Cutubka
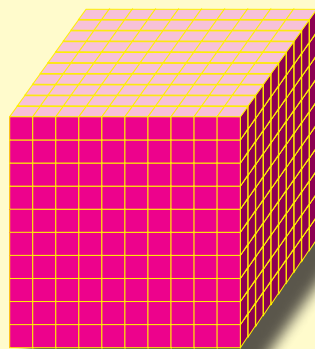
1^{aad}

LABA JIBBAARKA, XIDID LABA JIBAARKA, SADDEX JIBBAARKA IYO, XIDID SADDEX JIBBAARKA

Cutubkani marka uu dhamaado ardaydu waxay awoodi doonaan iney:

➢ Xisaabiyaan jibbaarka tiro.

➢ Raadiyaan jibbaarka, tiro, iyagoo ka raadinaya shaxda jibbaarka.

➢ Qeexaan, xidid laba jibbaarka tiro lakab oo aan aheyn eber.

➢ Qeexaan laba jibbaarka, oo ay xisaabiyaan xidid laba jibbaarka Qeexaan sadddexjibbaarka tiro

➢ Caddeeyaan saddex jibbaarka tirooyinka.

➢ Qeexaan xididka sadexjibbaarka tiro.

➢ Caddeeyaan xididsaddexjibbaarka iyo saddexjibbaarka Quman

TUSMOOYINKA MUHIMKA AH

1.1 Laba jibbaarka tirooyinka

1.2 Xidid laba jibbaarka tirooyinka lakab.

1.3 Saddex jibbaarka iyo xidid saddex jibbaarka.

Furaha Tibxaha

Sookoobida Cutubka

Nakhtiinka layliska

HORDHAC

Fasalladii hore waxaad kusoo barateen qaabka ay tirooyinka u shaqeeyaan sidoo kale waxaad soo aragteen sida tiro la isugu dhufto (loo jibbaaro). Raadinta tiro jibbaarkeedu yahay dhawr tiro, iyo sidoo kale sida tiro la isugu dhufto saddex jeer iyadoo la raadinayo saddex jibbaarkeeda. Cutubkan waxaan xoogga saaraynaa dhammaan furfuritanada si qoto dheer, sidoo kale waxaynu baraneynaa raadinta tiro saddex-jibbaarkeeda. Waxaan u adeegsanaynaa labajibbaarka iyo xidid laba jibbaarka, saddexjibbaarka iyo xidid saddex jibbaarka. Bangiyada, fiisigiska iyo joomatariga.

1.1   LABA JIBBAARKA TIRO

Dhammaadka qaybtan waxaad awoodi doontaan:

➤ Xisaabinta laba jibbaarka tiro.
➤ Raadinta laba jibbaarka tiro iyadoo laga raadinayo shaxda laba jibbaarka.

1.1.1   Laba jibbaarka tiro lakab

Hawl-galka 1.1

1 Adigoo adeegsanaya aqoontaada joomatariga ee bedka laba jibbaaranaha ku buuxi shaxdan soo socota.

Dhinaca laba jibbaarka (sm)	Bedka laba jibbaarka (sm^2)
1.	
2.	
3.	
4.	
5.	
6.	

2 Iyadoo lagu salaynayo bedka shaxda sare ku xusan. Raadi bedka

b. Laba jibbaarka dhererka dhinaca.

Masalo furan:

➢ *Nin beeeraley ah ayaa u beeray geed bun ah qaab laba jibbaarane ah sida ku muujisan jaantuska dhinaca midig (Jaantus 1.1). Haddii uu ninku beeray 20 saf, isla markaana saf kasta ay ku beeran tahay 20 geed oo bun ah, soo saar wadarta tirade geedaha bunka ah ee uu beeray ninka beeraleyda ah.*

Jaantuska 1.1

Hawl-galka 1.2

1 Raadi Bedka laba jibbaarka ee dhinacyadan.

b 8 sm   **t** 10 sm   **j** 15 sm   **x** 20 sm

2 Raadi bedka laydi dhererkiisu yahay 2 cm, ballaciisuna yahay 5 sm.

3 Dhammaystir shaxdan soo socota.

x	1	3	4	5	6	7	9	12	13	16	20
$x + x$	2	6	8	10	12						
$x \times x$	1	9	16	25	36						

b Waa maxay faraqa u dhexeeye $x + x$ iyo $x \times x = x^2$

t Tirooyinkan maxaa loo yaqaanaa 1, 4, 9, 16, 25 … ?

Hawlgalka kor ku xusan ee 1.2, waxaad ku soo aragtay Qeexitaan $1 \times 1 = 1, 4$ in loo cadeyn karo $2 \times 2 = 4$, 9 in loo cadeynkaro $3 \times 3 = 9$, Dhammaan tirooyinka noocaa ah waxaa loo cadeyn karaa iskudhufashada tirada laf ahaanteeda. Sida 1, 4, 9, 16, 25, … waxaana loo yaqaanaa **laba jibbaar tiro**. Markaad tiro iskudhufatid laf ahaanteeda waxaad heleysaa tiro kale oo loo yaqaano taranta labo tiro sida, $5 \times 5 = 5^2 = 25$.

Qeexid 1.1 *Habka iskudhufashada tiro lafteeda laba jeer waxaa loo yaqaanaa laba jibbaarka tiro, taranta tirolafteeda waxaa loo yaqaanaa laba jibbaarka tiro, waxaana lagu asteeyaa $x \times x = x^2$. Waxaana loo akhriyaa laba jibbaarka x, $x \times x = x^2$.*

Tusaale 1:

b $3^2 = 3 \times 3 = 9$, sidaas darteed 9 waa laba jibbaarka 3.

t $6^2 = 6 \times 6 = 36$. Sidaas darteed 36 waa laba jibbaarka 6.

Dhanka kale marka tiro loo geeyo iyada lafteeda waxan helaynaa tiro kale, taasoo ah wadarta laba tiro oo isle'eg, sida 5 + 5 = 10.

Xusuus: *Tiro kasta oo ay tahay y, waxa jira farqi u dhexeeya 2y iyo y^2.*

Qeexid 1.2 *Tiro idil oo ah W waxaa loo yaqaanaa laba jibbaarka qumman ama laba jibaarka tiro. Haddii la laba jibbaaro tiro idil oo ah x, markaa x iyo y waa tirooyin idil, $y = x^2$.*

Tusaale 2:   Tirooyinka idil ee 0, 1, 4, 9, 16, 25, 36, …, 169, waa laba jibbaaraneyaal qumman. Ma tixi kartaa laba jibbaaraneyaasha qumman ee ka yar 200?

Furfuris: laba jibbaaraneyaasha qumman waxa sameeya jibbaaridda tirooyinka idil. Sidaas darteed laba jibbaaraneyaasha qumman ee ka yar 200, waxaa lagu helaa jibbaaridda tirooyinka idil, adiga oo ka bilaabaya 0, 1, 2, 3,… oo kuna joojinaya inta ka hoosaysa 200 (laba boqol). Taasina waa sidan:-

$0^2 = 0 \times 0 = 0,$ $1^2 = 1 \times 1 = 1,$ $2^2 = 2 \times 2 = 4$

$3^2 = 3 \times 3 = 9,$ $4^2 = 4 \times 4 = 16,$ $5^2 = 5 \times 5 = 25$

$6^2 = 6 \times 6 = 36,$ $7^2 = 7 \times 7 = 49,$ $8^2 = 8 \times 8 = 64$

$9^2 = 9 \times 9 = 81,$ $10^2 = 10 \times 10 = 100,$ $11^2 = 11 \times 11 = 121$

$12^2 = 12 \times 12 = 144,$ $13^2 = 13 \times 13 = 169,$ $14^2 = 14 \times 14 = 196$

Hawl-galka 1.3

1   Adigoo isticmaalaya aqoontaadii hore ee isirraynta mutuxan, waxaad raadisaa isirraynta mutuxan ee tirooyinka soo socda?

     b   15   **t**   194   **j**   400   **x**   1025

2   Tirooyinka aan su'aasha hore ku soo sheegnay tiradee ayaa u qormi karta taranta laba tiro oo ay isku mid yihiin isirrayntooda mutaxani?

Waxaad isticmaali kartaa isirraynta mutuxan si aad u hubisid, inay tirooyinka idil yihiin laba jibbaaraneyaal qumman iyo in kale. Marka hore raadi isirraynta mutuxan ee tirada. Haddii ay suuragal tahay waxaad habeysaa isirrada tirada, adigoo u habeynaya taranta laba tiro oo isirrayntooda mutuxani ay isku mid tahay.

Haddaba haddii ay suurtagal noqon weydo, arrintaas aan kor ku soo xusnay tiradaas ma aha laba jibbaar qumman.

Tusaale 3: Kuwan soo socda keebaa ah laba jibbaar qumman?

      b   144   **t**   125   **j**   625

Furfuris:

    b $144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = (2 \times 2 \times 3) \times (2 \times 2 \times 3)$

$$= 12 \times 12 = 12^2$$

Haddaba isirrada 144, waxaynu u habeyn karnaa taranta laba isir oo isku mid ah waana sidan $12 \times 12 = 144$, sidaas darteed 144, waa laba jibbaarane qumman.

    t $125 = 5 \times 5 \times 5$, maadaama ayna isirradeedu u haybeysmaynin sida taranta laba isir oo isku mid ah ma aha laba jibbaar qumman.

    j $625 = (5 \times 5) \times (5 \times 5) = 25 \times 25 = 25^2$ maadaama oo ay isirradeedu u habaysmayaan taranta labo tiro oo isku mid ah waxaan odhaneynaa waa laba jibbaar qumman.

Hawl-galka 1.4

1   Fiiri taranta laba jibbaaraneyaasha qumman ee soo socda.

    b $4 \times 9 = 2^2 \times 3^2$ ma tahay taranta laba jibbaarane yaal qumman?

    t $25 \times 16 = 5^2 \times 4^2$ ma tahay taranta laba jibbaar qumman

2   Waxaad hubisaa taranta laba jibbaaraneyaalka qumman inay tahay laba jibbaaraneyaalka qumman?

3   Adigoo laba jibbaaraya 5 tiro ee ugu horeysa tirooyinka ee idil cabbirka god danbeedkoodu yahay 5.

    $5^2 = 25$ $15^2 = 225$ $25^2 = 625$ $35^2 = 1225$ $45^2 = 2025$

     Waxaad fiirisaa 25 inay isir u tahay dhammaantood.

    b   Raadi laba jibaarka 55 iyo 65.

    t   Maxaad ka fahmaysaa, $1 \times 2 = 2$, (2^2), $2 \times 3 =$, (6^2), $3 \times 4 = 12$, (12^2), $4 \times 5 = 20$, (20^2) iyo 4×5, markaad eegtid natiijada taranta laba jibbaarka.

Laba jibbaarka tirooyinka lakab ee qaabka Jajabyada ah:

Fasalladii hore waxaad ku soo aragtay in tirooyinka lakab ay u qormaan qaabkan $\dfrac{a}{b}$

marka ay a iyo b ay yihiin abyooneyaal, b ≠ 0. Sidaas darteed laba jibbaarka $\dfrac{a}{b}$ waa

$$\left(\dfrac{a}{b}\right)^2 = \dfrac{a}{b} \times \dfrac{a}{b} = \dfrac{a \times a}{b \times b} = \dfrac{a^2}{b^2}.$$

Tusaale 4: Raadi laba jibaarka tirooyinka soo socda.

b $\quad \left(\dfrac{2}{3}\right)^2 = \dfrac{2}{3} \times \dfrac{2}{3} = \dfrac{2 \times 2}{3 \times 3} = \dfrac{2^2}{3^2} = \dfrac{4}{9}$

t $\quad \left(\dfrac{5}{4}\right)^2 = \dfrac{5}{4} \times \dfrac{5}{4} = \dfrac{5 \times 5}{4 \times 4} = \dfrac{5^2}{4^2} = \dfrac{25}{16}$

Hawl-galka 1.5

Raadi laba jibbaarka tirooyinka lakab ee soo socda.

b $\quad \dfrac{10}{13}$ **t** $\quad \dfrac{14}{11}$ **j** $\quad \dfrac{19}{20}$

Haddii tirada lakab u qoran tahay qaabka jajab tobanle waxaad laba jibbaarkeeda u raadin kartaa iskudhu fashada tirada laf ahaanteeda.

Tusaale 5: Raadi

b $\quad (2.37)^2$ **t** $\quad (32.4)^2$

Furfuris:

b
```
      2.37
  ×   2.37
 ─────────
      1659
       711
      474
 ─────────
    5.6169
```

t
```
      32.4
  ×   32.4
 ─────────
      1296
       648
      972
 ─────────
   1049.76
```

Sidaas darteed $(2.37)^2 = 5.6169$

$(32.4)^2 = 1049.76$

Layliska 1.1

1 Raadi lab jibbaarka tirooyinkan soo soda

b	$\dfrac{11}{3}$	**j**	$\dfrac{17}{100}$	**kh**	0.112	**r**	0.0001
t	$\dfrac{3}{11}$	**x**	1.12	**d**	0.025		

2 Caddee oo tusaale ka bixi wadarta laba tiro oo laba jibbaaraneyaal qumman ah inayna noqonaynin laba jibbaaraneyaal qumman.

3 Caddee wadarta 10 tiro ee kisiga,ah ee tirooyinka idil. $1 + 3 + 5 + \ldots + 19$ inay noqonayso laba jibaaranayaal qumman.

1.1.2 Isticmaalka Shaxda qiimaha laba jibbaarka

Qaybihii hore waxaad ku soo aragtay in laba jibbaarka tiro lakab oo aan ahayn eber in lagu raadin karo, iyadoo la adeegsanayo iskudhufashada.

Hawl-galka 1.6

Raadi laba jibbaarka mid kastoo ka mida ah kuwan soo socda

b	5.34	**t**	9.87	**j**	37.4

Haddii aad adeegsatid habka iskudhufashada si aad u raadisid laba jibbaarka tiro lakab mararka qaarkood way adag tahay inaad habkan ku heshid laba jibbaarka, ama waxay kaa qaadan wakhti helitaanku. Sidaas darteed baa loo diyaariyay shaxdan waxaana loo yaqaanaa shaxda tirooyinka. Shaxdana waxaad ku arki doontaan dhamaadka buugan, qaaciido shaxdani waa $y = x^2$ shaxda laynkeeda jiifka ahna waxaa ku asteysan "x" Taas oo ay kutaxantahay tirooyinka 1.0 ilaa 9.9 laynka qotonka'ah waxaa ku taxan 0 ilaa 9 Hadaba haddii aad doontid inaad laba jibbaarka tiro karaadisid shaxda tirooyinka. Habka aad raacaysid waxaa uu ka muuqdaa tusaalaha soo socda.

Tusaale 6: Raadi $(5.67)^2$ laba jibbaarka adigoo ka raadinaya shaxda tirooyinka.

Furfuris:

Tallaabada 1: Shaxda qotonka ah ee ugu horeysa ee kubilaabanta (x) waxaad ka raadisaa shaxda jiifka ah eek u bilaabanta 5.6.
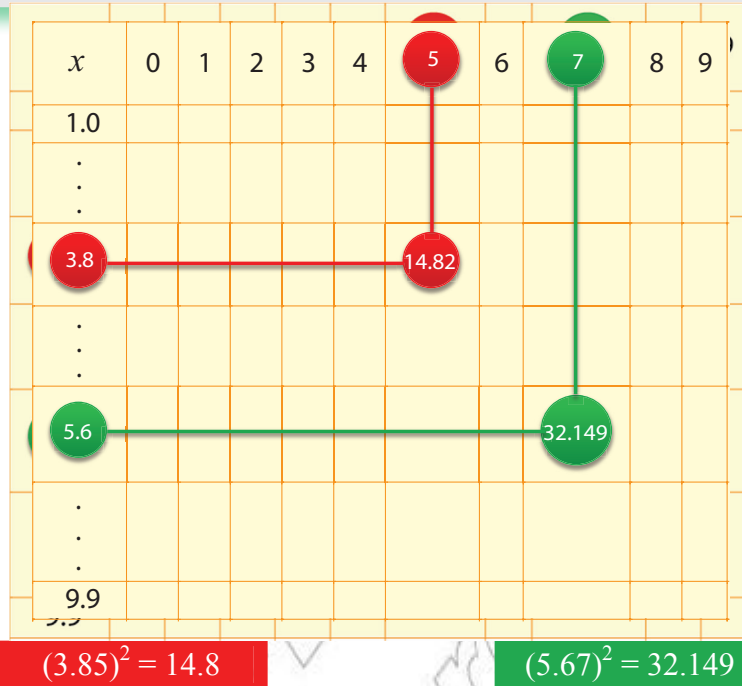
Tallaabada 2: Shaxda jiifka ah ee kubilaabanta (x) waxaad ka raadisaa shaxda qotonka ah ee kubi laabanta (7)

Tallaabada 3: Ka dib akhri tirada dhextaalka u ah shaxda jiifka ah ee ku bilaabanta 5.6 iyo shaxda qotanka ah ee ku bilaabanta 7 taas oo ah 32.149, markaa $(5.67)^2 = 32.149$

Dhinaca teknoolajiga:

A digoo isticmaalaya kaalkuleetarka sayntifiga waxaad laba jibbaarka tiro u isticmaalaysaa astaanta (x^2)

x	0	1	2	3	4	5	6	7	8	9
1.0										
.										
.										
.										
3.8						14.82				
.										
.										
5.6								32.149		
.										
.										
.										
9.9										

$(3.85)^2 = 14.8$ $\qquad (5.67)^2 = 32.149$

Xusuusnow:

i *Tallaabooyinka 1 ilaa 3 waxaa lagu soo gaabiyey 5.6 iyo 7.*

ii *Qiimaha aad ka heshey shaxda laba jibbaarka badanaaba waa ugu dhawaansho.*

iii *Shaxda tirooyinku waxay ku kooban tahay oo kaliya 1.00 ilaa 9.99 oo lagu siiyey.*

Iskuday inaad dib u xusuusatid aqoontaadii hore ee ahayd tirooyinka jajab tobanle tirooyinkan oo ah tirooyin lakab waxaa loo qoraa inta u dhexeysa 1 ilaa 10 iyo jibaarada toban.

Tusaale ahaan 3245 = 3.245 × 1000 = 3.245 × 10^3 marka aad rabtid inaad raadisid laba jibbaarka tiro taasoo aan ku jirin kuwii aan kor ku soo sheegnay ee shaxda tirooyinka. Marka hore waa inaad tirada taranta tirada u qortid inta dhexeysa 1 ilaa 10 iyo jibaarka 10.

Tusaale 7:

Raadi

b $(32.4)^2$ **t** $(567)^2$ **j** $(3251)^2$

Furfuris:

b $32.4 = 3.42 \times 10$, sidaas darteed $(32.4)^2 = (3.24 \times 10)^2 = (3.24)^2 \times 10^2$.

Raadi $(3.24)^2$ shaxda tirooyinka, keebaa ah $(3.24)^2 = 10.50$ sidaas darteed, $(32.4)^2 = 10.50 \times 100 = 1050$

t $567 = 5.67 \times 100$.

Ka dib $(567)^2 = (5.67 \times 100)^2 = (5.67)^2 \times 100^2$

Ka raadi $(5.67)^2$ shaxda tirooyinka $(5.67)^2 = 32.149$

Sidaas darteed $(567)^2 = 32.149 \times 10000 = 321490$.

j Raadi laba jibbaarka 3251 marka hore ku durki tirada saddex god dhinaca bidixda.

Taasina waa 3250, ka dib $3250 = 3.250 \times 1000$ iyo $(3250)^2$

$$= (3.250)^2 \times 1000^2.$$

Ka raadi $(3.250)^2$ shaxan tireedka. $(3.250)^2 = 10.56$.

Sidaas darteed, $(3250)^2 = 10.56 \times 1000000 = 10560000$.

Xusuus: *Adigoo adeegsanaya kaalkulaytar santifig ah waa in aad hesho kuwan soo socda.*

b $(32.4)^2 = 1049.76$

t $(567)^2 = 321489$

j $(3251)^2 = 10569001$

Xusuus:

Tiro badan, jidka ugu fiican aad u heleysid jibbaarkeeda waa in aad adeegsato kaalkulaytar sayntifig ah.

Layliska 1.2

Ka raadi mid kastoo ka mida ah kuwan soo socda shaxda laba jibaarka.

b $(8.54)^2$ **t** $(35.42)^2$ **j** $(0.151)^2$

x $(3.58)^2$ **kh** $(14.68)^2$ **d** $(9230)^2$

1.2 XIDID LABA JIBBAARKA TIROOYINKA LAKAB

Marka qaybtani dhammaato waxaad awoodi doontaan.

- ➢ Qeexida xidid laba jibbaarka tirooyinka togan ee lakabka leh.

- ➢ Xisaabinta xidid laba jibbaarka, jibbaarka qumman.

- ➢ Ka saaridda xidid laba jibbaarka tirada lakab adigoo adeegsanaya shaxda xidid laba jibbaarka.

Masalo furan:

Haweenay ayaa rabtay jikadeeda oo ah qaab laba jibbaarane in ay sibdhiso, taasoo bedkeedu yahay 16 m^2

- ➢ *Raadi dhererka dhinac kasta oo jikada ka mid ah.*

- ➢ *Qaybtii hore waxaad ku soo aragtay iskudhufashada tiro lafteeda taasoo ah laba jibbaarka tiro, qaybtana waxaad ku arki doontaa habka rogaalka laba jibbaarka tiro.*

Hawl-galka 1.7

1   Raadi dhinaca laba jibbaarane bedkiisu yahay 25sm^2?

2   Raadi tirada laba jibbaarkeedu yahay:-

b	1	**t**	9	**j**	36
x	0.01	**kh**	$\dfrac{4}{9}$	**d**	64

Tusaale 8: Raadi dhinaca laba jibbaarane bedkiisu yahay 64 sm^2.

Fur-furis: Haddii aad ka soo qaadid dhererka dhinaca inuu yahay "S" markaa

$$64 = S \times S = S^2.$$

Sidaas darteed si aad dhererka dhinaca u heshid waa in aad heshaa tiro laba jibbaarkeedu yahay 64. Tiradaasina waa 8.

- ✓ Inagoo ka duuleyna xaaladaha sare ku xusan oo dhan waxaan u baahanahay inaan raadino laba jibbaarka ina siinaya tiradaa.

    Helidda tiradaasna waxa loo yaqaanaa xidid laba jibbaar.

1.2.1   Xidid labajibaarka Jibaarka Quman

Rogaalka furfurista isugayntu waa kalagoynta, sidoo kale rogaalka iskudhufashadu waa isuqaybinta, sidaa si la mid ah rogaalka furfurista laba jibbaarka tiro waa helitaanka xidid laba jibbaarka tirada.

Qeexid 1.3   *Ka soo qaad $y \geq 0$.*

Hadii y ay tahay laba jibaarka tirada x, taasi oo ah, $x^2 = y$ kolkaa x waxa lagu magacaabaa xidid laba jibbaarka y, summad ahaana waxaa loo qori karaa sida $x = \sqrt{y}$, Summadda ah $\sqrt{}$ waxa loo yaqaanaa astaanta xididka, y – na waxaa loo yaqaanaa xididsane

$$\sqrt{x^2} = x;\ x \geq 0$$

Xusuus taarikheed:

Xusuusta taariikh ahaaneed, calaamada xididka ee aan hadda isticmaalno, waxa laga soo xigtay astaantii uu isticmaali jiray saynisyahankii la odhan jiray Christoff Rudolff sanadkii 1525.

Christoff Rudolff

Tusaale 9:

b $\sqrt{0} = 0$ maxaa yeelay $0^2 = 0$

t $\sqrt{9} = 3$ maxaa yeelay $3^2 = 9$

j $\sqrt{0.36} = 0.6$, maxaa yeelay $(0.6)^2 = 0.36$

x $\sqrt{49} = 7$, maxaa yeelay $7^2 = 49$

$\boxed{x} \xrightarrow{\text{laba jibbaarka}} \boxed{x^2}$

Ka saaridda xidid laba jibbaarka

$\boxed{x^2} \xrightarrow{} \boxed{x}\ (x{\geq}0)$

Waxaad isticmaali kartaa isirraynta mutaxan si aad u heshid xidid laba jibbaarka, laba jibbaaraneyaasha qumman.

Hadda waxaad fiirisaa isirraynta mutuxan ee tirooyinka soo socda iyo laba jibbaar kooda

Isirraynta mutuxan ee tiro	Isirraynta mutuxan ee laba jibbaarka
$4 = 2 \times 2$	$4^2 = 16 = 2 \times 2 \times 2 \times 2 = 2^2 \times 2^2 = (2 \times 2)^2$
$6 = 2 \times 3$	$6^2 = 36 = 2 \times 2 \times 3 \times 3 = 2^2 \times 3^2 = (2 \times 3)^2$
$15 = 3 \times 5$	$15^2 = 225 = 3 \times 3 \times 5 \times 5 = 3^2 \times 5^2 = (3 \times 5)^2$
$12 = 2 \times 2 \times 3$	$12^2 = 144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 2^2 \times 2^2\, 3^2 = (2 \times 2 \times 3)^2$

Tusaale 10: Adigoo adeegsanaya isirraynta mutuxan. Raadi xidid laba jibbaarka kuwan soo socda.
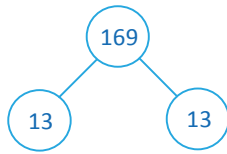
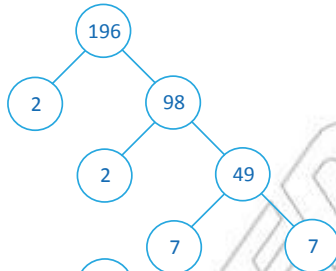   **b** $\sqrt{169}$ **t** $\sqrt{196}$ **j** $\sqrt{625}$

Furfuris:

   b

$169 = 13 \times 13 = 13^2$

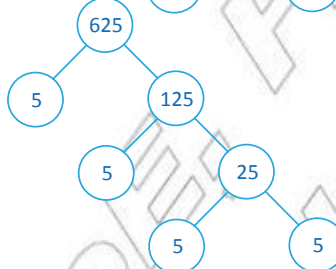Sidaas darteed $\sqrt{169} = \sqrt{13^2} = 13$

   t

$196 = 2^2 \times 7^2 = (2 \times 7)^2 = 14^2$

Sidaas darteed $= \sqrt{196} = \sqrt{14^2}$

$= 14$

   j

$625 = 5^2 \times 5^2 = (5 \times 5)^2 = 25^2$

Sidaas darteed $= \sqrt{625}$

$= \sqrt{25^2} = 25$

Dhinaca teknoolajiga:

Waxaa kalood isticmaali kartaa kalkuleetarka sayntifiga ka astaanta tusaale ahaan $\sqrt{}$

Layliska 1.3

Raadi xidid laba jibbaarka tirooyinka soo socda

     b   100   **t**   121   **j**   729

     x   900   **kh**   10,000   **d**   841

1.2.2   Isticmaalka shaxda xidid laba Jibaarka

Tusaale 11: Raadi $\sqrt{92.93}$ shaxda tirooyinka

Furfuris:

Tallaabada 1^{aad}: Tirada shaxda laga raadinayo qaaciidada lagu helayo waa $y = x^2$ haddaba raadi 92.93.
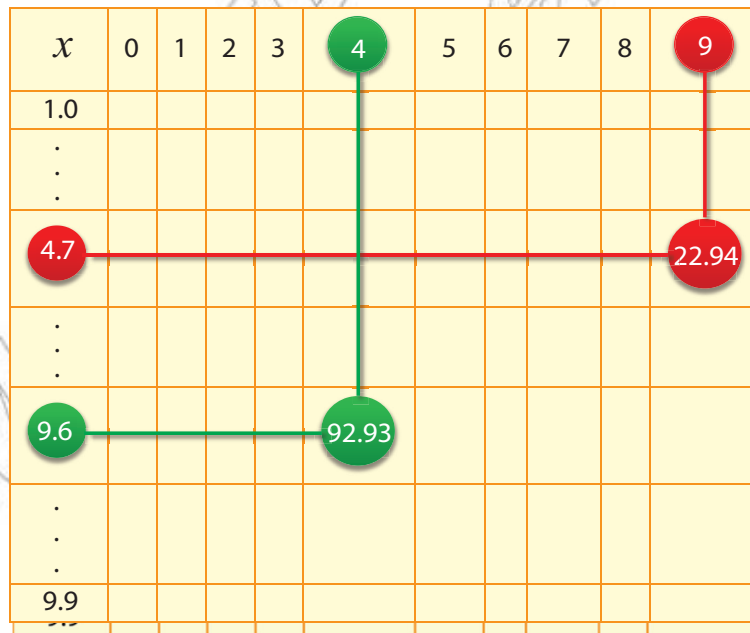
Tallaabada 2^{aad}: Shaxda jiifka ah ee ay kujirto 92.93 uga dhaqaaq dhinaca bidix. Ka dibna akhri tirada ku jirta shaxda qotonka ah ee ugu horeysa taas oo ah 9.6

Tallaabada 3^{aad}: Shaxda qotonka ah ee ay ku jirto tirada 92.93 uga dhaqaqaaq dhinaca kore oo akhri tirada ku jirta shaxda jiifka ah ee ugu horeysa taas oo ah 4

Tallaabada 4^{aad}: Sidaas darteed $\sqrt{92.93} = 9.64$

Horey waxaad u soo aragtay sida loo raadiyo laba jibbaarka tiro iyada oo laga raadinayo shaxda tirooyinka. Haddana waxaad arki doontaa habka duwan, kaas oo ah ka saarida xidid laba jibbaarka shaxda tirooyinka, kaas oo aad isticmaali jirtey marka aad raadineysid laba jibbaarka tiro.

Waxaanad ku arki doontaa tusaalahan soosocda.

x	0	1	2	3	4	5	6	7	8	9
1.0										
.										
.										
.										
4.7										22.94
.										
.										
.										
9.6					92.93					
.										
.										
.										
9.9										

$\sqrt{22.94} = 4.79$ $\sqrt{92.93} = 9.64$

> **Xusuus:** *wakhtiyada qaarkood waxa laga yaabaa in aad tirada ka weydid shaxda tirooyinka, sida xaaladahan oo kale waxad qaadan kartaa xidid laba jibbaarka tirada ugu dhaw tirada lagu siiyay.*

Tusaale 12: Raadi $\sqrt{56.90}$

Furfuris: tirada 56.90, kuma jirto shaxda tirooyinka, laakiin waxay u dhexeysaa 56.85 iyo 57, tirada ugu dhaw labadaa tiro 56.90 waa 56.85, iyo $\sqrt{56.85} = 7.54$. Sidaas darteed $\sqrt{56.90} \approx 7.54$.

Shaxda tirooyinka waxaa loo isticmaalaa si loo helo xidid laba jibbaarka tirooyinka u dhexeeya 1.00 ilaa 9.99. qaaciidada lagu helo xidid laba jibbaaka tirooyinka ka weyn 10.0, waxayna ku cadahay hoos iyada oo lagu adeegsanayo tusaalaha soo socda.

Tusaale 13: Raadi $\sqrt{2841}$,

Furfuris: marka hore waxaad u qortaa sidan $2841 = 28.41 \times 100$, markaa $\sqrt{28.41} = \sqrt{28.41 \times 100} = \sqrt{28.41} \times \sqrt{100} = \sqrt{28.41} \times 10$. Raadi $\sqrt{28.41}$, oo ka raadi shaxda tirooyinka taas oo ah 5.33.

Sidaas darteed $\sqrt{28.41} = 5.33 \times 10 = 53.3$

> **Xusuus:** *Ha iloobin qiimeyaasha aad ka heshay tuseyaal tireedkainay yihiin ugu dhawaansho*.

Layliska 1.4

1   Ku qor run ama been mid kasta oo ka mid ah kuwa soo socda:-

b $0.9 > (0.3)^2$ **j** $\sqrt{0.01} < 0.1$

t $\sqrt{0.04} > 0.4$ **x** $(0.04)^2 > 0.4$

2   Raadi xidid laba jibbaarka mid kasta.

b $\sqrt{9}$ **t** $\sqrt{2.25}$ **j** $\sqrt{441}$

x $\sqrt{0.36}$ **kh** $\sqrt{\dfrac{121}{225}}$

3 U habee mid kasta oo ka mid ah kuwa (tirooyinka) soo socda sida ay u sii kordhayaan.

$$\frac{1}{2}, \ \sqrt{0.01}, \ \sqrt{\frac{1}{2}}, \ 3, \ \sqrt{7}, \ \sqrt{10}$$

4 Tax dhammaan tirooyinka idil uu laba jibbaarkoodu dhexeeyo 1 iyo 100.

5 Haddi 69 laadhu ah loo habeeyo labaJibaar ahaan, imisa laadhu ah, ayaa hadhaysa?

6 Sharax sababta – 16 ayna u lahayn xidid laba Jibbaar.

7 Adigoo isticmaalaya Isirraynta mutuxan waxaad raadisaa xidid laba jibbaarka taranada soo socda.

   b 16×9 **t** $25 \times 49 \times 9$ **j** $20 \times 35 \times 63$

8 Raadi xidid laba jibbaarka tirooyinka soo socda adigoo ka raadinaya shaxda tirooyinka.

   b   234   **t**   12,321   **j**   0.099   **x**   4.356

9 Adigoo isticmaalaya shaxda tirooyinka raadi dhinacyada laba jibbaarane bedkiisu yahay 4.63 sm^2.

1.3 SADDEX JIBBAARKA IYO XIDID SADDEX JIBBAAR

Dhammaadka qaybtan waxaad awoodi doontaa

> Inaad qeexdid saddex jibbaarka tiro.
> Inaad raadisid saddex jibbaarka tiro.
> Inaad qeexdid xidid saddex jibbaarka.
> Inaad raadisid xidid saddex jibbaarka ee saddex jibbaarada qumman.

1.3.1 Saddex Jibaarka tiro

Joometeri ahaan waxaad garanaysaa erayga "Saddex jibbaarane". Waa sanduuq ay isle'eg yihiin dhammaan geftinadiisa.

Shaqo-kooxeedka 1.1

Idinkoo adeegsanaya qalabka laga helo deegaanka waxaad samaysaan saddex jibbaarane dhinnacyadiisu yahay halbeeg.

Isla markaana kaga jawaaba su'aalaha soo socda qaab-dhismeedka saddexjibbaaraneyaasha aad samayseean:-

1   Imisa saddexjibbaaraneyaal oo gedtinku halbeegyahay kara cidhifka hal cabbir, sidoo kale imisa sadex-jibaar ayaa ka samaysmi kara cidhifka laba cabbir?

2   Imisa saddexjibaar ayaa ka samaysmikara cidhifka hal cabbir, sidoo kale imisa saddexjibaar ayaa ka samaysmi kara cidhif ka sadex cabbir?

Fiiri tirooyinka 1, 8, 27, 64, 125, mid kastoo ka mid ah tirooyinka waxaa helaa, markaa tiro la iskudhufato saddex jeer isla laf haanteed.

Taas oo ah:

$1 = 1 \times 1 \times 1 = 1^3$ $\qquad$ $8 = 2 \times 2 \times 2 = 2^3$ $\qquad$ $27 = 3 \times 3 \times 3 = 3^3$

$64 = 4 \times 4 \times 4 = 4^3$ $\qquad$ $125 = 5 \times 5 \times 5 = 5^3$

tirooyinka waxa loo yaqaanaa saddexjibaaraneyaal qumman, ama tirooyinka saddex-jibaaran.

Hawl-galka 1.8

1   Raadi mugga sadexjibaarane geftinkiisu yahay 4 cm.

2   Imisa sadexjibaarmayaal oo geftinkoodu yahay 1 sm ayaa ka samaysmi kara sadex jibaarane geftinkusu yahay yihiin.

   b   6 sm?   **t**   7 sm?

3   Dhamaystir tusaha soo socdta.

x	−4	−3	−2	−1	0	1	2	3	4
x^3		−27							

Qeexid 1.4   *Habka tiro laysugu dhufto saddex jeer lafahaanteeda ayaa loo yaqaanaa saddex jibaar tiro. Marka x, laysku dhufto saddex jeer ayaa layidhaahdaa saddex jibaarka "x". Waxaana lagu asteeyaa $x^3 = x \times x \times x$. Isla markaana loo akhriyaa "x saddex jibbaaran" ama "x lagu jibbaaray 3".*

Tusaale 14:

Raadi saddexjibaarka mid kasta oo ka mid ah tirooyinka soo socda.

b 9 **t** 11 **j** – 10

Furfuris:

b $9^3 = 9 \times 9 \times 9 = 729$

t $11^3 = 11 \times 11 \times 11 = 1331$

j $(-10)^3 = (-10) \times (-10) \times (-10) = -1000$

> **Qeexid 1.5** *Tirada idil ee "a" waxaa loo yaqaanaa saddex jibaar quman haddii ay la mid tahay saddexjibbaarka tiro idil oo b ah. Taasoo ah $a = b^3$.*

Tusaale 15: Caddee in tirooyinka idil ee 0, 1, 8, 27, 125. Inay yihiin saddex jibaaraneyaal quman.

Furfuris:

$$0 = 0 \times 0 \times 0 = 0^3, \qquad 1 = 1 \times 1 \times 1 = 1^3,$$
$$5^3 = 5 \times 5 \times 5 = 125 \qquad 27 = 3 \times 3 \times 3 = 3^3,$$
$$125 = 5 \times 5 \times 5 = 5^3,$$

Tusaale 16: 9 miyey tahay saddex jibaar quman?

Furfuris:

$9 = 3 \times 3$, haddaba majirto tiro idil oo marka saddex jeer laysku dhufto ina siisa 9. Sidaas darteed 9 ma aha saddex jibaar quman. Waxaad adeegsan kartaa isiraynta mutuxan si aad u hubisid inay tirada idil tahay mid saddex jibaar quman ah iyo inayna ahayn.

Fiiri tusaha soo socda

Isiraynta mutuxan ee tiro	Isirraynta mutaxan ee saddexjibbarkeeda
$4 = 2 \times 2$	$4^3 = 64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^3 \times 2^3$
$6 = 2 \times 3$	$6^3 = 216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 2^3 \times 3^3$
$15 = 3 \times 5$	$15^3 = 3375 = 3 \times 3 \times 3 \times 5 \times 5 \times 5 = 3^3 \times 5^3$
$12 = 2 \times 2 \times 3$	$12^3 = 1728 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 2^3 \times 2^3 \times 3^3$

Hawl-galka 1.9

Maxaad ka ogaatay isirrada mutuxan ee tiradaa saddexjibaarkeedu ka muuqdo tusaha sare?

Isiraynta mutuxan ee tiro kasta, haddii isirkasta muuqdo saddex jeer, kolkaa tiradu waa saddex jibaar quman.

Tusaale 17: Kuwan soo socda keebaa ah saddexjibaar quman

   b   729   **t**   500   **j**   8000

Furfuris:

   b $729 = (3 \times 3 \times 3) \times (3 \times 3 \times 3)$ Isiradu waxaa loo kooxayn karaa saddex-saddex. Sidaas darteed 729 waa saddex jibaar quman.

   t $500 = (2 \times 2) \times (5 \times 5 \times 5)$ hadab taranta waxaa ah saddex saddex shanaad laakiin 2 waa laba jeer oo keliba. Sidaas darteed 500 ma aha saddexjibaar quman.

   j $8000 = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (5 \times 5 \times 5)$ haddaba Taranta 2du waa laba koox ro saddex-saddex ah taranta saddex 5^{aad} jeer, Sidaas darteed. 8000 waa saddex jibaar quman.

Dhinaca teknoolajiga:

Si aad kaalkuleetarka seyntifiga u adeegsatid waxaad taaban si aad u heshid 53, adeegso kalkulaytar sayntifig oo cadaadi

$$5^3 = \boxed{5}\,\boxed{x^y}\,\boxed{3}$$

Layliska 1.5

1   Raadi saddex jibaarka mid kasta oo ka mid ah tirooyinka soo socda:-

   b $\dfrac{1}{2}$ **t**   0.3   **j** $\dfrac{-4}{5}$ **x** $\dfrac{3}{7}$

2   Kuwan soo socda kuwee ah saddexjibaaraneyaal quman:-

   b   343   **t**   400   **j**   3375

   x   9000   **kh**   15625   **r**   2025

   d   6859   **s**   512000

1.3.2 Xididada saddex jibaarka

Qaybtii hore waxaad ku soo aragtay sida loo raadiyo xidid laba jibaarka tiro. Kaas oo ah rogaalka labajibaarka ee tiro. Sidoo kale raadinta xidid saddexjibaarka, waa rogaalka furfurista saddexjibaarka.

Hawl-galka 1.10

1 Haddii muga saddexjibaarane yahay $125sm^3$, markaa waxaad raadisaa dhererka geftinkiisa?

2 Mid kasta oo ka mid ah kuwan soo socda soo saar tirada uu saddexjibbaar keedu yahay:

b	0	**t**	1	**j**	27
x	64	**kh**	1000		

Hawl-galka 1.10 waxaad ku naaqtiimi furfurida saddexjibaarka. haddaba habka rogaalka raadinta saddex jibaar tiro waxaalo uqeexay sida soo socota:-

---

Qeexid 1.6 *Haddii y ay tahay saddex jibaarka x, markaa $y = x^3$ kolkaa x waxaa loo yaqaanaa xidid saddex jibaarka y, kaas oo astaan ahaan loo qori karo $x = \sqrt[3]{y}$ $\sqrt[3]{x^3} = x$: astaantan $\sqrt[3]{y}$, 3 waxaa loo yaqaanaa muujiyaha. $\sqrt[3]{}$ waa astaanta xidid saddex jibaarka.*

Tusaale 18: Raadi xiddid saddex jibaarka kuwa soo socda

b 27 **t** $\dfrac{64}{125}$

Furfuris:

b $27 = 3 \times 3 \times 3$, sidaas darteed $\sqrt[3]{27} = 3$.

t $\dfrac{64}{125} = \dfrac{4 \times 4 \times 4}{5 \times 5 \times 5}$. Sidaas darteed $\sqrt[3]{\dfrac{64}{125}} = \dfrac{4}{5}$

Waxaad adeegsan kartaa isiraynta mutuxan si aad u raadisid xidid saddex jibaarka ee tiro.

Fiiritusaalaha soo socda

Tusaale 19:

b $1000 = (2 \times 2 \times 2) \times (5 \times 5 \times 5)$

$= 2^3 \times 5^3 = (2 \times 5)^3$ sidaas darteed,

$\sqrt[3]{1000} = \sqrt[3]{(2 \times 5)^3} = 10$.

t $8000 = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (5 \times 5 \times 5)$

$= 2^3 \times 2^3 \times 5^3$

$= (2 \times 2 \times 5)^3$.

Sidaas darteed, $\sqrt[3]{8000} = \sqrt[3]{(2 \times 2 \times 5)^3}$

$= 2 \times 2 \times 5 = 20$.

Dhinaca teknoolajiga:

Marka aad adeegsaneysid kaalkuleetarka siaad u raadisid $\boxed{\sqrt[3]{8}}$, cadaadi $\boxed{8}$ $\boxed{2nd}$ $\boxed{x^y}$ $\boxed{3}$

Xusuus: *Marka ay tiro u qoran tahay taranta saddex isir oo isleeg, isir kasta waxaa lagu magacaabaa xidid saddexjibaarka tirada.*

Layliska 1.6

1 Raadi xidid saddexjibaarka mid kasta oo ka mid ah tirooyinka soosocda adiga oo adeegsanaya isiraynta mutuxan.

b 512 **j** 27000 **kh** 15625

t 2744 **x** 10648

2 Raadi xidid saddex jibaarka kuwan soo socda:-

b $\sqrt{\dfrac{64}{729}}$ **t** $\sqrt{\dfrac{1,000,000}{117,649}}$

🔑 Furaha Tibxaha 🔑

- Labajibaar
- Xidid laba jibaarka
- saddex jibaarka quman
- Labajibaar quman
- Xidid saddex jibaarka
- Xidid kasaarida saddex-jibaarka

Sookoobida Cutubka

✓ *Habka la iskugu dhufto tiro laf ahaanteed waxa lagu magacaabaa laba-jibaarka tiradaa.*

✓ *Haddii tiro idil oo ah y loo cadayn karo sida x^2 haddii x tahay tiro idil, markaa y waxa lagu magacaabaa laba jibbaar quman.*

✓ *Haddii ay isiraynta mutuxan tiro laba jeer soo noqoto tiradaas waxaa loo yaqaanaa laba jibbaar quman.*

✓ *Xidid laba jibaarku waa rogaalka xisaabfalka laba jibbaarka.*

✓ *Xidid laba jibbaarka togan ee tiro waxaa lagu asteeyaa calaamadan $\sqrt{}$. Tusaale $3^2 = 9$ sidaa darteed $\sqrt{9} = 3$.*

✓ *Tirooyinka soo baxa marka tiro iyada lafteeda sadex jeer la isku dhufto waxa lagu magacaabaa, saddex jibaarka tiro, Tusaale: 1, 8, 27.*

✓ *Haddii tiro isiraynteeda mutuxan uu isir kasta saddex jeer soo noqdo, tiradaa waxa lagu magacaabaa saddexjibaar-quman.*

✓ *Rogida xisaab falka ee helidda saddexjibaarka tiro waa helidda xiddid saddex jibaarka tiro. taasoo ah helidda (raadinta) tiro saddexjibaarkeedu yahay tirada lagu siiyay.*

✓ *Astaantan $\sqrt[3]{}$ waxa lagu suntaa xidid saddex jibaarka. Tusaale $\sqrt[3]{27} = 3$.*

Nakhtiinka layliska cutubka 1aad

1 Tirooyinka soo socda kuwee ah laba jibbaaranayaal qumman?

b	8	**t**	100	**j**	30,000
x	90,000	**kh**	1210000		

2 Tirooyinka soo socda kuwee ah saddex jibaarenayaal quman?

b	64	**t**	1000	**j**	216000
x	250,000	**kh**	15,000		

3 Raadi xidid laba jibaarka mid kasta tirooyinka soo socda adigoo ka raadinay tusaha, tirooyinka.

    b 397   **t** 9.231   **j** 0.81

4 Raadi xidid saddex jibaarka mid kasta tirooyinka soo socda, adigoo ka raadinaya tusaha tirooyinka

    b 66   **t** 7382   **j** 13400

5 Shakhsi ayey lacagi u taalaa bangiga lacagtaas oo dhan $20{,}000\,(1.06)^3$. Haddaba waxaad raadisaa xadiga lacagta bangiga u taala tirada ugu dhaw ee tirada idil ah

6 Raadi saddex jibaarka tiro, labajibaar keeduna yahay 0.09.

7 Raadi xididka mid kasta oo kuwan kamida.

    b $\sqrt{36}$ **t** $\sqrt{0.16}$ **j** $\sqrt{\dfrac{25}{16}}$ **x** $\sqrt{\dfrac{169}{400}}$

8 Fududee mid kasta kuwan soo socda

    b $\sqrt{\dfrac{6}{36}}$ **t** $\dfrac{\sqrt[3]{27}}{\sqrt{64}}$ **j** $\dfrac{\sqrt[3]{-125}}{\sqrt{25}}$ **x** $\sqrt[3]{\dfrac{a^3}{8}}$

9 Ku qor Run ama Been kuwan soo socda mid kasta

    b Saddex jibaarka tiro kasta oo kisi ah waa tirokisi

    t Haddii jibaarkadu tiro ku dhamaado 5 markaa tiradaas saddex jibaarkeeduna wuxuu ku dhamaadaa 25.

    j Ma jiro saddexjibaar qumman oo ku dhamaada 8.

10 Saamiga laba jibbaarka laba tiro ayaa'ah 25:9. Waa imisa saamiga tirooyinka?

11 Haddii saddex jibaarka tiro yahay 64 waa maxay xidid laba jibaarka tiradu?

12 Raadi xidid laba jibbaarka wadarta $1 + 2^3 + 3^3 + 4^3$.

13 Raadi mugga saddex jibaarane geftinkiisu yahay $\sqrt[3]{2}$.