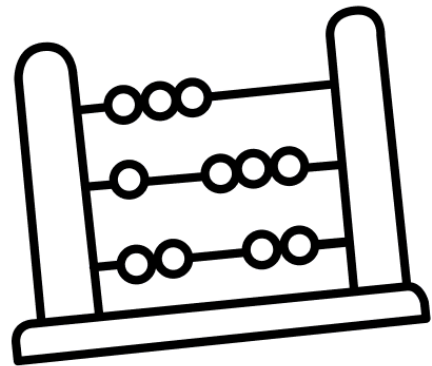


Hubinta iyo xaqiiijinta fahamka tirooyinka 10-ga ah

Maths

Cutub: Qaabka caadiga ah (Standard form)



Natiijo

Waxaan awoodi karaa inaan kala saaro tirooyinka 10n si loo fududeeyo isku dhufashada iyo qaybinta tirooyinka dhammaystiran iyo jajab tobanle (decimals) labadaba.

Marka tiro lagu dhufto nafteeda marar badan, waxaa loo qori karaa si ka fudud qaab jibbaar ah (exponential form).

$$\text{e.g. } 2 \times 2 \times 2 = 2^3$$

$$\text{e.g. } 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 10^6$$

Erayada muhiimka ah

Hawl (operation) waa commutative haddii qiimaha ay ku shaqeyso lagu qori karo labada hab iyada oo aan isbeddelin xisaabta.

Tusaale

$$3 + 4 = 4 + 3$$

Tusaale

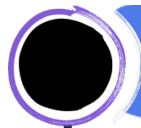
$$7 \times 2 = 2 \times 7$$

Tusaale aan ahayn (Non example)

$$10 - 2 \neq 2 - 10$$

Qaabka casharka

Hubinta iyo xaqiijinta fahamka tirooyinka 10-ga ah



Isticmaalka jibbaarada 10 si loo fududeeyo xisaabinta



Isticmaalka jajabyada u dhigma (equivalent fractions) si loo fududeeyo xisaabinta

Isticmaalka jibbaarada 10 si loo fududeeyo xisaabinta

Waa kuwan jaantuska Gattegno.

1000	2000	3000	4000	5000	6000	7000	8000	9000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

Wax soo saarka (product) labada tiro ee la calaamadeeyay waa 21

Raadi labo tiro oo kale oo ku yaal jaantuska, oo wax soo saarkoodu yahay 21

Waa kuwan jaantuska Gattegno.

1000	2000	3000	4000	5000	6000	7000	8000	9000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

Tusaale ahaan,

$$0.3 \times 70$$

Ogsoonow tirada ku taal safka 3aad waa mid ka hooseeya tirada asalka ah, kan ku yaal safka 7aadna waa mid ka sareeya.

Isticmaalka jibbaarada 10 si loo fududeeyo xisaabinta



Waa kuwan jaantuska Gattegno.

1000	2000	3000	4000	5000	6000	7000	8000	9000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

Maxay tani weli u siinaysaa wax soo saar (product) 21?

Hoos uga dhaqaaqista safka jaantuska Gattegno waxay u qaybisaa tiro 10, kor uga dhaqaaqistuna waxay ku dhufataa tiro 10.

Waa kan jaantuska Gattegno.

1000	2000	3000	4000	5000	6000	7000	8000	9000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

Waa maxay wax soo saarrada (products) kale ee jaantuskan leh wax soo saar (product) 21?

Lammaane kale: 0.03×700 30×0.7 300×0.07

Aynu si faahfaahsan u sahaminno (explore) tan

$$\begin{array}{ccc} & 30 \times 0.7 & \\ \swarrow & & \searrow \\ 3 \times 10 & \times & 7 \times 0.1 \\ 3 \times 7 & \times & 10 \times 0.1 \\ 21 & \times & 1 \\ 30 \times 0.7 = 21 & & \end{array}$$

Isticmaalka sharciga isku xidhka
(associative law) waxaan qori
karnaa

$$30 = 3 \times 10 \text{ iyo}$$

$$0.7 = 7 \times 0.1$$

Dib u qorista iyadoo la isticmaalayo
sharciga beddelka (commutative law)

Fududaynta (Simplifying)

Tus adigoo isticmaalaya sharciga isku xidhka (associative law), sharciga beddelka (commutative law) iyo awoodaha (powers) 10, sababta wax soo saarku (product) u yahay 21

$$\begin{array}{ccc} & 300 \times 0.07 & \\ \swarrow & & \searrow \\ 3 \times 100 & \times & 7 \times 0.01 \\ 3 \times 7 & \times & 100 \times 0.01 \\ 21 & \times & 1 \\ 300 \times 0.07 = 21 & & \end{array}$$

Isticmaalka awoodaha (powers) 10 si loo fududeeyo xisaabinta (calculations)

Qorista isku dhufashada (multiplications) 100, 10 000 iwm waxay qaadan kartaa waqti, marka aynu isticmaalno jibbaarada (exponents) si aan u muujinno isku dhufashada, si hufan.

Ma buuxin kartaa jaantuskan si aad u muujiso isku dhufashada 10 qaab jibbaareed (exponential form)? Midda hore ayaa lagu sameeyay.

Tiro (Number)	Qaab jibbaareed (Exponential form) 10^0
1	10^1
10	10^2
100	10^3
1000	10^4
10 000	10^5
100 000	10^6
1 000 000	

Isticmaalka awoodaha (powers) 10 si loo fududeeyo xisaabinta (calculations)



Sharaxaad

Isticmaalka awoodaha (powers) 10, aynu qorno xisaabtan (calculation).

$$2000 \times 4000$$

$$\begin{array}{rcl} 2000 & \times & 4000 \\ \swarrow & & \searrow \\ 2 \times 1000 & \times & 4 \times 1000 \\ 2 \times 4 & \times & 1000 \times 1000 \\ 8 & \times & 1\,000\,000 \\ 8 & \times & 10^6 \end{array}$$

Isticmaalka sharciga isku-xirka (associative law)

Fududaynta

Dib u qorista iyadoo la isticmaalayo sharciga beddelka (commutative law)

Isticmaalka awoodaha 10, waxaan arki karnaa 2000×4000 waxaa loo qori karaa

$$8 \times 10^6$$

Labo arday ayaa la siiyay xisaabtan si ay ugu qoraan awoodaha 10

Cabdi

$$\begin{array}{rcl} & 800 \times 200 & \\ \swarrow & & \searrow \\ 8 \times 100 & \times & 2 \times 100 \\ 8 \times 2 & \times & 100 \times 100 \\ 16 & \times & 10\,000 \\ 16 & \times & 10^4 \end{array}$$

$$800 \times 200 = 16 \times 10^4$$

Saciid

$$\begin{array}{rcl} & 800 \times 200 & \\ \swarrow & & \searrow \\ 8 \times 100 & \times & 2 \times 100 \\ 8 \times 2 & \times & 100 \times 100 \\ 16 & \times & 10\,000 \\ 1.6 \times 10 & \times & 10\,000 \\ 1.6 & \times & 10 \times 10\,000 \\ 1.6 & \times & 100\,000 \end{array}$$

$$800 \times 200 = 1.6 \times 10^5$$

Yaa sax ah oo ma sharixi kartaa sababta?

Labaduba waa sax. Labaduba waxay isticmaaleen awoodaha 10; Saciid wuxuu doortay inuu u qoro 16 sida 1.6×10 laakiin labaduba waa qaabab isku mid ah oo loo qoro tiro isku mid ah.

Kee baa ka duwan? Sharax sida aad u ogaatay.

a $2.5 \times 3 \times 10^4 = 7.5 \times 10 \times 10 \times 10 \times 10 = 75\,000$

b $7.5 \times 10^4 = 7.5 \times 10 \times 10 \times 10 \times 10 = 75\,000$

c $25 \times 3 \times 10^3 = 75 \times 10 \times 10 \times 10 = 75\,000$

d $15 \times 5 \times 10^3 = 75 \times 10 \times 10 \times 10 = 75\,000$

e $2.5 \times 10^3 = 2.5 \times 10 \times 10 \times 10 = 2500$

Waxaad xisaabin kartaa jawaabta dhabta ah ee mid kasta oo ka mid ah oo aad heli kartaa kan ka duwan.



1) Isku-dhafan (Match) xisaabta leh xisaabta isticmaasha qaabka jibbaarada (exponential form).

$$200 \times 400$$

$$200 \times 4000$$

$$2 \times 40$$

$$8000 \times 1000$$

$$8 \times 10$$

$$8 \times 10^5$$

$$8 \times 10^4$$

$$8 \times 10^6$$

2) Isku-dhafan (Match) xisaabta leh xisaabta isticmaasha qaabka jibbaarada (exponential form).

$$200 \times 600$$

$$200 \times 6000$$

$$2 \times 60$$

$$3000 \times 4000$$

$$12 \times 10^4$$

$$1.2 \times 10^2$$

$$12 \times 10^5$$

$$1.2 \times 10^7$$

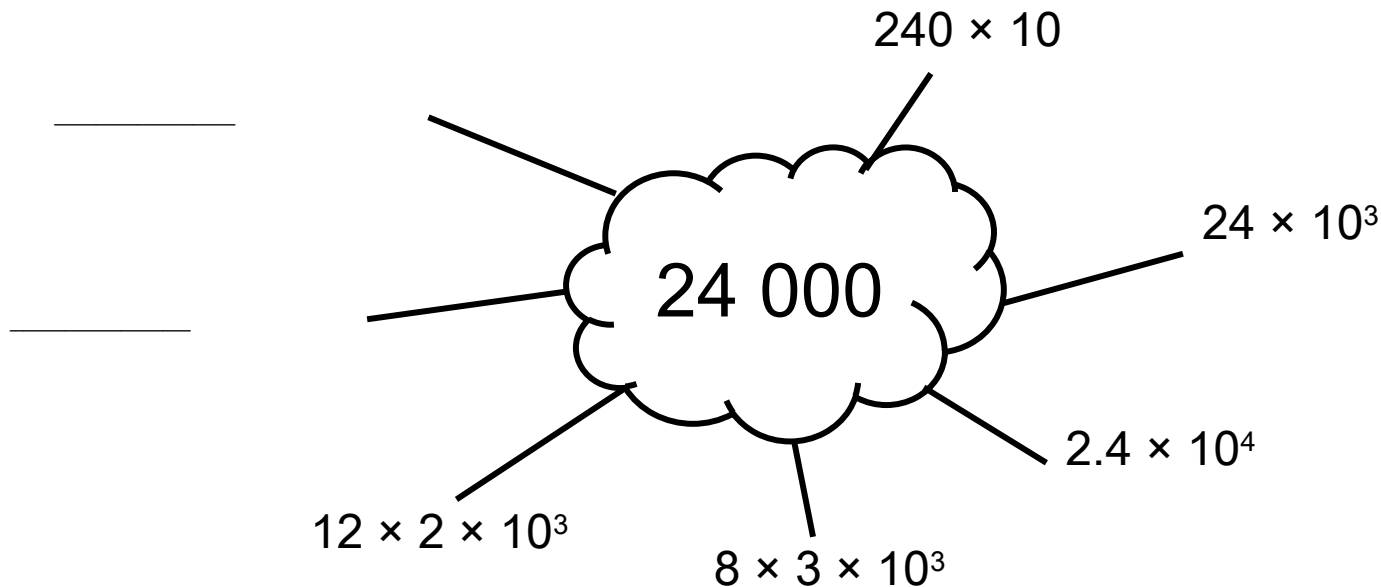
3) Buuxi tirooyinka maqan. Hubi inaad muujiso shaqadaada.

a) $9000 \times 100 = 9 \times 10^{\square}$

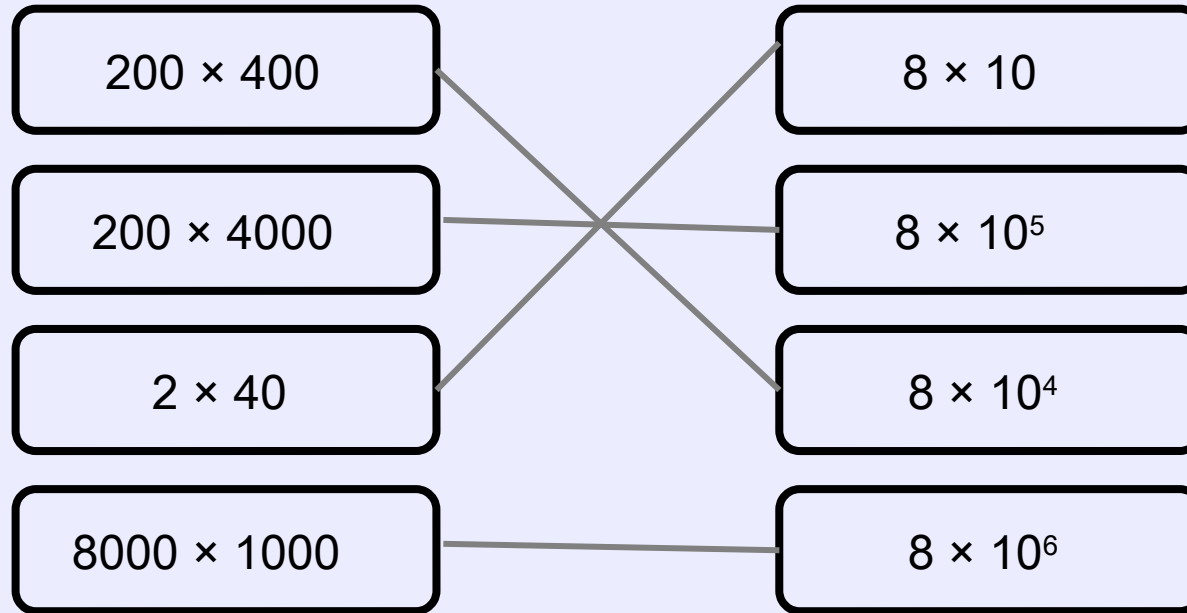
b) $300 \times 250 = 75 \times 10^{\square} = 7.5 \times 10^{\square}$

c) $4000 \times 1500 = 60 \times 10^{\square} = 6 \times 10^{\square}$

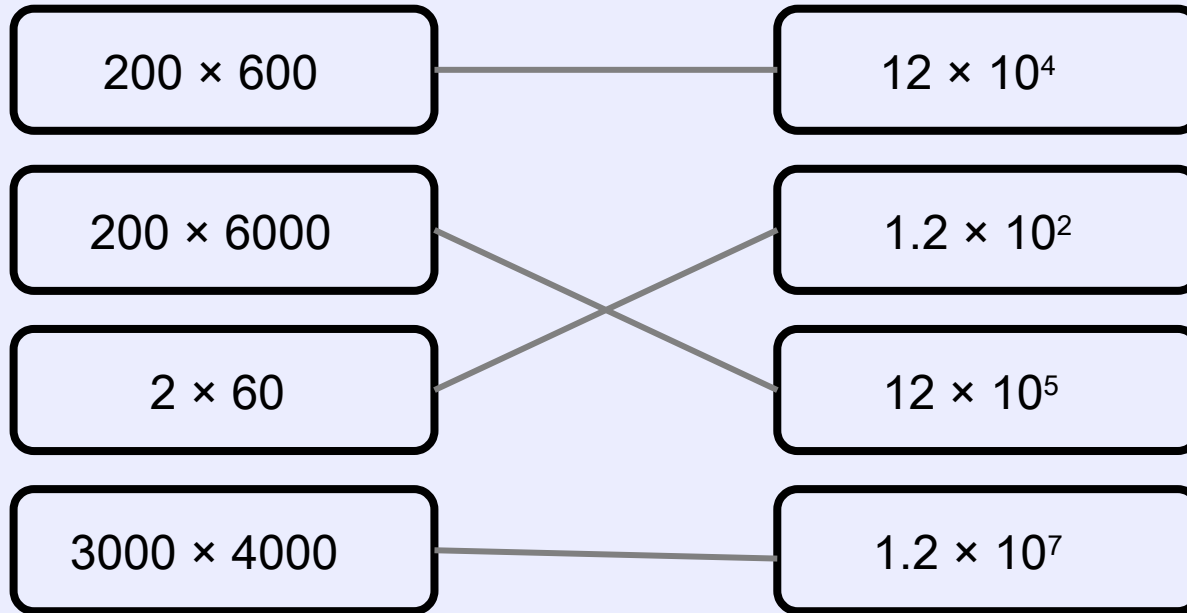
4) Geli calaamad (tick) agtooda xisaabaha saxda ah oo samee laba xisaab oo adiga kuu gaar ah oo sax ah adigoo isticmaalaya awoodaha 10.



1) Isku-dhafan (Match) xisaabta leh xisaabta isticmaasha qaabka jibbaarada (exponential form).



2) Isku-dhafka xisaabta ku habboon qaabka jibbaarada (exponential form).



3) Buuxi tirooyinka maqan. Hubi inaad muujiso shaqadaada.

$$a) 9000 \times 100 = 9 \times 10^5$$



9×1000	$\times$	1×100
9×1	$\times$	1000×100
9	$\times$	10 000
9	$\times$	10^5

3) Buuxi tirooyinka maqan. Hubi inaad muujiso shaqadaada.

$$b) 300 \times 250 = 75 \times 10^{\square} = 7.5 \times 10^{\square}$$



Jawaabaha:

3	4	3×100	$\times$	25×10	$\times$	100×10	3×25	$\times$
1000		75	$\times$	10^3		75	$\times$	10^3
7.5×10		$\times$	10×10^3		7.5	$\times$	10^4	7.5

3) Buuxi tirooyinka maqan. Hubi inaad muujiso shaqadaada.

$$c) 4000 \times 1500 = 60 \times 10^{\square} = 6 \times 10^{\square}$$



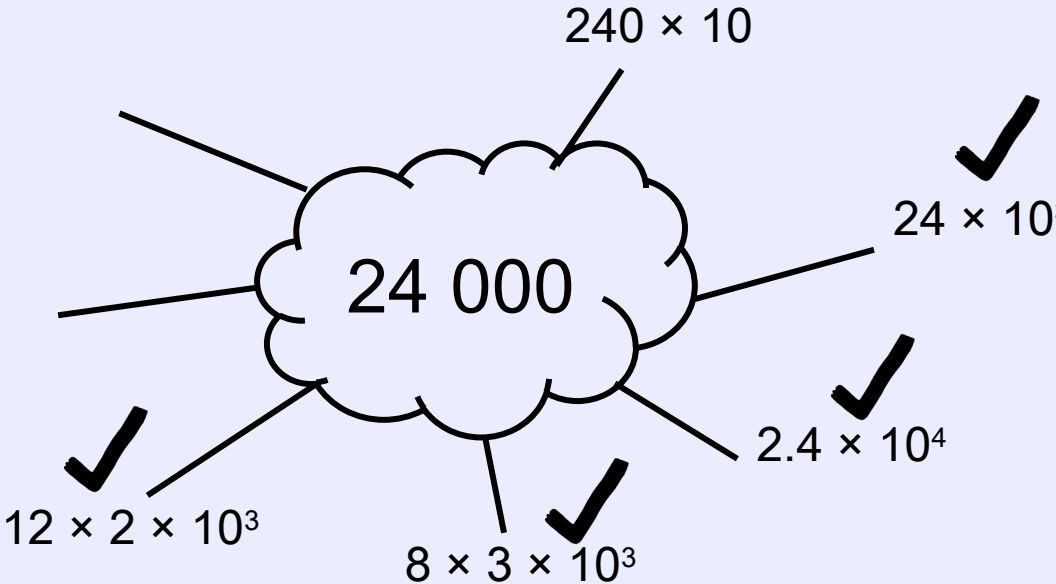
Jawaabaha:

5	6	4×1000	$\times$	15×100	$\times$	1000×100	4×15	$\times$
100 000		60	$\times$	10^5		60	$\times$	10^5
6×10		$\times$	10×10^5	6	$\times$	10^6	6	

4) Geli calaamad (tick) xisaabaha saxda ah oo samee laba xisaab oo sax ah oo adeegsanaya awoodaha 10 (powers of 10).

E.g. $6 \times 4 \times 10^3$

E.g. 240×10^2



24 000

240×10

24×10^3

2.4×10^4

$8 \times 3 \times 10^3$

$12 \times 2 \times 10^3$

Waxaa jira tiro aan dhammaad lahayn. Kaliya hubi in xisaabtaadu la mid tahay 24 000

Qaabka casharka

Hubinta iyo xoojinta fahamka tirooyinka 10 (multiples of 10)



Isticmaalka awoodaha 10 (powers of 10) si loo fududeeyo xisaabinta



Isticmaalka jajabyada u dhigma (equivalent fractions) si loo fududeeyo xisaabinta

Waxaan hore u ognahay awoodaha 10 (powers of 10) ee tirooyinka waaweyn.

Ma buuxin kartaa qaabka jajabka (fractional form) ee tirooyinka jajabka tobanlaha (decimals) soo socda?

1000	10^3	}	tirooyin dhammaystiran (integers)
100	10^2		
10	10^1		
1	10^0		
$\frac{1}{10}$	0.1	}	kuwa aan ahayn tiro dhammaystiran (non-integers)
$\frac{1}{100}$	0.01		
$\frac{1}{1000}$	0.001		



Waxaan sidoo kale aqoonsan karnaa jajabyo u dhigma (equivalent fractions) iyadoo la adeegsanayo awoodaha 10 (powers of 10).

1000	10^3	}	tirooyin dhammaystiran (integers)
100	10^2		
10	10^1		
1	10^0		
$\frac{1}{10}$	0.1	}	kuwa aan ahayn tiro-dhammaystiran (non-integers)
$\frac{1}{100}$	0.01		
$\frac{1}{1000}$	0.001		

Isticmaalka jajabyada u dhigma (equivalent fractions) si loo fududeeyo xisaabinta



Sharaxaad

Aynu eegno xisaab kale oo isticmaalaysa kuwa aan ahayn tiro-dhammaystiran.

$$\begin{array}{rcl} & 3.2 \times 4.1 & \\ \swarrow & & \searrow \\ 32 \times 0.1 & \times & 41 \times 0.1 \\ 32 \times \frac{1}{10} & \times & 41 \times \frac{1}{10} \\ 32 \times 41 & \times & \frac{1}{10} \times \frac{1}{10} \\ 32 \times 41 & \times & \frac{1}{100} \end{array}$$

Isticmaalka sharciga isku-xirka (associative law)

Aqoonsiga jajabyada u dhigma (fractional equivalents)

Isticmaalka sharciga beddelka (commutative law)

Hadda waxaan haynaa xisaab isticmaalaysa tiro-dhammaystiran iyo awoodaha 10 (powers of 10)

$$32 \times 41 \times \frac{1}{100}$$

Fududaynta

Aynu eegno xisaab kale oo isticmaalaysa kuwa aan ahayn tiro-dhammaystiran oo sii wadno kala-qaybinta iyadoo la isticmaalayo awoodaha 10.

$$\begin{array}{ccc} & 3.2 \times 4.1 & \\ \swarrow & & \searrow \\ 32 \times 0.1 & \times & 41 \times 0.1 \\ 32 \times \frac{1}{10} & \times & 41 \times \frac{1}{10} \\ 32 \times 41 & \times & \frac{1}{10} \times \frac{1}{10} \\ 32 \times 41 & \times & \frac{1}{100} \end{array}$$

Waxaan kaloo isticmaali karnaa aqoonteena ku saabsan qorista jajabka qaab jibbaar ah (exponential form)

$$32 \times 41 \times \frac{1}{100} = 32 \times 41 \times \frac{1}{10^2}$$

Isticmaalka jajabyada u dhigma si loo fududeeyo xisaabinta

Xisaabtan waxaa loo qori karaa siyaabo kala duwan, iyadoo la isticmaalayo aqoonta ku saabsan isku-dhufashada jajabyada.

Ilaa hadda, waxaan ognahay

$$3.2 \times 4.1 = 32 \times 41 \times \frac{1}{100} = 32 \times 41 \times \frac{1}{10^2}$$

Isticmaalka isku-dhufashada jajabyada, waxaan ognahay

$$32 \times 41 \times \frac{1}{100} = \frac{32}{1} \times \frac{41}{1} \times \frac{1}{100} = \frac{32 \times 41}{1 \times 1 \times 100} = \frac{32 \times 41}{10^2}$$

Isticmaalka jajabyada u dhigma si loo fududeeyo xisaabinta

Kee ka mid ah kuwan soo socda waa xisaabo u dhigma 5.6×2.7 ?

a $56 \times 27 \times \frac{1}{10^2}$ ✓

b $\frac{56 \times 27}{100}$ ✓

c $\frac{56 \times 27}{10^2}$ ✓

d $\frac{56 \times 27}{1000}$

5.6×2.7

56×0.1 $\times$ 27×0.1

$56 \times \frac{1}{10}$ $\times$ $27 \times \frac{1}{10}$

56×27 $\times$ $\frac{1}{10} \times \frac{1}{10}$

56×27 $\times$ $\frac{1}{100}$

1) Aqoonso xisaabaha u dhigma 3.4×9.3

a $34 \times 93 \times \frac{1}{100}$

b $34 \times 93 \times \frac{1}{10^2}$

c $\frac{34 \times 93}{100}$

d $\frac{34 \times 93}{1000}$

e $\frac{34 \times 93}{10^2}$

2) Aqoonso xisaabaha u dhigma 0.4×3.8

a $4 \times 38 \times \frac{1}{100}$

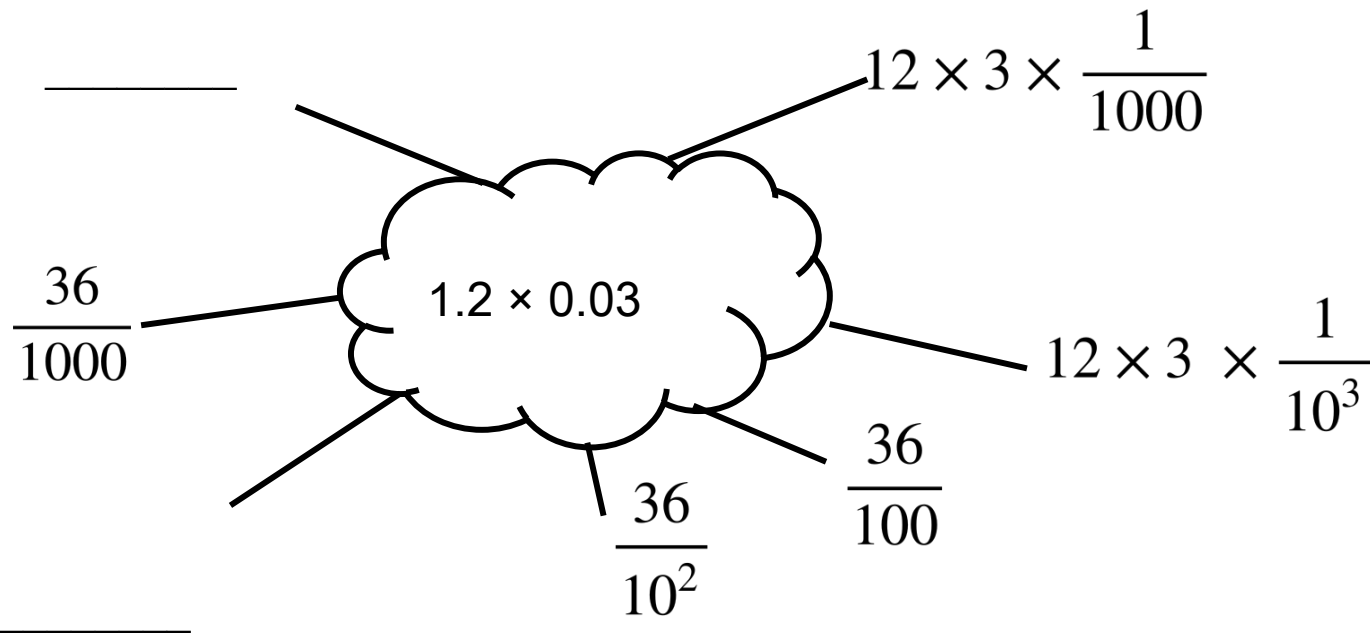
b $4 \times 38 \times \frac{1}{1000}$

c $\frac{4 \times 38}{100}$

d $\frac{4 \times 38}{10^2}$

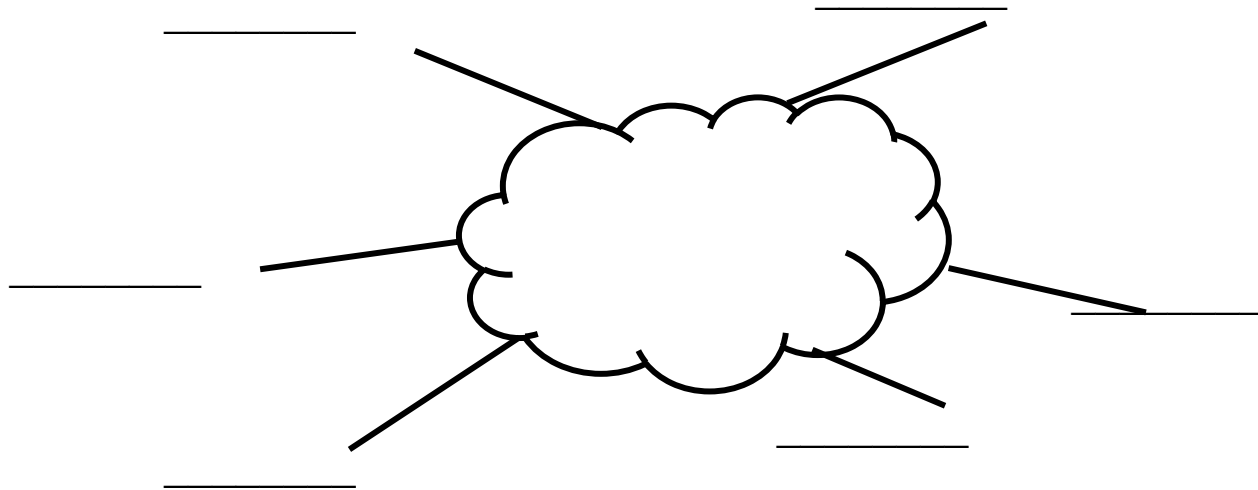
e $\frac{152}{100}$

3) Geli calaamad (tick) agtooda xisaabaha saxda ah oo samee laba xisaab oo adiga kuu gaar ah oo sax ah iyadoo la isticmaalayo awoodaha $10\frac{1}{10}$



4) Abuur xisaabtaada iyo lix xisaabood oo u dhigma (equivalent) adigoo isticmaalaya awoodaha (powers of)

$$\frac{1}{10}$$



1) Aqoonso xisaabaha u dhigma (equivalent) ee 3.4×9.3

a $34 \times 93 \times \frac{1}{100}$ ✓

b $34 \times 93 \times \frac{1}{10^2}$ ✓

c $\frac{34 \times 93}{100}$ ✓

d $\frac{34 \times 93}{1000}$

e $\frac{34 \times 93}{10^2}$ ✓

2) Aqoonso xisaabaha u dhigma (equivalent) ee 0.4×3.8

a $4 \times 38 \times \frac{1}{100}$ ✓

b $4 \times 38 \times \frac{1}{1000}$

c $\frac{4 \times 38}{100}$ ✓

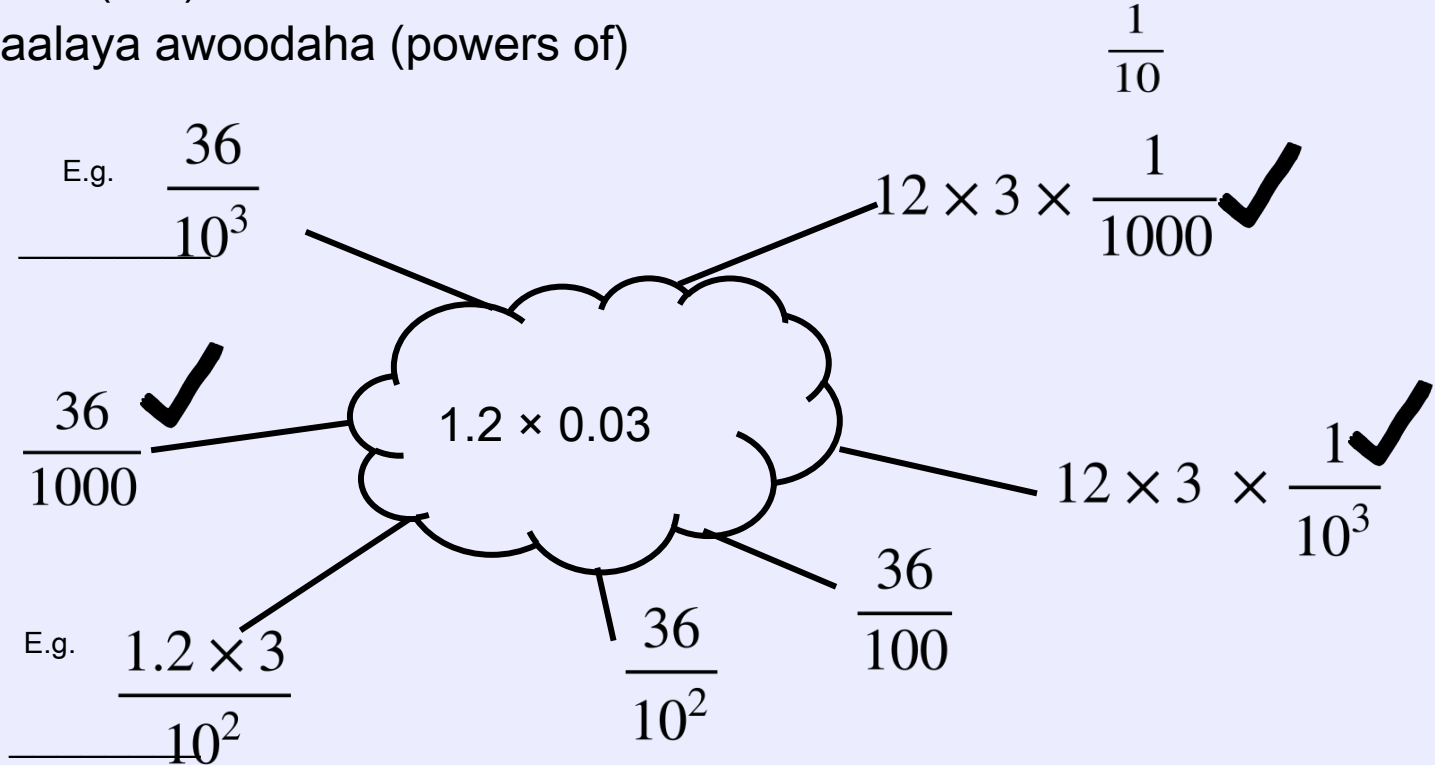
d $\frac{4 \times 38}{10^2}$ ✓

e $\frac{152}{100}$ ✓

Tani waxay kaa rabtay inaad xisaabiso jawaabta $4 \times 38 = 152$

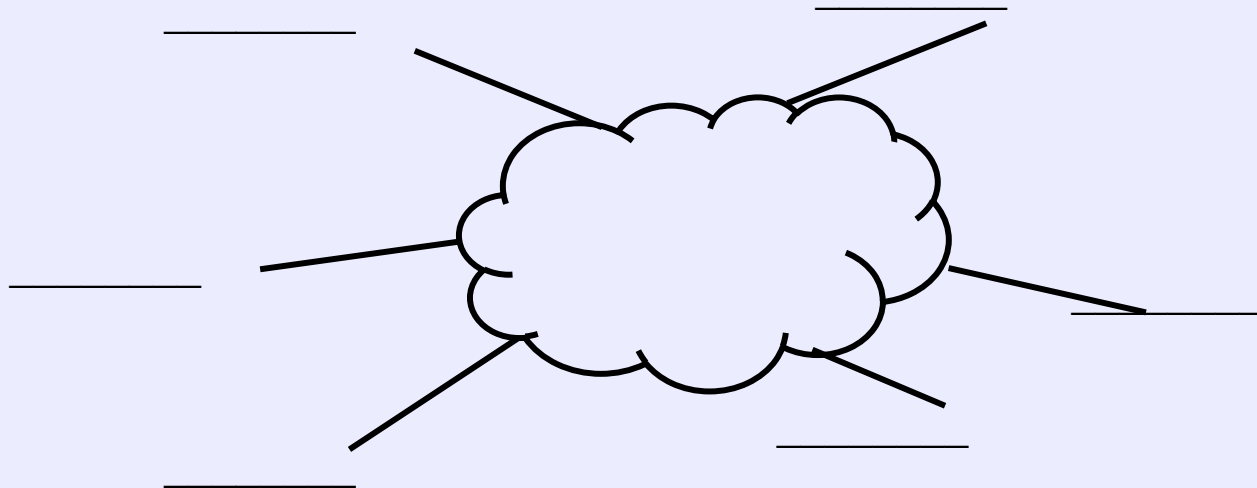
3) Geli calaamad (tick) xisaabaha saxda ah oo abuur laba xisaabood oo sax ah adigoo isticmaalaya awoodaha (powers of)

Waxaa jira tiro aan dhammaad lahayn. Hubi in xisaabtaadu u dhiganto 0.036



4) Abuur xisaabtaada iyo lix xisaabood oo u dhigma (equivalent) adigoo isticmaalaya awoodaha (powers of)

$$\frac{1}{10}$$



Waxaa jira tiro aan dhammaad lahayn oo jawaab ah. Hubi adigoo isticmaalaya xisaabiyaha (calculator) ama hababka qoraalka.

Waxaan eegnay isku dhufashada tirooyinka waaweyn (integers) iyadoo la kala saarayo (factorising) tirooyinka $10n$ si loo fududeeyo isku dhufashada.

Tusaale ahaan, $2000 \times 4000 = 2 \times 10^3 \times 4 \times 10^3 = 8 \times 10^6$

Waxaan isticmaali karnaa hab la mid ah marka la isku dhufanayo tiro kasta, anagoo isticmaalaya aqoonta jajabka tobanle (decimal) iyo jajabka (fractional) u dhigma.

Tusaale ahaan, $3.2 \times 4.1 =$

$$32 \times 41 \times \frac{1}{100} = 32 \times 41 \times \frac{1}{10^2} = \frac{32 \times 41}{10^2}$$