
| b | $xy + x^2 y^2$ | t | $4x + 8xy$ | j | $3x^2 y + 6xy$ |
| x | $3xy + 6x^2 y^3$ | kh | $5x - 10x^2$ | | |

3 Maku fidin karnaa astaanta kala dhigga iskudhufashada ee isugeynta marka ay tibxaha qowska ku jiraa ay ka badan yihiin labo? Marka ay tibxaha ku jira isku qawska ay xidho astaanta ka goyntu?

4 Imisa hab oo kala duwan ayaad u dhigi kartaa isugeynta tibxaha isku midka ah ee soo socda adigoo dhaqaajin tibxaha? Caddee jawaabaha inay isku mid yihiin dhamaan jidadku?

| | | | |
|----------|---------------|----------|--------------------|
| b | $x + 2x + 5x$ | t | $x + 2x + 3x + 4x$ |
|----------|---------------|----------|--------------------|

5 Fududee tibaaxaha aljebrada ee soo socda. Adeegso astaanta hormogelinta ee isugeynta.

| | | | |
|----------|----------------|----------|----------------------|
| b | $x + (3x + y)$ | t | $5y^2 + (y^2 - 2xy)$ |
| j | $(x + y) - 3y$ | x | $(2x + 3) + 12$ |

6 Fududee $(x + 2y) + 5x$ ma fududeyn kartaa adigoo isticmaalaya astaanta hormogelinta ee isugeynta oo kelinf?

7 Fududee tibaaxaha aljebrada ee soo socda:-

b $3[4x - (2x - 5)]$ **t** $pq^2 + 4p^2q^2 + 3pq^2$

j $-[(5 - 2p) - (3p + 10)]$ **x** $3a - 2c + 4 + 6c - 2a$

8 Adigoo isticmaalaya Horsanaanta xisaab falada ku haboon fududee tibaaxaha aljebrada ee soo socda?

b $m^2 - 2\{n - 4 - [5 - 3(m^2 - 2n)] + 7n\}$

t $4r - \{(s - 2r) - [4s - (r - s)]\}$

j $2x - [4 + 5x - 3(8 - 2x)]$

2.1.3 Isticmaalka Doorsoomeyaasha oo lagu furfurayo masalooyinka

Qaybtii hore waxaad ku soo nakhtiinteen doorsoomayaasha, tibxaha iyo tibaaxaha iyo sida loo fududeeyo tibaaxah aljebrada iyada la isku ururinaya tibxaha isku midka ah. Waxaa kale oo aad soo aragtay sida doorsoomeyaasha loogu adeegsado qaaciidooyinka. Hadaba maxaa kale oo aad umaleynaysaa in loo adeegsado doorsomeyaasha?

Hawl-galka 2.7

Nolol maalmeedkeena waxaynu la kulanaa masalooyin u baahan in lagu furfuro xadiyo aan la gareynin. Kuwan soo socdaa waa kuwo gaar ahaaneed ee iskuday inaad furfurtid?

- 1 In ka badan saddex sano, ayuu Ahmed awawgii 6 laab ka weynaa da'da Ahmed jirey, sanadkii hore. Marka da'da Axmed ee hada uu jiro lagu daro da'da awawgii uu hada jiro, wadartoodu waa 68. Mid kasta waa imisa jir iminka?
- 2 Kala badhka da'da Daahir laba sano ka dib marka loo geeyo saddex meeloodka da'duu jiray saddex sano kahor waa labaantansano. Waa imisa jir hada Daahir?
- 3 Ka soo qaad Aabahaa ayaa lacagta uu ku shaqeeyo dhan tahay 500 Bir bishii haddaba haddii shaqada laga joojiyo bisha dhamaad keedii oo ayka hadhsan tahay 12 maalmood. Imisa lacag ah ayuu helayaa? Waa kee doorsoomaha kujira masaladan? Ma u dhigi kartnaa doorsoome ahaan? Sidee baynu u xalineynaa masaladan?

Furfurista masalooyinka macnahoodu wuxuu yahay raadinta xadiga maqan (doorsoomaha) adigoo adeegsanaya waxa lagu siiyey. Furfurista masalooyin xisaabta waa xadiga aan la garaneyn (doorsoomaha) kaasoo hawraarta ka dhigaya Run, marka lagu bedelo doorsoomaha. Tusaale ahaan $x + 5 = 8$, keliya waxay run noqoneysaa marka x lagu bedelo 3, sidaas darteed $x = 3$, waa furfuris $x + 5 = 8$ masalooyinka xisaabta xadiga aan la garaneynin waxaa u taagan doorsoomaha.

Tusaale 1: furfur isle'egtan $3x = 120$

Furfuris: $\frac{3x}{3} = \frac{120}{3} = x = 40$

Sidaas darteed furfuristu waa $x = 40$, $3 \times 40 = 120$.

Hawl-galka 2.8

Haddii masalada lagu siiyo erayo ahaan waxaad u badali kartaa isle'eygo xisaabeed. Iyada oo loo badalayo doorsoomeyaal. Hadaba marka la rogayo ama labadalayo masalooyinka iyagoo loo badalayo isle'eygo xisaabeed.

Waa inaad raadisaa tibaaxo aljebro u taagan cadeymaha weedhaha.

Dhamaystir shaxdan soo socota adigoo tibaaxaha aljebraad ku astaynaya astaamaha u qoran weedhaha.

| Caddeymahaweedhaha | Tibaaxaha abjebraada calaamad ahaan |
|--|-------------------------------------|
| Lix lagu dhuftay tiro | |
| Lix oo lagu daray tiro | |
| Tiro laga jarey lix | |
| Tiro usoo noq noqotay isir ahaan saddex jeer. | |
| Tiro usoonoq noqotey tibix ahaan saddex jeer | |
| Wadarta saddex tiro oo isku xiga oo tirooyin idil, ah [Fikrad ahaan:- uqaado x iney tahay tirada hore] | |
| Sided wayka yar tahay laban laabka tiro. | |
| Hal loo geeyey saddex laabka tiro. | |

Tusaale 2: Shaxda hoos ku qorani waxay inoo sheegeysaa xidhiidhka ka dhexeeya caddeymaha, weedhaha iyo tibaaxa aljebraada.

| Caadeymaha weedhaha | Tibaaxaha Aljebra |
|-----------------------------------|-------------------|
| Tiro | x |
| Rogaalka tiro | $\frac{1}{x}$ |
| In ka badan hal tiro | $x + 1$ |
| In ka yar hal tiro | $x - 1$ |
| Laban laab ka tiro | $2x$ |
| In shan ka badan laban labka tiro | $5 + 2x$ |
| Laba jibaar tiro | x^2 |
| Farqiga laba tiro | $x - y$ |
| Laba jibaarka wadarta laba tiro | $(x + y)^2$ |
| Qeybta (saamiga) laba tiro | $\frac{x}{y}$ |
| Wadarta labajibaarka laba tiro | $x^2 + y^2$ |

Tusaale: Wadarta sadex abyooneyaal oo isku xiga ayaa ah 18. Hadaba waa kee abyoonaha ugu yari?

Furfuris: U qaado x inay tahay abyoonaha ugu yar marka abyoonaha ku xiga, x waa $x + 1$ islamarkaana abyoonaha ku sii xigaa $x + 1$ ii yahay $x + 2$.

$$\text{Sidaas darteed, } x + (x + 1) + (x + 2) = 18$$

$$3x + 3 = 18$$

$$3x = 15$$

$$x = 5$$

Sidaas darteed abyoonaha ugu yari waa 5.

Tusaale 4: Dhererka laydi ayaa ah afar laabka ballaciisa. Bedka laydiguna waa 36 m^2 . Raadi dhererka iyo ballaca laydiga?

Furfuris: U qaado ballaca laydiga b dhererkiisuna yahay dh .

Maadaama uu dhererku yahay afar laabka ballaciisu $dh = 4b$.

$$\text{Laakiin } B = dh \times b = 4b \times b = 4b^2$$

Bedka la ina siiyey na waa 36 sm^2

$$\text{Sidaas darteed } \frac{4}{4}b^2 = \frac{36}{4} \text{ sm}^2 = b^2 = 9 \text{ sm}^2$$

$$b = 3 \text{ sm}$$

hadaba balac, $b = 3 \text{ sm}$

$$dh = 4b$$

$$dh = 4 \times 3$$

$$dh = 12 \text{ sm}$$

Tusaale 5: Saamiga laba tiro ayaa ah 2:5 wadarta tirooyinkuna waa 21.
Raadi tirooyinkan

Furfuris: u qaado x iyo y inay yihiin laba tiro $x : y = 2:5$

$$\text{Tan macnaheedu waa } \frac{x}{y} = \frac{2}{5}$$

Markaa haddii si isweydaar ah

$$\text{isugu dhufatid waxay noqon sidan, } 5x = 2y \text{ ama } y = \frac{5}{2}x$$

$$\text{Tallaabada labaad waa } x + y = 21.$$

$$\text{Sidaas darteed, } x + y = x + \frac{5}{2}x = \left(1 + \frac{5}{2}\right)x = \frac{7}{2}x = 21$$

$$\text{Sidaas darteed } x = \frac{2}{7} \times 21 = 2 \times 3 = 6 \text{ sidoo kale}$$

$$y = \frac{5}{2}x = \frac{5}{2} \times 6 = 5 \times 3 = 15$$

Sidaas darteed tirooyinku waa 6 iyo 15.

Laylika 2.4

1 Furfur isle egyada soo socda.

b $x + 10 = 40$

t $3 - (7 - x) + 10 = 40$

j $30 - (7 - x) = 10$

x $3x^2 = 108$

kh $x + 2x + 5x + 2 = 100$

- d** $x + y = 100$ iyo $y = 3x$. Markaa raadi x iyo y
- r** $xy = 40$ iyo $y = 10x$. raadi x iyo y .
- s** $y = 3x^2$ iyo $x = 2$. raadi y
- sh** $\frac{x}{y} = 1$ iyo $y = 2x - 1$. raadi x iyo y .
- 2** Badri wuxuu ku yidhi Ibraahim, waxaan maanka ku hayaa tiro, tiradaas haddii aan laban laabo jawaabtu waxay noqoneysaa lix? Waa imisa tirada uu ka fikirayey Badri?
- 3** Raadi saddex abyooneyaal oo isku xiga oo wadartoodu tahay 24.
- 4** Raadi afar tiro oo isku xiga oo abyooneyaal kisi ah oo wadartoodu tahay 128.
- 5** Qoys ayaa leh saddex carruur ah oo mid waliba midka kale saddex sano ka weyn yahay, haddaba haddii wadarta da'adoodu tahay 21 sano. Waa imisa jiro?
- 6** Tuulo ayey ku nool yihiin dad dhan 261. Raggu haddii ay 7 dheer yihiin haweenka carruurtuna ay ragga dheer tahay 16 waa imisa tirada raggu?
- 7** Aqal ayaa 2m dheer dhererka ballaciisa. Haddii uu wareeqiisu yahay 32m, waa imisa dhererku?
- 8** Ninbaa wiilkiisa wuxuu ka wayn yahay 8 jeer. Shan sano gudahood wuxuu noqday in uu afar jeer kawaynaado wiilkiisa. Waa imisa jir wiilka hadda?
- 9** Ahmed da'diisu waa laban laabka dada Daahir hadii muddo dhan 20 sano wadarta da'doodu noqoto 85 sano, imisa jirro ay noqonaysaa da'doodii muddo dhan 10 sano gudaheed ah?
- 10** Mushqaayada 10 nin iyo 4 wiil ayaa ah 100 birr maalintiba halka 5 nin iyo 6 wiil ay mushqaayadoodu ka tahay 70 birr. Haddaba waa imisa mushqaayada uu helayo mid walba?
- 11** Tareen ayaa ka dhaqaaqay saldhig. Tareen kale oo daba socday ayaa isaguna ka daba dhaqaaqay hal saac ka dib, kuna socda xawaare ah 10 km/saac. Kal uu sii socday imisa ayuu ahaa xawaaraha tareenka kowaad?



2.2 ISKUDHUFASHADA LABA TIBIXLAYAASHA

2.2.1 Iskudhufashada hal tibixlayaasha iyo laba tibxaalayaasha

Waxaad ogoosantahay in hal tibixluhu yahay tibaax aljebro oo leh hal tibix ah oo kaliya laba tibixlayaashuna waa tibaaxo aljebro oo leh laba tibxood.

Hawl-galka 2.9

- 1 Waa imisa qiimaha $10 \times (12+13)$? Imisa jid oo kala duwan baad u xisaabin kartaa? Xeer xisaabeedkee ayaad u adeegsatay hababka midkood?
- 2 Caddee hal tibixlayaasha iyo laba tibixlayaasha mid kastoo ka midah taranta isla markaana ka shaqee tarantu oo fiiri farqiga u dhexeeya masalooyinka.

| | | |
|--------------------------------|------------------------------|---------------------------|
| b $213 \times (12+127)$ | t $15 \times (x+1)$ | j $2 \times (x+y)$ |
| x $(3+14)5x$ | kh $5y \times (11-7)$ | d $2(x-11)$ |
| r $4y \times (2x+3y)$ | s $2x \times (5y-7x)$ | |

Tusaale 1: u fiirso tibaaxda $4(x+3)$

$4(x+3)$ macnaheedu waa 4 lagu dhuftay $(x+3)$ ama afar laabka $(x+3)$.

$$\begin{aligned} 4(x+3) &= (x+3) + (x+3) + (x+3) + (x+3) \\ &= (x+x+x+x) + (3+3+3+3) \\ &= 4 \times x + 4 \times 3 = 4x + 12 \end{aligned}$$

Tusaale 2: Fududee $\frac{2}{5}(x+5)$

Furfuris: $\frac{2}{5}(x+5) = \frac{2}{5} \times x + \frac{2}{5} \times 5 = \frac{2}{5}x + 2$

Xususnow waxaynu isticmaalnay astaanta kala dhigga iskudhufashada ee isugeynta.

Tusaale 3: Fududee $2x(3y-5x)$.

Furfuris: $2x(3y-5x) = 2x \times (3y) - 2x \times (5x) = 6xy - 10x^2$

Tusaale 4: Fududee $5y(2x + 3y)$.

Furfuris: $5y(2x + 3y) = 5y \times 2x + 5y \times 3y = 10yx + 15y^2$

Guud ahaan, marka laba tibixaalle lagu dhuftaah, hal tibxle taranta la helayaa waa iskudhufashada labada tibxood ee laba tibixlaha iyo hal tibixlaha marka loo eego astaanta kala dhigga iskudhufashada ee isugeynta.

Tusaale 5: Fududee mid kastoo ka mid ah tibaaxaha soo socda.

$$x + 3(x + y), x - 3(x + y), x - 3(x - y), x + 3x(x - y)$$

Furfuris: $x + 3(x + y) = x + 3x + 3y = (x + 3x) + 3y = 4x + 3y$

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

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

$$x + 3x(x + y) = x + 3x^2 + 3xy$$

Tusaale 6: Fududee tibaaxaha aljebrada ee soo socda:-

$$2(x - y) + 2(3x + y), -2(x + y) - 3(2x - y), 3(x - y) + (x - y)$$

Furfuris: $2(x - y) + 2(3x + y) = 2x - 2y + 6x + 2y$

$$= (2x + 6x) + (-2y + 2y) = 8x + 0 = 8x$$

$$-2(x + y) - 3(2x - y) = -2x - 2y - 6x + 3y = -8x + y$$

$$3(x - y) + (x - y) = 3x - 3y + x - y = 3x + x + (-3y - y) = 4x - 4y \text{ or}$$

$$3(x - y) + (x - y) = 3 \times (x - y) + 1 \times (x - y)$$

$$= (3 + 1)(x - y) = 4(x - y)$$

$$= 4x - 4y$$

Qeexid 2.9 Laba tibaax aljebro waxaa la odhan karaa waa isku mid haddii midda laga soo dhex saarey midda kale ay sax ku tahay xeerar xisaabeedka.

Tusaale ahaan $4(x + y) = 4x + 4y$

Sidaas darteed $4(x + y)$ iyo $4x + 4y$, waa tibaaxo aljebro oo isle'eg. Laakiin $4(x + 1) \neq 4x + 1$, maxaa yeeley $4(x + 1)$, 4 waa in lagu dhuftaa labada tibxood ee qowska ku jira, iyada oo loo eegayo astaanta kala dhigga iskudhufashada ee isugeynta.

Layliska 2.5

- 1** Raadi taranta iyada oo la isku dhufanayo hal tibixle iyo laba tibxaale.
- | | | | | | |
|----------|--------------|-----------|----------------|----------|---------------|
| b | $2(x - 5)$ | t | $15(x + 10)$ | j | $5(2x + 4)$ |
| x | $-3(4x - 5)$ | kh | $-8(-3x - 12)$ | d | $-6x(2 - 4x)$ |
- 2** Ka shaqee mid kasta oo ka mid ah weydiimaha soo socda.
- | | | | |
|-----------|-----------------------|----------|------------------------|
| b | $2x(x + y)$ | t | $5x(3x - 2y)$ |
| j | $-8x(xy + x^2)$ | x | $-12xy(4x - 7y)$ |
| kh | $6xy(xy + y^2)$ | d | $12x^2y^2(10x + 21xy)$ |
| r | $-2x^2y(3xy - 5xy^2)$ | s | $-6xy(2x^2 - 3y^2)$ |
- 3** U kala saar lammaane kasta ee tibaaxaha aljabrada lagu siiyey inay isle'eg yihiin ama in kale.
- | | | | |
|-----------|-----------------------------|----------|-------------------------------|
| b | $x(x + y), x^2 + yx$ | t | $-3x(x - y), -3x^2 - 3xy$ |
| j | $-x(-2x + 3y), -2xy + 3y^2$ | x | $yx(x - 3y), x^2y - 3xy$ |
| kh | $xy(x + y), x^2y + y^2x$ | d | $-3x(-5x - 4y), 15x^2 + 12xy$ |
| r | $2x(-4x + 5y), 10xy - 8x^2$ | s | $3 - 2x, -2x + 3$ |

2.2.2 Iskudhufashada laba tibxaale yaasha

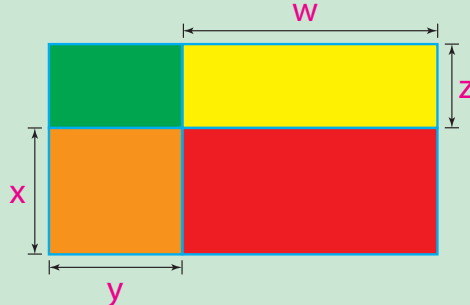
Waxaad ogsoon tahay in marka la iskudhufanayo hal tibxle in aad adeegsan jiray astaanta kala dhigga iskudhufashada ee isugeynta. Sidoo kale waxaad adeegsan kartaa isku xeer la mid ah marka la iskudhufanaya laba tibxaayaasha.

Hawl-galka 2.10

Nin beeraley ah ayaa dhul-beereedkiisii qaab-laydiyeedka ahaa u waangaabeeyey (u qayb qaybiyey) gaballo afar ah oo uu mid kastaba yahay mid leh qaab-laydiyeed iyo dhinaeyo (ku halbeegan mitirro) sida uu tilmaamayo jaantuska la ina siiyey. Ka jawaab kuwa soo socda.

- 1** Hilaadi bedka waangaab kasta.
- 2** Soo saar wadarta bededka waangaabyada oo idil ee aad ka soo lulaadisay weydiinta (1).

- 3 Hilaadi bedka ugu weyn laydiga idil ahaan afarta waangaab uu ka kooban yahay.
- 4 Isbarbardhig jawaabaha aad ka soo heshay weydiinta (3) iyo weydiinta (4).
- 5 Maxaad ku soo gunaanadi kartaa tarantala xidhiidha $(x + z)(y + w)$.



Tusaale 1: Raadi taranta $(2x + 1)(3y + 2)$.

Furfuris:

Habka 1^{aad}:- Waxaad u kala dhigi kartaa tibxaha ku jira qowska hore iyo tibxaha ku jira qowska dambe.

$$\begin{aligned} \text{Sidan } (2x + 1)(3y + 2) &= 2x(3y + 2) + 1(3y + 2) \\ &= 6xy + 4x + 3y + 2 \end{aligned}$$

Habka 2^{aad}:- Waxaad u kala dhigi kartaa tibxaha ku jira qowska dambe iyo tibxaha ku jira qowska hore.

$$\text{Sidan } (2x + 1)(3y + 2) = (2x + 1)3y + (2x + 1)2 = 6xy + 3y + 4x + 2 ;$$

Tusaalaha 2:- Raadi taranta $(2xy + 3y)(-5x + 7xy)$

Furfuris: $(2xy + 3y)(-5x + 7xy) = 2xy(-5x + 7xy) + 3y(-5x + 7xy)$

$$= -10x^2y + 14x^2y^2 - 15yx + 21xy^2$$

$$(2xy + 3y)(-5x + 7xy) = 2xy(-5x + 7xy) + 3y(-5x + 7xy)$$

$$= -10x^2y + 14x^2y^2 - 15yx + 21xy^2$$

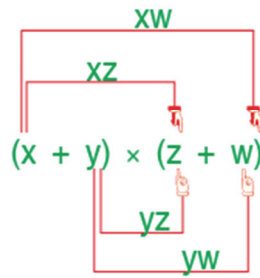
Hadaba guud ahaan marka la isku dhufanayo laba tibxaalayaal waxaan haysanaa laba isir oo isirkii walbaa leeyahay laba tibxod.

Fiiri shaxannada soo socda.

Tibxaha sida $xy, xz, yz, yw,$

Taranta $(x + y)(z + w)$ waxaa loo yaqaanaa qayb tarameedyo.

$$(x + y)(z + w) = xz + xw + yz + yw$$



Tusaale 3: Raadi taranta $(2x - y)(5m - 3n)$

Furfuris: $(2x - y)(5m - 3n) = 2x(5m - 3n) + (-y)(5m - 3n)$
 $= 10xm - 6xn - 5ym + 3yn$

Tusaale 4: Raadi taranta $(3x + 4y)(2xy - 5x^2)$

Furfuris: $(3x + 4y)(2xy - 5x^2) = 3x(2xy - 5x^2) + 4y(2xy - 5x^2)$
 $= 6x^2y - 15x^3 + 8xy^2 - 20yx^2$

Hawl-galka 2.11

1 Raadi mid kasta tarannada soo socda.

b $(x + 2)(x + 3)$ **t** $(x + 2)(x - 3)$ **j** $(x - 3)(x + 3)$

x $(x - y)(x + y)$ **kh** $(2x - y)(2x + 3y)$ **d** $5(3x + y)(2x - 3y)$

2 Iskudhufashada laba tibixlayaasha tibix kasta oo ka midah laba tibxaalaha hore ayaan ku dhafanaynaa tibix kasta oo ka mid ahi laba tibxaalaha dambe. Maka fikirtay sida aan ku heleyno tarantan oo kale?

b $(x + y + 2)(2x + 3y)$ **t** $(x + y + 2)(2x - y + 1)$

Layliska 2.6

1 Raadi taranta soo socota adigoo iskudhufanaya laba tibxaalayaasha:-

b $(x + y)(x - y)$ **t** $(2x + 4y)(6x - 9y)$

j $(4xy + 3y)(4x - xy)$ **x** $(x + xy)(xz + x^2yz)$

kh $(xy + yz)(xz + yz)$ **d** $(1 + x)(x^2 + y^2)$

r $(-12xy + 5y^2)(2xz + 4xyz)$ **s** $(3x^2y + 2y^2x)(2x - 5y)$

2 Fududee mid kaata tibaaxaha aljebrada ee soo socda.

b $3(x+2)(2x-1) - 2(3x-2)$ **t** $(x+3)(4x-1) + (2x-3)(2x+3)$

j $(x+y)^2 - 2(x-y)^2$ **x** $3x[(x+y)^2 - y^2]$

kh $(x-y)^2 + 2xy$ **d** $x(x-y) + y(x-y) + x + y$

r $(x-y)^2 - (x^2 - y^2) + 2xy$ **s** $2x(x+3y) - 2y(x-y)$

Waxaad soo aragtay sida la isugu dhufto laba tibxaalayaasha. Isu dhigan ahaan waxaad u tibaaxi kartaa tibaaxaha qaarkood sida taranta tibxaalayaasha.

Tusaale, ahaan

$$\begin{aligned} xy + y + x + 1 &= (xy + y) + (x + 1) = y(x + 1) + (x + 1) \\ &= (y + 1)(x + 1) \end{aligned}$$

Shaqo-kooxeedka 2.3

U tibaax tibaaxaha soo socda sida taranta laba tibxaaleyaasha.

1 $xy + x + 2x + 2$ **2** $x^2 + xy + x + y$

3 $ax + ay + bx + by$ **4** $x^2y + y + x^2 + 1$

5 $2xy + 2ax + 3y^2 + 3ay$

2.3 ISIR WEYNAHA AY WADAAGAAN

Waxaad ogsoon tahay isirku inuu yahay qayb ka mid ah taranta. Tusaale ahaan $12 = 3 \times 4$ hadaba 3 iyo 4 ma'aha isirada keliya ee 12.

Sidoo kale 1, 2, 6, 12, waa isirrada 12 sida $12 = 1 \times 12$ ama $12 = 2 \times 6$.

Hawl-galka 2.12

Dib u xusuuso qaybtii 1.2, isla markaana iskuday inaad ka jawaabto masalooyinka soo socda.

1 x miyey isir u tahay x^2 ?

2 x^2 miyey isir u tahay x ?

4 Raadi dhammaan isirada suurtagalka ah ee x^3 .

- 5** **b** Tax isirada x^2y sida $1, x, \dots$
- t** Tax isirada xy^2 sida $1, y, \dots$
- j** Tax isirada ay wadaagaan x^2y iyo xy^2 .
- x** Dhamaan isirada ay wadaagaan x^2y iyo xy^2 kuwaas oo aad ku soo taxday (j), caddee isirka ay wadaagaan dhammaan isirada kale.
- kh** Jawaabta aad ka heshay (x) waxaa loo yaqaanaa Isir weynaha ay wadaagaan x^2y iyo xy^2 . Ma sheegi kartaa sababta loogu magacaabay sidan?
- 6** Ku celi su'aasha, (ii) adigoo u qoraya sidan x^2yz, x^2y^2z iyo x^2yz^2 .

Ogow, haddii a iyo b ay yihiin tirooyin idil marka $a \times b = ab$ isla markaana a waa isirka ab , b , waa isirka ab . Sidaa si la mid ah waxaynu u fiirineynaa isirada tibaaxaha aljebrada.

Tusaale ahaan $3uv$ waxay leedahay isiradan:- $1, 3, u, v$ isku darkooduna wuxuu noqonayaa $3u, 3v, uv$ iyo $3uv$ lafaahaanteed.

Tusaaleyaal kale

- 1** $2ab = 2 \times a \times b$ waxay leedahay $1, 2, a, b, 2a, 2b, ab$ iyo $2ab$
- 2** xyz waxay leedahay isirada $x, y, z, xy, xz, yz, 1, xyz$.
- 3** xy waxay leedahay isirada $1, x, y, z$ iyo xy .

Marka aynu fududaynayno tibaaxa aljebrada waxaan u baahanahay isirka ay wadaagaan laba tibaaxood oo kasta waxay leeyihiin isiro ay wadaagaan isirada oo loo qaybinayo labadaba.

Tusaale 1:

- b** $3ur$ iyo $6u$ isirada ay wadaagaan waa $1, 3, u$, iyo $3u$.
- t** $2xy$ iyo $4xyz$ isirada ay wadaagaan waa $1, 2, x, y, 2x, 2y, 2xy$, iyo xy .

Isir weynaha ay wadaagaan tirooyinku waa isirka ugu weyn ee u qaybsama labada tibaaxood. Sidaas darteed isirka ugu weyn ee ay wadaagaan $3ur$ iyo $6u$ waa $3u$. isirka ugu weyn ee ay wadaagaan $2xy$ iyo $4xyz$, waa $2xy$.

Tusaale 1 Fiiri tibaaxda aljebrada ee x^3y

$$x^3y = x \times x^2y = x^2 \times xy = x^3 \times y = x^3y \times 1$$

Sidaas darteed isirada x^3y waa:- $1, x, x^2, x^3, y, xy, x^2y, x^3y$

Qeexid 2.10 *Isirka ay wadaagaan laba tibaax aljebro waa tibix kasta oo isir u ah labada tibaax aljebro.*

Tusaale 2: Fiiri tibaaxan aljebro x^2y^3 iyo x^3y^2

Isirada x^2y^3 waa:- $1, x, x^2, y, xy, x^2y, y^2, xy^2, xy^3, x^2y^2, y^3, x^2y^3$

Isirada x^3y^2 waa:- $1, x, x^2, x^3, y, xy, x^2y, x^3y, y^2, xy^2, x^2y^2, x^3y^2$

Isirada ay wadaagaan labada tibaax aljebro waa:- $1, x, x^2, y, y^2, xy, x^2y, xy^2, x^2y^2$

Qeexid 2.11 *Isirweynaha ay wadaagaan laba tibaax aljebro, waa tibix aljebro oo ay labaduba wadaagaan.*

Isirweynaha ay wadaagaan waxaa loo soo gaabiyaa sidan I.W.W

Tusaale 3 Hubi x^2y^2 inuu yahay isir weynaha ay wadaagaan x^2y^3 iyo x^3y^2 .

Furfuris: Sidaad kor ku soo aragtay x^2y^2 waa isirka ay wadaagaan x^2y^3 iyo x^3y^2 . Haddaba dhammaan isirada ay wadaagaan x^2y^3 iyo x^3y^2 waa sidan

$1, x, x^2, x^3, y, xy, x^2y, x^3y, y^2, xy^2, x^2y^2, x^3y^2$ waa isirada x^2y^2 .

Sidaas darteed x^2y^2 waa isir weynaha ay wadaagaan (I.W.W). x^2y^3 iyo x^3y^2 .

Tusaale 4: $18a, 45b$

Furfuris $18a = 2 \times 3 \times 3 \times a$

$$45b = 3 \times 3 \times 5 \times b$$

Sidaas darteed I.W.W = $3 \times 3 = 9$

Hawl-galka 2.13

Raadi isir weynaha ay wadaagaan (I.W.W) tibxaha lamaaneyaasha ah ee soo socda.

b $6ab, 8a^2$

t $9a^2b, 45a^2b^3$

j $15a^3b^2, 45a^2b^3$

x $8x^2y^3z^3, 16xy^2z$

Habka ugu gaaban ee lagu raadiyo (I.W.W) laba ama in ka badan oo tibaaxo, aljebraad ah

- i** Caddee dhammaan doorsoomeyaasha ku jira tibaaxaha aljebraada.
- ii** Doorsoomeyaasha ku jira (i) ka raadi doorsoomaha ugu jibaarka badan kaasoo isir, u ah dhammaan tibaaxaha aljebraada ee lagu siiyey.
- iii** Raadi I.W.W tirooyinka horgaleyaasha tibaaxaha aljebraada ee lagu siiyey.
- iv** Dhis tibaaxo aljebraad kuwaas oo ah taranta jibaarada ee (ii) iyo I.W.W tirooyinka horgaleyaasha u ah (iii).

Xusuus:

- 1** Jibaarada x waa tixbahan soo socda $1, x^2, x^3, x^4, x^5, \dots, I.W.M$
- 2** Haddii doorsoomaha x laga waayo tibaaxda aljebraada, jibaarka ugu weyn ee tibaaxda aljebraada waxaa loo qaadanayaa inuu yahay 0 .

Tusaale 4: Raadi I.W.W $2xy^2, 6x^2y^2$ iyo $4x^3yz$

Furfuris: Doorsoomayaasha ay ka kooban yihiin saddexda tibaax aljebro waa x , y iyo z . Ka ugu jibaarka weynina waa x , kan oo ah isirka ay wadaagaan $2xy^2, 6x^2y^2$ iyo $4x^3yz$, waa x .

Jibaarka ugu weyn ee ay wadaagaan y , $2xy^2, 6x^2y^2$ iyo $4x^3yz$, waa y .

Jibaarka ugu weyn ee z , kan oo ah isirka ay wadaagaan $2xy^2, 6x^2y^2$ iyo $4x^3yz$, waa 1 .

Tirooyinka horgaleyaashuna waa $2, 6$ iyo 4 I.W.W $2, 4$ iyo 6 waa 2 .

Sidaas darteed I.W.W $2xy^2, 6x^2y^2$ iyo $4x^3yz = x \times y \times 1 \times 2 = 2xy$

Xusuus: Sidaad ku soo aragtay tusaaleyaashii hore laba tibaax aljebro waxay yeelan karaan dhawr isir oo ay wadaagaan, I.W.W laba tibaax aljebraana waa mid keliya mana noqon karo mid wax ka badan.

Tusaale 5: Isiree tibaaxahan soo socda.

b $x^2 + 4x$

t $3x^3y^2 - 6x^2y^3$

Furfuris

b $x^2 + 4x = x(x + 4)$

t $3x^3y^2 - 6x^2y^3 = (3x^2y^2)x - (3x^2y^2)2y = 3x^2y(x - 2y)$

Tusaale 6: $9xy$ iyo $15xz$ waxay leeyihiin I.W.W oo ah $3x$.

Tusaale 7: $6a$ iyo $5b$ I.W.W, waa 1.

Marka aynu ka shaqeyno wareega leydiga waxaan xisaabinaa dhererka laba jeer sidoo kale balacana laba jeer.

$$W = 2dh + 2b$$

Inagoo isireyneyna waxaynu ubadali tibix fudud sidan $W = 2(dh + b)$.

Marka aynu isireyno tibaaxaha aljebra waxaynu fiirineynaa isirka ay wadaagaan tibxuhu inaga oo dibada ugu saareyna qowska isir ka ay wadaagaan. Si uu u sameeyo taran sida tusaaleha kore.

Tusaale 8: $9x + 24y = 3(3x + 8y)$

Tusaale 9: $9x^2 + 3x + 15x^3 = 3(3x^2 + x + 5x^3)$

Laakiin tibxaha ku jira qowska isir ay wadaagaani waa x , $9x^2 + 3x + 15x^3 = 3x(3x + 1 + 5x^2)$. Hadaba waa inaan isireynta tibxaha kujira qowska aan joojinaa maadaama ayna jirin isiro kale oo ay wadaagaan.

Tusaale 10: $2ab^2 + ab^2c + 3ab = ab(2b + bc + 3)$

Tusaale 11: $-2xy^2 - 4x^2y = -2xy(y + 2x)$

Tusaale 12: Fududee $5(x + 2) + y(x + 2) = (5 + y)(x + 2)$

Waxaan xusuusanahay $(x + 2)$ iney tahay isirka ay wadaagaan, marka aynu ka saaro isirkan waxaynoqoneysaa, sidan $5(x + 2) + y(x + 2) = (x + 2)(5 + y)$

Tusaale 13:- $7(y + 1) - x(y + 1) = (y + 1)(7 - x)$

Layliska 2.7

1 Isiree tibaaxahan soo socda

b $7x + 4$

t $20x - 4$

j $18xy - 3yz$

x $12mn + 18mp$

kh $16m^2 - 4m$

d $3x^2 + 6x - 18$

r $-6x - 24$

s $-2xy - 8x$

sh $24mn - 16m^2n$

dh $-x^2y - y^2x$

c $12m^2n + 24m^2n^2$

g $72y^2p - 18y^2p^2$

2 Isiree tibaaxaha soo socda

b $4(x+3) + m(x+3)$ **t** $x(x-1) + 5(x-1)$

j $y(y+4) - 6(y+4)$ **x** $x^2(x+7) + x(x+7)$

kh $3x(x-4) - 7(x-4)$

Isireynta waxaa kale oo aan u istimaalaa fududeynta tibaaxa aljebra ee jajabyada. Hadaba inaga oo isticmaalayna hab isku mid ah ee jajabyada caadiga ah waxaynu ka saari isirka ay wadaagaan tibaaxaha aljebra si uu u samaysmo jajab fudud oo la mid ah.

Tusaale 14: $\frac{x}{2x} = \frac{1 \times x}{2 \times x} = \frac{1}{2}$ inaga oo isu jareyna isirka ay wadaagaan ee

sareeyaha iyo hooseeyaha oo ah x.

Tusaale 15: $\frac{5x^2y}{15xy} = \frac{5xy \times x}{5xy \times 3} = \frac{x}{3}$

Tusaale 16: $\frac{4a + 2ab}{2a} = \frac{2a(a+b)}{2a} = 2 + b$

Adoo xusuusan isirka $2a$ inuu yahay isirka aywadaagaan wadarta labada tibxood.

Tusaale 17: $\frac{7x^2}{5y} \times \frac{15yz}{x} = \frac{x \times 7x}{5y} \times \frac{5y \times 3z}{x}$

$$= \frac{x \times 7x \times 5y \times 3z}{5y \times x} = 7x \times 3z = 21xz$$

Xusuusnow in hadii la, isu jaro sareeyaha iyo hooseeyaha ay noqonayaan 1, laakiin ayna noqoneynin, 0.

Tusaale 18: $\frac{x}{3} \div \frac{2x^2}{3} = \frac{x}{3} \times \frac{3}{2x^2} = \frac{1}{2x}$

Tusaale 19: $\frac{6x+18}{20} \div \frac{3x+9}{15} = \frac{6(x+3)}{20} \times \frac{15}{3(x+3)}$

$$= \frac{6 \times 15}{20 \times 3} = \frac{3 \times 2 \times 5 \times 3}{5 \times 2 \times 2 \times 3} = \frac{3}{2}$$

Tusaale 20: Fududee tibaaxahan $\left(\frac{4x+20}{5}\right) \times \left(\frac{8x+40}{20}\right)$

Furfuris:
$$\left(\frac{4x+20}{5}\right) \times \left(\frac{8x+40}{20}\right) = \frac{(4x+20) \times (8x+40)}{5 \times 20}$$

$$= \frac{32x^2 + 320x + 800}{100} = \frac{32x^2}{100} + \frac{320x}{100} + \frac{800}{100}$$

$$= \frac{8x^2}{25} + \frac{16x}{5} + 8.$$

Layliska 2.8

- Waa maxay isirrada 18?
- Waa maxay isiraada ay wadaagaan;

| | | |
|--------------------|--------------------|--------------------|
| b 12 iyo 32 | t 24 iyo 40 | j 32 iyo 48 |
|--------------------|--------------------|--------------------|
- Soo saar dhammaan isirrada suurtagalak ah mid kasta oo ka mid ah tibaaxaha aljabra ee soo socda.

| | | | |
|--------------------------|----------------------------|--------------------------|---------------------------|
| b 4x | t x ² | j 3x ² | x 5xy ² |
| kh y ³ | d 3x ² y | r xyz | s xyz ² |
- Isirree mid kasta oo ka mid ah tibaaxaha aljabra ee soo socda.

| | | |
|---------------------------------|--------------------------------|--|
| b -3x + 21 | t 6x ² + 3x | j 18x ² + 12xy |
| x 6tm - 24m ² | kh 8x + 12y + 10x + 15y | d x ² - 7x + 3x - 21 |
- Soo saar dhammaan isirrada ay wadaagaan iyo isir weynaha ay wadaagaan (IWM) mid kasta oo ka mid ah tibaaxaha soo socda.

| | | |
|---|--|---|
| b x ² , x ³ | t x ² , x ² y | j 6x ³ y ² , -12x ² y ³ |
| x 8x ² y ² , 6x ³ y ³ | kh 2x ³ , 3xy | d 2x ³ y ² , 6x ² y, 8xy ² |
| r 3x ² yz ² , 6x ³ y ² z, 15x ² y ² z ² | | |
- Fududee mid kasta tibaaxaha soo socda.

| | | |
|--------------------------------|--|---|
| b $\frac{3x}{15}$ | t $\frac{2x+10}{4}$ | j $\frac{x^2+4x}{x+4}$ |
| x $\frac{9x+27}{9x+18}$ | kh $\frac{x^2-5x}{2x+10} \times \frac{3x+15}{4x}$ | d $\frac{24x-8}{12} \div \frac{9x-3}{6}$ |
| r $\frac{6xy+18x}{12}$ | s $\frac{7mn}{24} \div \frac{8x+4}{20}$ | |

🔑 Furaha Tibxaha 🔑

- Tibxaha Aljebrada → Labatibxaale → Tibix
- Qaaciido → Isir weynaha ay wadaagaan
- Doorsoomeyaal → Hal tibixle

Sookoobida cutubka

- ✓ *Tibaaxaha aljebro* waa iskudar kasta oo ka kooban tirooyin iyo doorsoomeyaal.
- ✓ *Tibix* waa qayb ka midal tibaaxaha aljebrada oo wadata calaamadeeda kuxidheysa qeybta kale ee tibaaxaha aljebrada oo isugeynaysa.
- ✓ *Tibaaxda Aljebro* waxay ka koobnaan kartaa, haltibixo oo loo yaqaano haltibixle ama waxayka koobnaankartaa laba tibxood oo loo yaqaano labatibxaale.
- ✓ *Doorsomeyaashu* waxay utaagan yihiin tirooyin ama xadiyo waxa kaloo loo adeeg sadaa qaaciidooyinka kala duwan. Sida qaaciida bedka, shaxamada joometariga iyo xadiya duleed ee kale, sida heer-kulkka
- ✓ *Waxaynu isticmaalaynaa xeerarka xisaabta sida*
 - Astaanta kala hormarinta ee isugeynta.*
 - Astaanta kala hormarinta ee iskudhufashada*
 - Astaanta kaladhiga iskudhu fashada ee isugeynta*
 - Astaanta hormo galinta ee iskudhufashada*
 - Astaanta hormo galinta ee isugeynta.*
- ✓ *Waxaan u adeegsanaa astaanta kala hormarinta isku habeynta tibxaha si aan isugu ururino tibxaha, iskumidka ah astaanta hormo galintana waxaan u adeegsanaa inaan tibxaha u kooxeyno iskudhinacyo inaga oo isticmaaleyna qows. Astaanta kaladhiga iskudhufasha ee isugeynta waxaa u, adeegsanaa ka saarida isirka ay wadaagaan iyo isku dhufashada laba tibxaale iyo haltibixle.*
- ✓ *Marka ay tibxuhu lee yihiin hal xisaabfal inka badan waxaan uqaabeynaynaa siday ukala horeeyaan waxaan kabilaabeynaa qaws, waxaan kuxijisiineynaa jibaarada markaa waan iskudhufaneynaa ama waan isugeybineynaa markaxiga waa isugeynagnaa ama waan kala jareynaa, marka ay qowsas badani jiraan waxaanka bilaabeynaa ka gudaha kujira marka hore.*
- ✓ *Isirka aywadaagaan laba tibaax aljebro, waa tibaax kasta oo isir u ah labada tibaax aljebro, Isirweynaha ay wadaagaan laba tibaax aljebro waa tibix aljebro oo ah isirka aywadaagaan, oo isirada kalena sidoo kale isir u, ah Isirweynaha ay wadaagaan waxa loo soo gaabiyaa (I. W. W)*

- ✓ Waxaa u adeegsanaa I.W.W laba iyo inkabandan oo tibaaxo aljebro ah inaan ku isireyno tibaaxaha, iyo inaan kufududeyno tibaaxaha la inasiyey inaga oo ufududeynayna. Qaabka isuqeybinta, ee sareeye iyo hooseeye.

Nakhtiinka layliiska cutubka 2^{aad}

- 1 Qor tirada tibxaha ee tibaaxahan soo socda

| | | |
|----------------------|-----------------------------|---------------------------|
| b $x + y + z$ | t $x + 2x + 3x + 4x$ | j $\sqrt{1+x+y+z}$ |
|----------------------|-----------------------------|---------------------------|
- 2 Adigoo adeegsanaya astaanta hormo gelinta isugu gee tibxaha isku midka ah ee soo socda laba jid oo kala duwan.

| | | |
|-------------------------|---------------------------|--|
| b $2x + 3x + 5x$ | t $-3y + 13y - 4y$ | |
|-------------------------|---------------------------|--|
- 3 Adigoo u adeegsanaya astaanta hormo galinta isugu kooxee tibxaha astaanta kala hormarintana inaad tibxaha isku midka ah isugu ururisid fududee tibaaxaha aljebra ee lagu siiyey.

| | | |
|------------------------------|-------------------------------|------------------------------|
| b $x + 2y + 5x$ | t $5y + 7x - 3y$ | j $8x + 2y - 20x$ |
| x $2x + 3y - 5x - 8y$ | kh $x^2y - xy + 7x^2y$ | d $xy + 7xy^2 - 12xy$ |
- 4 Qor taranta adigoo muujineynin calaamada iskudhufashada (x).

| | | |
|-----------------------|---------------------------------|-----------------------|
| b $x \times y$ | t $x \times y \times z$ | j $3 \times x$ |
| x $x \times x$ | kh $y \times y \times y$ | |
- 5 Qaabee taranta oo qor natiijada adigoo muujineynin calaamada iskudhufashada (x)

| | | |
|---------------------------|------------------------------------|--------------------------|
| b $2x \times 3y$ | t $-3x \times 7y$ | j $-2x \times 4x$ |
| x $-3x \times -5x$ | kh $2y \times 3y \times 7y$ | |
- 6 U adeegso astaanta hormogelinta meelaha laba tibxoodleyda astaanta kala dhigga iskudhufashada ee isugeynta meelaha wadarta leh, tibxaha isku midka ah ee soo socda.

| | | |
|----------------------|---|-------------------------------|
| b $x + 2x$ | t $x + 2x + 3x$ | j $x^2 - 5x^2 + 7$ |
| x $2xy - 8xy$ | kh $8xy^2z^3 + 12xy^2z^3 - 5xy^2z^3$ | d $x^2 + 12x^2 - 3x^2$ |
- 7 Wadarta shan abyoone oo isku xiga waa 35 waa kee abyoonaaha u yari?
- 8 50° digrii farenhet imisa digrii centigradh?
- 9 Dhererka laydi ayaa ah laban laabka ballaciisa. Haddii wareegu laydigu yahay 30 sm, xisaabi bedka laydiga?
- 10 Raadi I.W.W $24x^2y^3$ iyo $60x^3y^2z^2$.