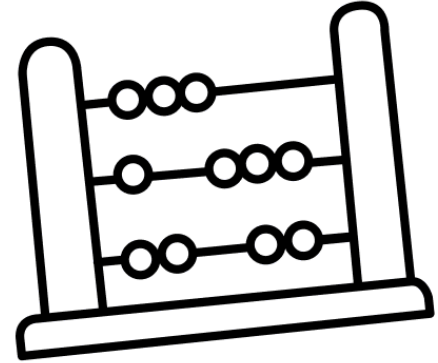


Hubinta fahamka taxanaha xisaabeed (arithmetic sequences)



Maths

Cutub: Xiriirrada aan tooska ahayn (non-linear relationships)

Natiijo

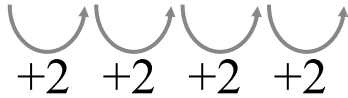
Waxaan qiimeyn (value) karaa in eray kasta oo ku jira taxanaha xisaabeed (arithmetic sequence) lagu muujin karo marka loo eego booskiisa taxanaha oo aan soo saari karo eray kasta.

Erayada muhiimka ah

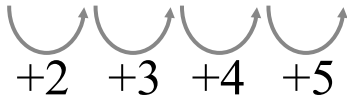
Taxane xisaabeed (arithmetic) (ama toosan) waa taxane uu farqiga u dhexeeya erayada isku xiga yahay mid joogto ah.

E.g. 10, 12, 14, 16, 18,...

E.g. 10, 12, 15, 19, 24,...



Kani waa taxane xisaabeed (arithmetic sequence) oo leh farqi guud (common difference) oo ah +2



Kani ma aha taxane xisaabeed (arithmetic sequence) sababtoo ah ma jiro farqi guud (common difference) oo u dhexeeya erayada isku xiga.

Erayga nth ee taxanaha waa booska erayga taxanaha halkaas oo n u taagan yahay lambarka erayga. Tusaale, haddii $n = 10$ tani waxay ka dhigan tahay erayga 10aad ee taxanaha.

Hubinta fahamka taxanaha xisaabeed (arithmetic sequences)



Aqoonsiga taxanaha xisaabeed (arithmetic sequences)



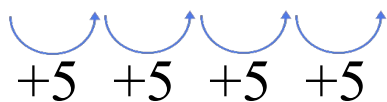
Soo saarista taxanaha xisaabeed (arithmetic sequences)



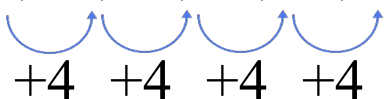
Matalaadda taxanaha xisaabeed (arithmetic sequences)

Suad waxay eegaysaa taxano tirooyin ah.

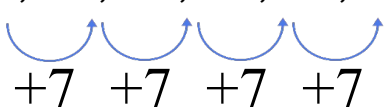
6, 11, 16, 21, 26, ...



19, 23, 27, 31, 35, ...

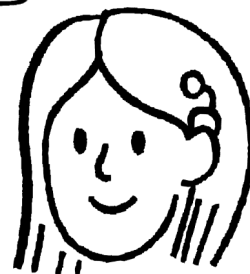


51, 58, 65, 72, 79, ...



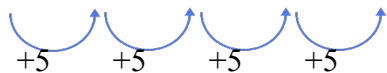
Inkastoo kuwani ay yihiin taxano kala duwan, waxaan arki karaa wax ay wadaagaan.

Dhammaan saddexda taxane waxay kordhaan tillaabooyin siman markasta



Suad waxay eegaysaa taxano tirooyin ah.

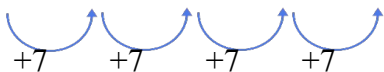
6, 11, 16, 21, 26, ...



19, 23, 27, 31, 35, ...



51, 58, 65, 72, 79, ...



Taxanaha leh farqi guud (common difference) waxaa loo yaqaan taxanaha xisaabeed (arithmetic sequences). Waxa kale oo laga yaabaa inaad maqasho iyaga oo loo yaqaan taxanaha toosan (linear sequences).

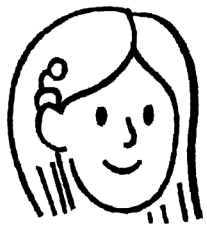
Suad waxay tijaabinaysaa Cabdi ee ku saabsan taxanaha xisaabeed (arithmetic sequences).

a) 1, 8, 15, 22, 29, ...

b) 64, 84, 104, 124, 144, ...

c) 29, 24, 19, 14, 9, ...

d) 16, 21, 31, 36, 46, ...



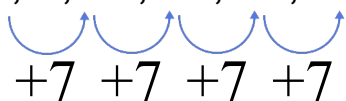
Mid ka mid ah taxanahan ma aha tiroxiriir (arithmetic). Keeba ayaad u malaynaysaa?

Waxaan u malaynayaa waa c) sababtoo ah tan ayaa hoos u socota (decreasing).



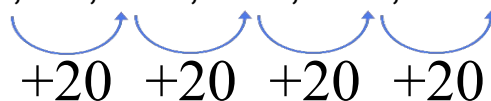
Suad ayaa tijaabinaysa Cabdi tiroxiriirrada (arithmetic sequences).

a) 1, 8, 15, 22, 29, ...



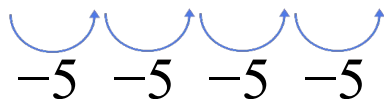
+7 +7 +7 +7

b) 64, 84, 104, 124, 144, ...



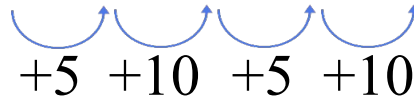
+20 +20 +20 +20

c) 29, 24, 19, 14, 9, ...

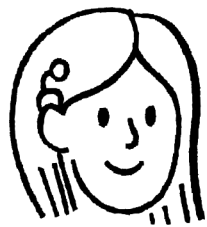


-5 -5 -5 -5

d) 16, 21, 31, 36, 46, ...



+5 +10 +5 +10



Aynu eegno kala
duwanaanshaha eray-ka-eray
(term-to-term differences) Cabdi.

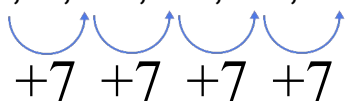
Waxaan u malaynayaa inaan ra'yigayga
beddelay. Ma d) baa aan ahayn tiroxiriir
(arithmetic)?



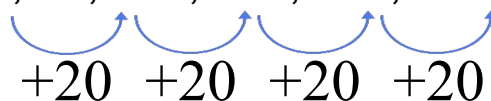
Aqoonsiga tiroxiriirrada (arithmetic sequences)

Suad ayaa tijaabinaysa Cabdi tiroxiriirrada (arithmetic sequences).

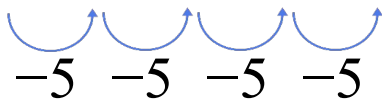
a) 1, 8, 15, 22, 29, ...



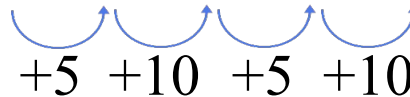
b) 64, 84, 104, 124, 144, ...



c) 29, 24, 19, 14, 9, ...



d) 16, 21, 31, 36, 46, ...



Tiroxiriirrada (Sequences) a), b) iyo c) waa tiroxiir (arithmetic); dhammaantood waxay leeyihiin kala duwanaansho guud (common difference). Ma khalidan c) inay leedahay kala duwanaansho guud taban (negative common difference).

d) ma aha tiroxiir (arithmetic). Kala duwanaanshuhu (differences) ma go'an.

Aqoonsiga tiroxiriirada (arithmetic sequences)

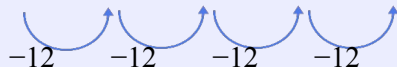


Hubi

Kee ka mid ah kuwanu waa tiroxiriir (arithmetic sequences)?

a

73, 61, 49, 37, 25, ...



Tiroxiriir (Arithmetic sequence) oo leh kala duwanaansho guud (common difference) -12

b

-13, -9, -5, -1, 3, ...



Tiroxiriir (Arithmetic sequence) oo leh kala duwanaansho guud (common difference) $+4$

c

-15, -9, -4, 0, 3, ...



Ma aha tiroxiriir (Not arithmetic).
Ma leh kala duwanaansho guud (common difference).

1) Ku calaamadee taxanahan mid waa 'tiroxiriir (arithmetic)' ama 'ma aha tiroxiriir (not arithmetic)'.

a) 9, 13, 17, 21, 25, ...

b) 37, 31, 25, 19, 13, ...

c) -70, -68, -66, -64, -62, ...

d) 35, 31, 26, 20, 13, ...

e) 12.6, 13.7, 14.8, 15.9 ...

f) 3, 6, 12, 24, 48, ...

g) $\frac{13}{29}, \frac{18}{29}, \frac{23}{29}, \frac{28}{29}, \dots$

h) $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \dots$



1) Ku calaamadee taxanahan mid waa 'tiroxiriir (arithmetic)' ama 'ma aha tiroxiriir (not arithmetic)'.

a) 9, 13, 17, 21, 25, ...

$$\begin{array}{ccccccc} & \nearrow & \nearrow & \nearrow & \nearrow & & \\ +4 & +4 & +4 & +4 & & & \end{array}$$

Tiroxiriir (Arithmetic)

b) 37, 31, 25, 19, 13, ...

$$\begin{array}{ccccccc} & \searrow & \searrow & \searrow & \searrow & & \\ -6 & -6 & -6 & -6 & & & \end{array}$$

Xisabi (Arithmetic)

c) -70, -68, -66, -64, -62, ...

$$\begin{array}{ccccccc} & \nearrow & \nearrow & \nearrow & \nearrow & & \\ +2 & +2 & +2 & +2 & & & \end{array}$$

Xisabi (Arithmetic)

d) 35, 31, 26, 20, 13, ...

$$\begin{array}{ccccccc} & \searrow & \searrow & \searrow & \searrow & & \\ -4 & -5 & -6 & -7 & & & \end{array}$$

Ma aha xisabi (Not arithmetic)

e) 12.6, 13.7, 14.8, 15.9 ...

$$\begin{array}{ccccccc} & \nearrow & \nearrow & \nearrow & & & \\ +1.1 & +1.1 & +1.1 & & & & \end{array}$$

Xisabi (Arithmetic)

f) 3, 6, 12, 24, 48, ...

$$\begin{array}{ccccccc} & \nearrow & \nearrow & \nearrow & \nearrow & & \\ +3 & +6 & +12 & +24 & & & \end{array}$$

Ma aha xisabi (Not arithmetic)

g) $\frac{13}{29}, \frac{18}{29}, \frac{23}{29}, \frac{28}{29}, \dots$

$$\begin{array}{ccccccc} & \nearrow & \nearrow & \nearrow & & & \\ +\frac{5}{29} & +\frac{5}{29} & +\frac{5}{29} & & & & \end{array}$$

Xisabi (Arithmetic)

h) $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \dots$

$$\begin{array}{ccccccc} & \searrow & \searrow & \searrow & & & \\ -\frac{1}{6} & -\frac{1}{12} & -\frac{1}{20} & & & & \end{array}$$

Ma aha xisabi (Not arithmetic)

Qaabka casharka

Hubinta fahamka taxanaha xisabiga (Checking understanding of arithmetic sequences)



Aqoonsiga taxanaha xisabiga (Identifying arithmetic sequences)



Abuurista taxanaha xisabiga (Generating arithmetic sequences)



Matalaadda taxanaha xisabiga (Representations of arithmetic sequences)

Abuurista taxanaha xisabiga (Generating arithmetic sequences)

Taxanaha xisabigu waxa lagu muujin karaa xiriirka ka dhexeeya nambarka term-ka (n) iyo qiimaha term-ka (T).

Nambarka term-ka (n)	1	2	3	4	5
Qiimaha term-ka (T)	3	6	9	12	15

Marka taxanaha 3, 6, 9, 12, 15, ... $n = 1$, $T = 3$

Term-ka booska koowaad ee taxanaha wuxuu leeyahay qiime 3

Abuurista taxanaha xisabiga (Generating arithmetic sequences)



Taxanaha xisabigu waxa lagu muujin karaa xiriirka ka dhexeeya nambarka term-ka (n) iyo qiimaha term-ka (T).

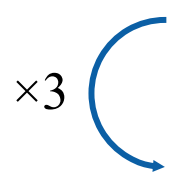
Nambarka term-ka (n)	1	2	3	4	5
Qiimaha term-ka (T)	3	6	9	12	15

Marka $n = 5$, $T =$

Ereyga booska ad wuxuu leeyahay qiime (ue) ah 15

Abuurista taxanaha xisaabta (arithmetic sequences)

Marka laga hadlayo taxanaha 3, 6, 9, 12, 15, ... waxaa jira xiriir cad oo u dhexeeya nambarka ereyga (n) iyo qiimaha ereyga (T).



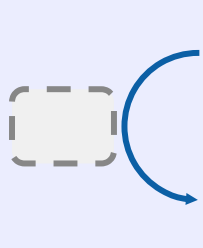
Nambarka ereyga (n)	1	2	3	4	5
Ereyga (T)	3	6	9	12	15

Qiimaha ereyga (T) waa had iyo jeer saddex jeer nambarka ereyga (n)

Tan waxaa loo qoraa si ka fudud sida nth term ah $3n$

Abuurista taxanaha xisaabta (arithmetic sequences)

Marka laga hadlayo taxanaha 5, 10, 15, 20, 25, ... waxaa jira xiriir cad oo u dhexeeya nambarka ereyga (n) iyo qiimaha ereyga (T).



Nambarka ereyga (n)	1	2	3	4	5
Ereyga (T)	5	10	15	20	25

Qiimaha ereyga (T) waa had iyo jeer  jeer nambarka ereyga (n)

Tan waxaa loo qoraa si ka fudud sida nth term ah $5n$



Abuurista taxanaha xisaabta (arithmetic sequences)

nth term, kiiskan $5n$, wuxuu noo saamaxayaa inaan helno erey kasta oo taxanaha ah iyadoo la beddelayo (substitution).

$\times 5$	Nambarka ereyga (n)	1	2	3	4	5	10	50	100
	Ereyga (T)	5	10	15	20	25			

Marka $n = 10$, $T = 5n = 5(10) = 50$

Marka $n = 50$, $T = 5(50) = 250$

Marka $n = 100$, $T = 5(100) = 500$

Abuurista taxanaha xisaabta (arithmetic sequences)

Mararka qaarkood xiriirka, nth term, wuxuu noqon karaa laba-tallaabo (two-step).

$\times 4 + 1$ (

Nambarka term-ka (n)	1	2	3	4	5
Term-ka (T)					

Qiimaha term-ka (T) waa afar jeer nambarka term-ka (n) oo lagu daray hal.

Abuurista taxanaha xisaabeed (arithmetic sequences)

Raadi shanta term ee ugu horreeya, iyo term-ka 50aad ee taxanaha $2n + 5$

$\times 2 + 5$	Nambarka term-ka (n)	1	2	3	4	5	50
	Term-ka (T)						

Marka $n = 1$

$$T = 2n + 5 = 2(1) + 5 = 7$$

Marka $n = 2$

$$T = 2n + 5 = 2(2) + 5 = 9$$

1) Raadi shanta term ee ugu horreeya ee afartan taxane:

a) $3n + 7$

Nambarka term-ka (n)	1	2	3	4	5
Term-ka (T)					

b) $3n - 7$

Nambarka term-ka (n)	1	2	3	4	5
Term-ka (T)					

c) $0.3n + 7$

Nambarka term-ka (n)	1	2	3	4	5
Term-ka (T)					

d) $7 - 3n$

Nambarka term-ka (n)	1	2	3	4	5
Term-ka (T)					

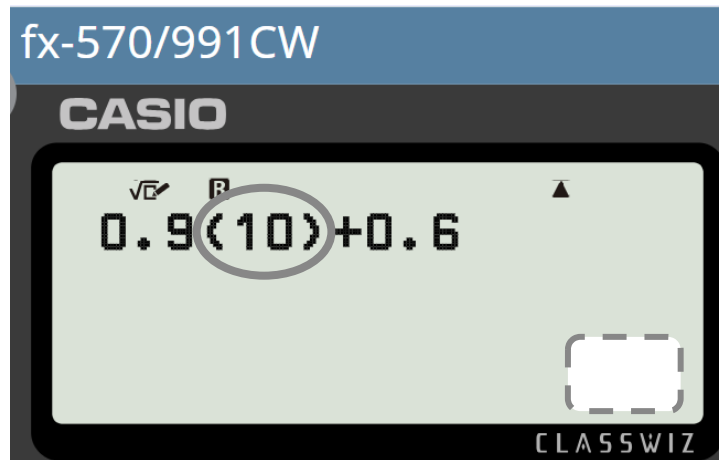
2) Raadi term-ka 10aad, 50aad, iyo 100aad ee taxanahan.

a) $9n + 6$

Waxaa laga yaabaa inaad u doorato inaad isticmaasho xisaabiyahaaga (calculator) qaar.

b) $9n - 6$

c) $0.9n + 0.6$



d) $6 - 9n$

1) Soo hel shanta erey ee ugu horreeya ee afartan taxane (sequences):

a) $3n + 7$

Nambarka Ereyga (Term number) (n)	1	2	3	4	5
Ereyga (Term) (T)	10	13	16	19	22

b) $3n - 7$

Nambarka Ereyga (Term number) (n)	1	2	3	4	5
Ereyga (Term) (T)	-4	-1	2	5	8

c) $0.3n + 7$

Nambarka Ereyga (Term number) (n)	1	2	3	4	5
Ereyga (Term) (T)	7.3	7.6	7.9	8.2	8.5

d) $7 - 3n$

Nambarka Ereyga (Term number) (n)	1	2	3	4	5
Ereyga (Term) (T)	4	1	-2	-5	-8

2) Soo hel ereyada 10aad, 50aad, iyo 100aad ee taxanahan (sequences).

a) $9n + 6$

$$n = 10, \quad T = 9n + 6 = 9(10) + 6 = 96$$

$$n = 50, \quad T = 9n + 6 = 9(50) + 6 = 456$$

$$n = 100, \quad T = 9n + 6 = 9(100) + 6 = 906$$

b) $9n - 6$

$$n = 10, \quad T = 9n - 6 = 9(10) - 6 = 84$$

$$n = 50, \quad T = 9n - 6 = 9(50) - 6 = 444$$

$$n = 100, \quad T = 9n - 6 = 9(100) - 6 = 894$$

2) Raadi 10aad, 50aad, iyo 100aad ee tixdan.

c) $0.9n + 0.6$

$$n = 10, \quad T = 0.9n + 0.6 = 0.9(10) + 0.6 = 9.6$$

$$n = 50, \quad T = 0.9n + 0.6 = 0.9(50) + 0.6 = 45.6$$

$$n = 100, \quad T = 0.9n + 0.6 = 0.9(100) + 0.6 = 90.6$$

d) $6 - 9n$

$$n = 10, \quad T = 6 - 9n = 6 - 9(10) = -84$$

$$n = 50, \quad T = 6 - 9n = 6 - 9(50) = -444$$

$$n = 100, \quad T = 6 - 9n = 6 - 9(100) = -894$$

Hubinta fahamka tixaha xisaabeed (arithmetic sequences)



Aqoonsiga tixaha xisaabeed (arithmetic sequences)

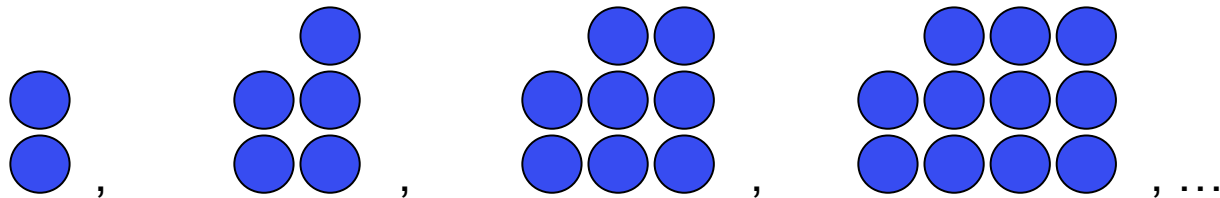


Abuurista tixaha xisaabeed (arithmetic sequences)



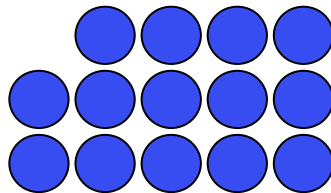
Matalaadda tixaha xisaabeed (arithmetic sequences)

Sidee u kordheysaa qaabkan?...



Si joogto ah ugu darista saddex tiro (counters) mar kasta.

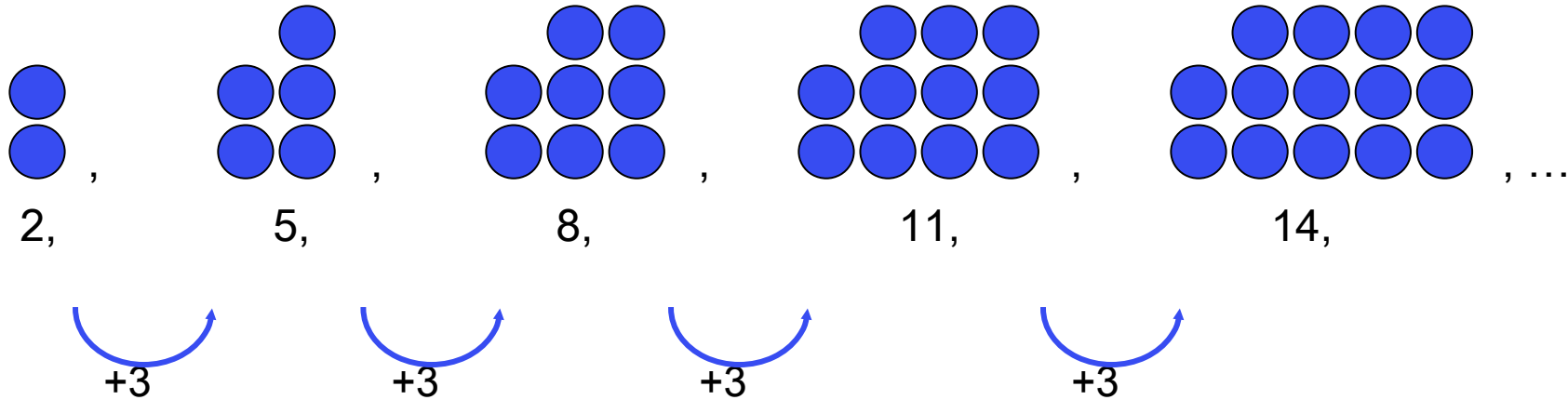
Qaabka xiga wuxuu noqon lahaa qaabka afraad...



...oo lagu daray saddex kale.

Matalaadda tixaha xisaabeed (arithmetic sequences)

Tani waa tusaale ka mid ah matalaadda muuqaalka ah ee tixda xisaabeed (arithmetic sequence).

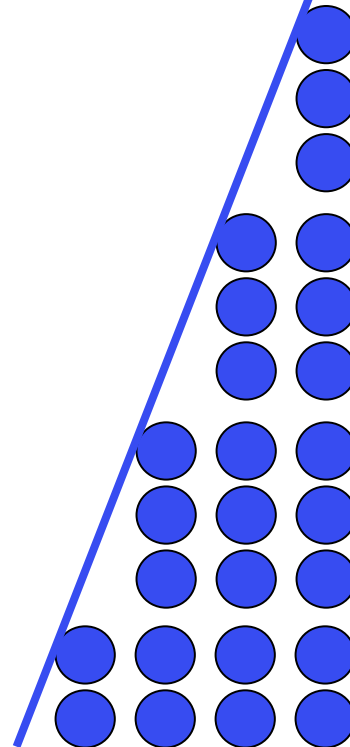


Matalaadda tixaha xisaabeed (arithmetic sequences)

Habaynta isla tixdan sidan waxay noo tusinaysaa wax ku saabsan qaabdhismeedka hoose ee tixaha xisaabeed (arithmetic sequences).

Waxaad si fudud u arki kartaa farqiga joogtada ah ee isku darka...

Waxaadna arki kartaa sababta loogu yaqaan tixaha toosan (linear sequences).

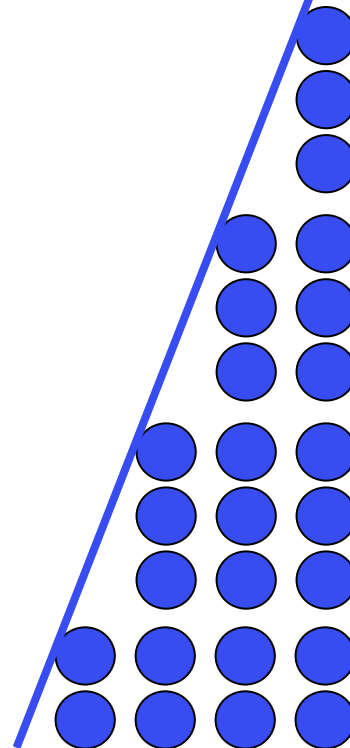


Matalaadda tixaha xisaabeed (arithmetic sequences)

Waxaan arki lahayn isla qaabka toosan (linear) haddii aan tixda ku sawirno garaaf ahaan.

Nambarka tixda (n)	1	2	3	4	5
Tixda (T)	2	5	8	11	14

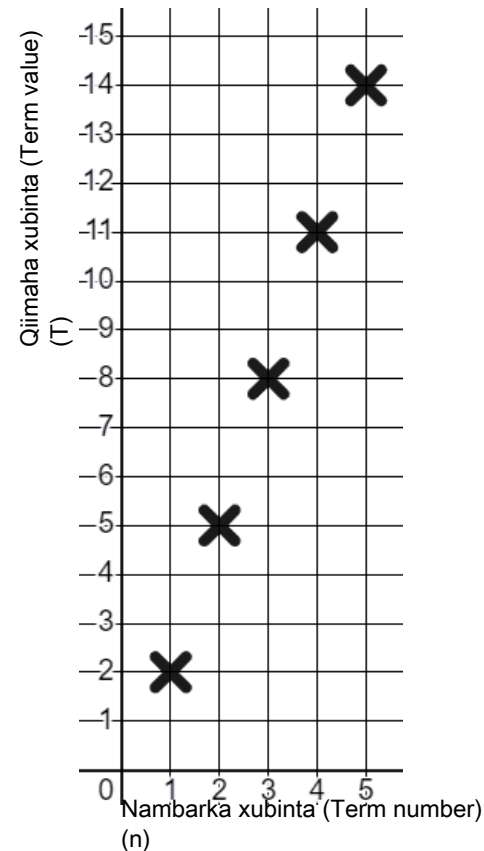
Waxaan ku sawiri karnaa kuwan iyagoo ku calaamadaynaya dhidibada 'Qiimaha tixda (T)' iyo 'Nambarka tixda (n)'.



Waxaan arki karnaa qaab-dhismeedka toosan (linear structure) isku mid ah haddii aan taxanaha (sequence) sawirno garaaf ahaan.

Nambarka xubinta (Term number) (n)	1	2	3	4	5
Xubin (Term) (T)	2	5	8	11	14

Waxaan sawiri karnaa kuwan iyadoo calaamadaynayna dhidibada (axes) 'Qiimaha xubinta (Term value) (T)' iyo 'Nambarka xubinta (Term number) (n)'.

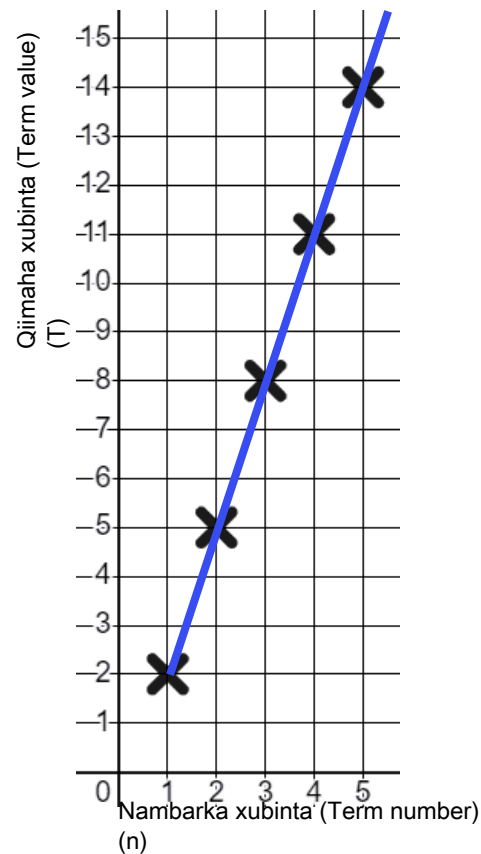


Waxaan arki karnaa qaab-dhismeedka toosan (linear structure) isku mid ah haddii aan taxanaha (sequence) sawirno garaaf ahaan.

Nambarka xubinta (Term number) (n)	1	2	3	4	5
Xubin (Term) (T)	2	5	8	11	14

Inkasta oo aan arki karno in dhibcuhu (points) is toosiyaan...

Waxaan sawirnaa oo kaliya isku-duwayaasha (coordinates), ma sawirno xariiqda toosan (straight line) halkan, in kastoo ay tahay hab fiican oo lagu hubiyo taxane toosan (linear sequence).



Run mise been?

Taxanahan (sequence) wuxuu sawiri doonaa dhibco (points) xariiq toosan (straight line) ah.

Nambarka xubinta (Term number) (n)	1	2	3	4	5
Xubin (Term) (T)	10	16	22	28	34



Run



Been

Sabab u sheeg jawaabtaada

a 10, 16, 22, 28, 34, ... waa taxane xisaabeed (arithmetic sequence) sidaas darteed waa toosan (linear); dhibcuhu (points) way is toosi doonaan 

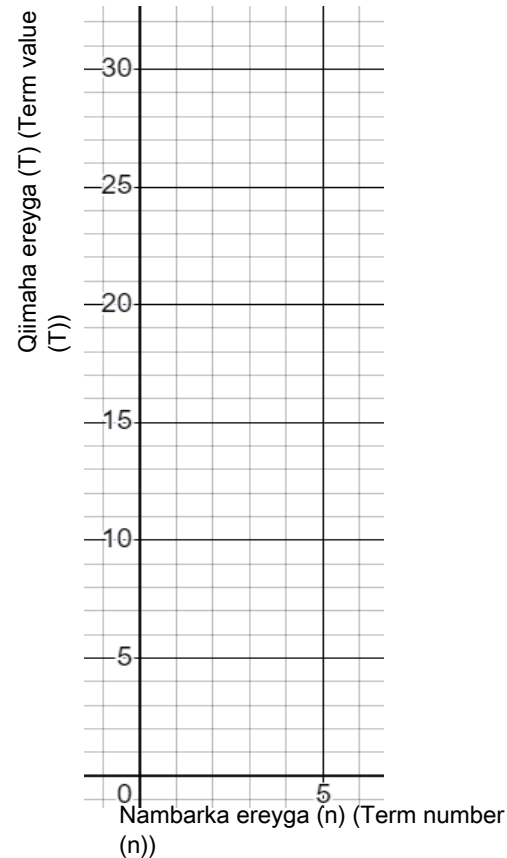
b Dhibcuhu (points) waxay noqon karaan meel kasta. Ma aha daruuri inay xariiq toosan (straight line) ku jiraan.



Cali iyo Layla waxay isku dayayaan inay sawiraan taxanaha xisaabeed (arithmetic sequence).

34, 28, 22, 16, 10, ...

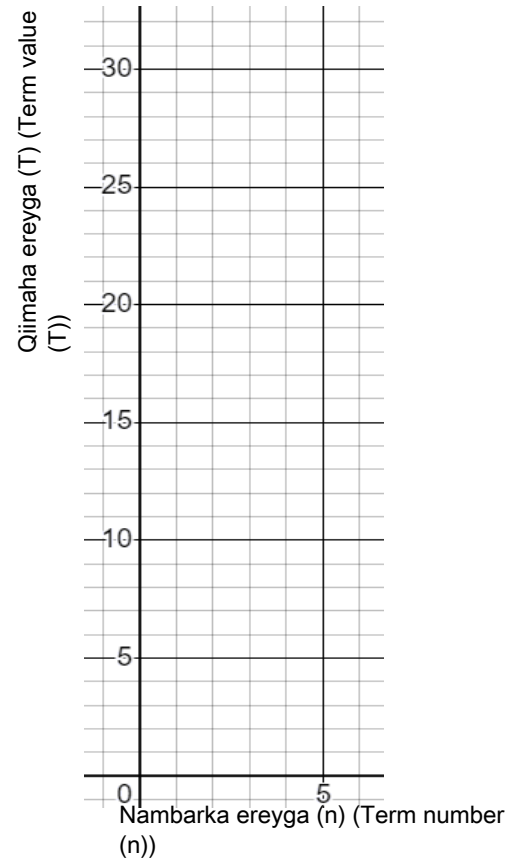
Isku xigxigani wuxuu yeelan doonaa ereyo taban (negative terms) sidaas darteed lama sawiri karo.



Cali iyo Layla waxay isku dayayaan inay sawiraan isku xigxiga xisaabeed (arithmetic sequence) oo ka bilaabmaya:

Isku xigxigani wuxuu yeelan doonaa ereyo taban (negative terms) sidaas darteed lama sawiri karo.

Waxaad sax tahay, waxaa jiri doona ereyo taban (negative terms). Laakiin, waxaan ku sawiri karnaa rubuca 4aad (4th quadrant).



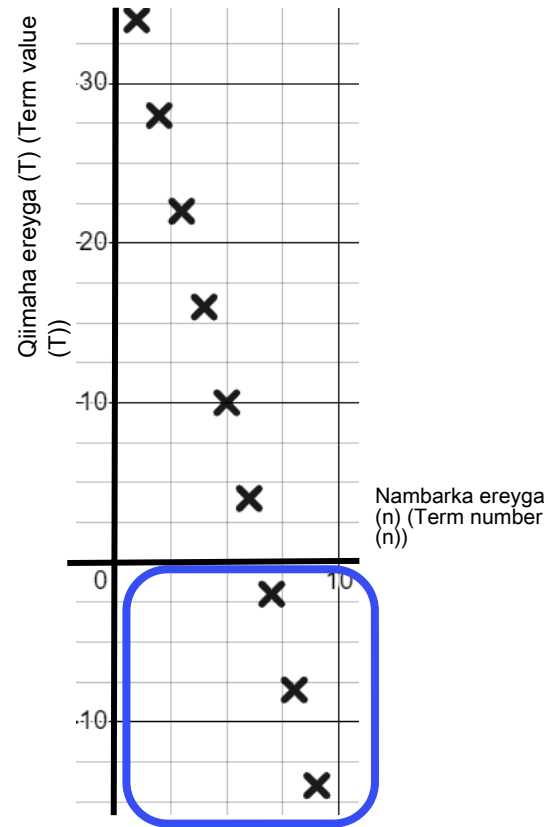
Cali iyo Layla waxay isku dayayaan inay sawiraan isku xigxiga xisaabeed (arithmetic sequence) oo ka bilaabmaya:

34, 28, 22, 16, 10, 4, -2, -8, -14, ...

Waa la sawiri karaa! Kaliya waxaan isticmaalnaa rubuca 4aad (4th quadrant). Mahadsanid Layla!



Waxaad sax tahay, waxaa jiri doonaa ereyo taban (negative terms). Laakiin, waxaan ku sawiri karnaa rubuca 4aad (4th quadrant).



Matalaadyada isku xigxiga xisaabeed (Representations of arithmetic sequences)

Run mise been?

Ereyada taban (negative terms) ee isku xigxiga $-13, -8, -3, 2, 7 \dots$ lama sawiri karo.

T Run

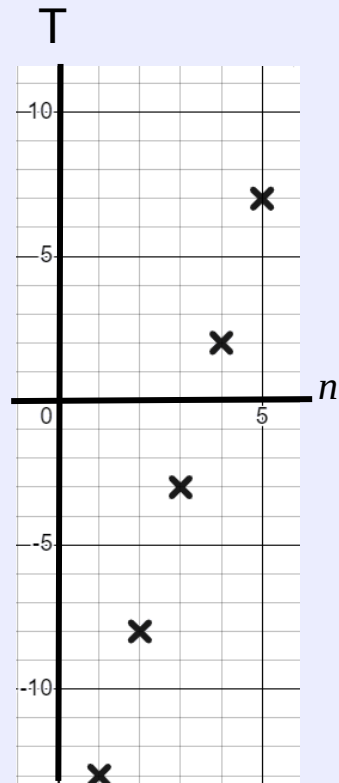
F Been



Sabab u sheeg jawaabtaada

a Qiimaha isku xigxiga xisaabeed (arithmetic sequence) waa inay ahaadaan kuwo togan (positive) si loo sawiro.

b Waa la sawiri karaa iyadoo la isticmaalayo rubuca 4aad (4th quadrant).



1) Sawir muuqaal ah u sawir shanta erey ee ugu horreeya ee taxanahan:

a) 5, 7, 9, 11, 13, ...

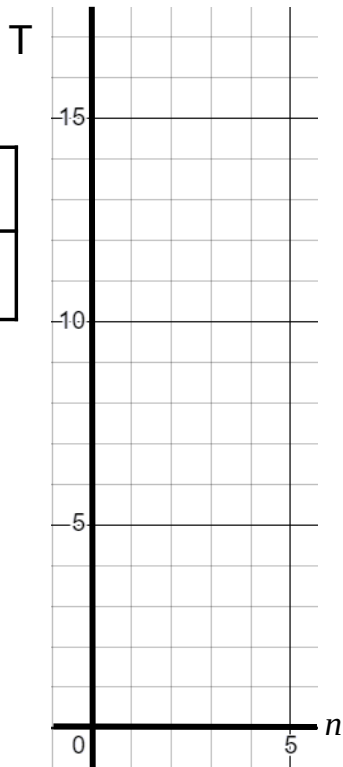
b) 21, 17, 13, 9, 5

c) $5n + 1$

2) Qorshee (Plot) shanta erey ee ugu horreeya ee taxanahan:

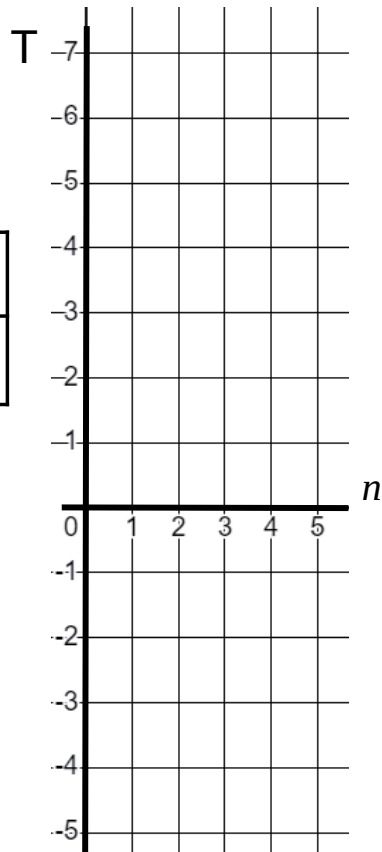
a) $4n - 3$

n	1	2	3	4	5
T					



b) $10 - 3n$

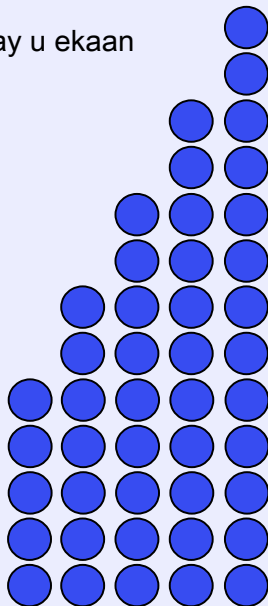
n	1	2	3	4	5
T					



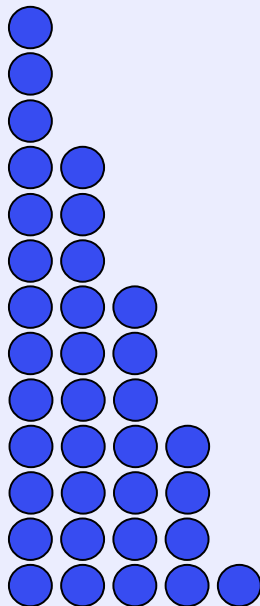
1) Sawir muuqaal ah u sawir shanta erey ee ugu horreeya ee taxanahan:

a) 5, 7, 9, 11, 13, ...

Tusaalooyinka sida ay u ekaan
karaan:



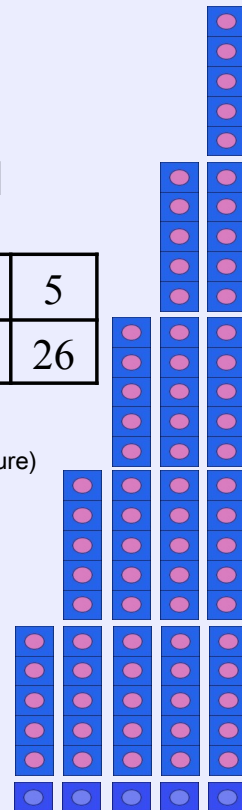
b) 13, 10, 7, 4, 1



c) $5n + 1$

n	1	2	3	4	5
T	6	11	16	21	26

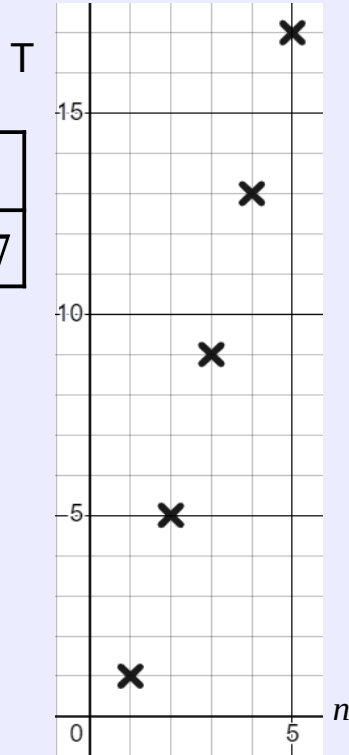
Xaalad kasta, qaabka toosan (linear structure)
ee taxanaha (sequence) waa la muujiyey.



2) Qorshee (Plot) shanta erey ee ugu horreeya ee taxanahan:

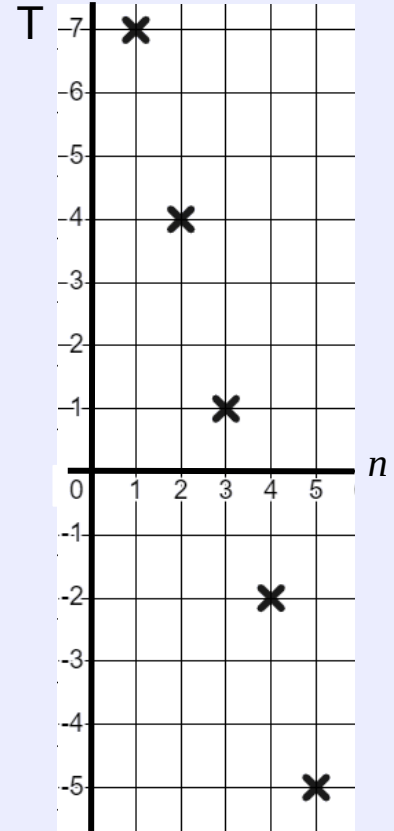
a) $4n - 3$

n	1	2	3	4	5
T	1	5	9	13	17



b) $10 - 3n$

n	1	2	3	4	5
T	7	4	1	-2	-5



Soo koobid Hubinta fahamka taxanaha xisaabeed (arithmetic sequences)

Erey kasta oo ku jira taxane xisaabeed (arithmetic sequence) waxaa loo qeexi karaa iyadoo la eegayo booskiisa taxanaha (sequence), waxaana soo saari karnaa erey kasta adoo isticmaalaya nth term (nth term).

Tusaale ahaan, taxanaha (sequence) $7n - 5$, ereyga 1aad waa $7(1) - 5 = 2$ halka ereyga 10aad uu yahay $7(10) - 5 = 65$