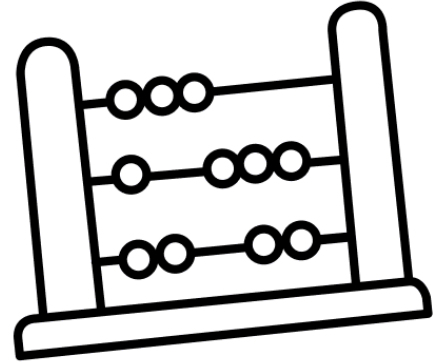


Aqoonsiga taxanaha tirooyinka gaarka ah



Maths

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

Natiijo

Waxaan aqoonsan karaa taxane tirooyin gaar ah.

Erayada muhiimka ah

Taxane xisaabeed (ama toosan) waa taxane halkaasoo farqiga u dhexeeya xubnaha isku xigta uu yahay mid joogto ah.

Taxane joomatari waa taxane leh xiriir isku dhufasho joogto ah oo u dhexeeya xubnaha isku xigta.

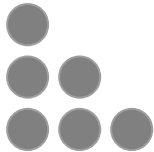
Tiro saddexagal (ama tiro saddexagal) waa tiro lagu matali karo qaab dhibco lagu habeeyay saddexagal siman. Tirada xubnaha waa tirada dhibcood ee dhinaca saddexagalka.



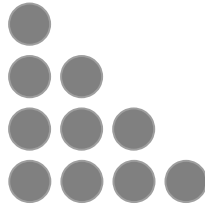
1



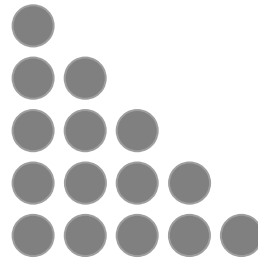
3



6



10



15

Aqoonsiga taxanaha tirooyinka gaarka ah



Taxanaha xisaabeed iyo joomatari



Sahminta taxanaha kale

Taxanaha xisaabeed (toosan) waxay leeyihiin farqi guud oo u dhexeeya xubnaha isku xigta.

Sideen u arki karnaa kuwaas oo ah shanta xubnood ee ugu horreeya ee taxane xisaabeed?

a) 81, 138, 195, 252, 309, ...

b) -24, -13, -2, 13, 24, ...

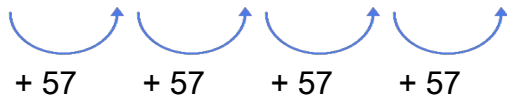
c) 21.7, 19.4, 17.1, 14.8, 12.5, ...

d) $2, \frac{11}{6}, \frac{3}{2}, \frac{4}{3}, 1, \dots$

Soo saar farqiga u dhexeeya xubnaha isku xigta oo hubi inuu isku mid yahay inta u dhexeysa lammaane kasta oo xubnaha ah.

Kuwee oo ka mid ah kuwan yihiin shanta xubnood ee ugu horreeya ee taxane xisaabeed?

a) 81, 138, 195, 252, 309, ...



b) -24, -13, -2, 13, 24, ...

c) 21.7, 19.4, 17.1, 14.8, 12.5, ...

d)

$$2, \frac{11}{6}, \frac{3}{2}, \frac{4}{3}, 1, \dots$$

Waa inay tahay
xisaabeed markaa



Caasha

Dhab ahaantii, waxaan u
baahanahay inaan
hubinno xubnaha kale.



Layla

Marka kani waa taxane toosan laakiin wali waxaa
muhiim ah inaan hubinnay xubin kasta.

Kuwani waa shanta erey ee ugu horreeya ee taxane xisaabeed (arithmetic sequence)?

a) 81, 138, 195, 252, 309, ...

$+ 57 \quad + 57 \quad + 57 \quad + 57$



$$-13 - (-24) = 11$$

$$-2 - (-13) = 11$$

Ma aha xisaabeed (arithmetic)

b) -24, -13, -2, 13, 24, ...

$+ 11 \quad + 11 \quad + 15 \quad + 11$



$$13 - (-2) = 15$$

$$24 - 13 = 11$$

c) 21.7, 19.4, 17.1, 14.8, 12.5, ...

d) $2, \frac{11}{6}, \frac{3}{2}, \frac{4}{3}, 1, \dots$

Waa fiicantahay inaan sii hubiyay dhammaan ereyada markan!



Caasha

Kuwani waa shanta erey ee ugu horreeya ee taxane xisaabeed (arithmetic sequence)?

a) 81, 138, 195, 252, 309, ...

$+ 57 \quad + 57 \quad + 57 \quad + 57$



b) -24, -13, -2, 13, 24, ...

$+ 11 \quad + 11 \quad + 15 \quad + 11$



c) 21.7, 19.4, 17.1, 14.8, 12.5, ...

$- 2.3 \quad - 2.3 \quad - 2.3 \quad - 2.3$



d) $2, \frac{11}{6}, \frac{3}{2}, \frac{4}{3}, 1, \dots$

Waxaa ii fudud in aan sii kala googooyo 2.3 oo aan eego haddii aan helo ereyga xiga



Layla

$$19.4 - 21.7 = -2.3$$

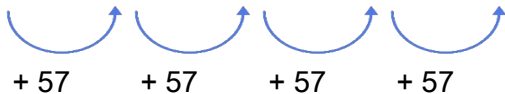
$$19.4 - 2.3 = 17.1$$

$$17.1 - 2.3 = 14.8$$

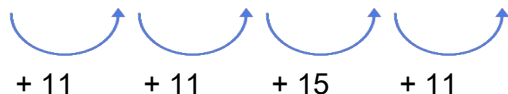
$$14.8 - 2.3 = 12.5$$

Kuwani waa shanta erey ee ugu horreeya ee taxane xisaabeed (arithmetic sequence)?

a) 81, 138, 195, 252, 309, ...



b) -24, -13, -2, 13, 24, ...



c) 21.7, 19.4, 17.1, 14.8, 12.5, ...

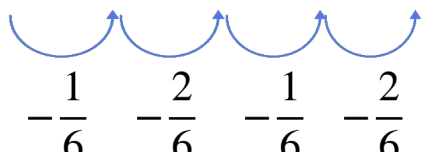


d)

$2, \frac{11}{6}, \frac{3}{2}, \frac{4}{3}, 1, \dots$



Midka ugu dambeeya, isticmaalka hooseeye wadaag ah (common denominator) ayaa laga yaabaa inuu caawiyo.

$$\frac{12}{6}, \frac{11}{6}, \frac{9}{6}, \frac{8}{6}, \frac{6}{6}, \dots$$


$-\frac{1}{6} \quad -\frac{2}{6} \quad -\frac{1}{6} \quad -\frac{2}{6}$

Kala duwanaanshuhu (differences) isku mid ma aha, marka kani ma aha taxane xisaabeed (arithmetic sequence).



Cabdi

Waxaan bilaabay taxane 8, 12, 18, 27, ...

Taxanaha Cabdi ma xisaabeed (arithmetic) baa?

Maya, kala duwanaanshaha (difference) u dhexeeya labada erey ee ugu horreeya waa 4 laakiin kani ma sii joogto (constant).

Waa nooc kale oo taxane ah oo uu noqon karaa?

Sideen u hubin karnaa haddii Caasha sax tahay?

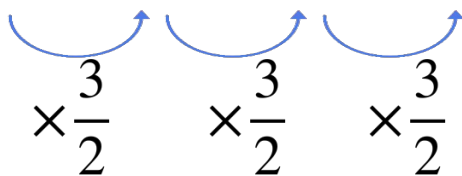
U qaybi ereyada isku xiga oo fiiri haddii ay jirto saami wadaag ah (common ratio).

Waxaa laga yaabaa inuu yahay joomatari (geometric)?



Caasha

Tixraacyada xisaabeed iyo joomatari (Arithmetic and geometric sequences)


$$\times \frac{3}{2} \quad \times \frac{3}{2} \quad \times \frac{3}{2}$$

$$12 \div 8 = \frac{12}{8} = \frac{3}{2}$$

$$18 \div 12 = \frac{18}{12} = \frac{3}{2}$$

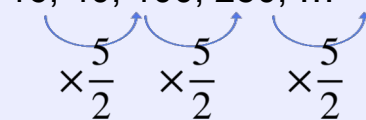
$$27 \div 18 = \frac{27}{18} = \frac{3}{2}$$

Marka Caasha waa sax, kuwani waxay noqon karaan afarta xubnood ee ugu horreeya ee tix joomatari ah oo leh $\frac{3}{2}$ sami guud (common ratio) ah

Kee ka mid ah kuwani waxay noqon karaan afarta xubnood ee ugu horreeya ee tix joomatari ah?

- | | | | |
|----------|--|---|---|
| a | 3, 12, 48, 194, ...

$\times 4 \quad \times 4$ |  | $48 \times 4 = 192$ |
| b | 2, 10, 50, 250, ...

$\times 5 \quad \times 5 \quad \times 5$ |  | Saami guud (common ratio) oo ah 5 |
| c | 16, 40, 100, 250, ...

$\times \frac{5}{2} \quad \times \frac{5}{2} \quad \times \frac{5}{2}$ |  | Saami guud (common ratio) oo ah $\frac{5}{2}$ |
| d | -5, 10, 20, 40, ...

$\times -2 \quad \times 2$ |  | Wuxuu ku bilaabmaa isku dhufashada -2 ka dibna wuxuu u wareegaa isku dhufashada 2 |

Tixraacyadu waxay yeelan karaan tibaaxyo aljabra ah (algebraic expressions) sida xubnaha.

Tixda ku bilaabata

$$a + 3, a + 7, a + 11, a + 15, \dots$$

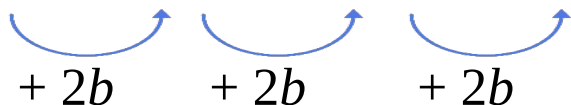


The diagram illustrates the common difference of +4 between the terms of the sequence. It shows three terms: $a + 3$, $a + 7$, and $a + 11$. A blue curved arrow points from $a + 3$ to $a + 7$, and another blue curved arrow points from $a + 7$ to $a + 11$. Below each arrow is the text $+ 4$.

Waxay noqon kartaa tix xisaabeed (arithmetic sequence) oo leh xubinta koowaad $a + 3$ iyo farqiga guud (common difference) $(+ 4)$

Waa maxay xubinta xigta haddii tani tahay tix xisaabeed?

$$a + b, a + 3b, a + 5b, \dots$$



The diagram illustrates the common difference of $+ 2b$ between the terms of the sequence. It shows three terms: $a + b$, $a + 3b$, and $a + 5b$. A blue curved arrow points from $a + b$ to $a + 3b$, and another blue curved arrow points from $a + 3b$ to $a + 5b$. Below each arrow is the text $+ 2b$.

Waxaan u malaynayaa in $a, 2a, 3a, 4a, \dots$ ay tahay tix joomatari (geometric sequence) sababtoo ah waxay isticmaashaa isku dhufasho si loo helo xubinta xigta.



Tani waxay noqon kartaa tix toosan (linear sequence) oo leh farqi guud ($+a$)

Tixraacyada xisaabeed iyo joomatari (Arithmetic and geometric sequences)



Haddii tix joomatari (geometric sequence) ay ku bilaabato $a, 2a, \dots$



waa maxay saddexda xubnood ee xiga?

$$2a \times 2 = 4a$$

$$4a \times 2 = 8a$$

$$8a \times 2 = 16a$$

$a, 2a, 4a, 8a, 16a, \dots$

Waa tix joomatari (geometric sequence) oo leh saami guud (common ratio) oo ah 2

Tixraacyada (sequences) Xisaabeed (Arithmetic) iyo Joometri (Geometric)

Tixraacyadan (sequences) kee baa noqon kara mid Joometri (Geometric)?

a

$$a, 5a, 10a, 50a, \dots$$

$\times 5 \quad \times 2 \quad \times 5$



b

$$a, a^2, a^3, a^4, \dots$$

$\times a \quad \times a \quad \times a$



Saamiga guud (Common ratio) ee a

c

$$a, ab, 2ab, 4ab, \dots$$

$\times b \quad \times 2 \quad \times 2$



1) Kala saar tixraacyadan (sequences) tiirka saxda ah ee jaantuska.

Xisaabeed (arithmetic)	Joometri (geometric)	kale (other)

- a) 1, 2, 3, 4, 5, ...
- b) 3, 9, 27, 81,
- c) 0.5, 1, 2, 4, ...
- d) 1, 1, 2, 4, 7, ...
- e) 1, 2, 4, 7, 11, ...
- f) -2, 4, -8, 16, ...
- g) -1, 5, 11, 17, 23, ...
- h) 18, 35, 52, 69, 88, ...
- i) 36, 12, -12, -36 ...
- j) 13.5, 9, 6, 4, ...
- k) 24, 12, 6, 3, 0, ...

2) Kala saar tixraacyadan (sequences) tiirka saxda ah ee jaantuska.

Xisaabeed (arithmetic)	Joometri (geometric)	kale (other)

a) $\frac{3}{2}, 1, \frac{1}{2}, 0, \dots$

b) $\frac{3}{8}, \frac{3}{4}, \frac{3}{2}, 3, \dots$

c) $\frac{1}{6}, \frac{5}{3}, \frac{50}{3}, \frac{500}{3}, \dots$

d) $\frac{3}{5}, \frac{3}{10}, \frac{3}{15}, \frac{3}{20}, \dots$

e) $-3, 1, -\frac{1}{3}, \frac{1}{9}, \dots$

f) $-\frac{8}{5}, 1, \frac{18}{5}, 6, \dots$

$-\frac{4}{5}, -\frac{2}{3}, -\frac{8}{15}, -\frac{2}{5}, \dots$

3) Tixraac (sequence) ayaa ka bilaabanta $2a$, $6a$, ...

a) Haddii tixraacu (sequence) yahay Xisaabeed (arithmetic), waa maxay seddexda xubnood ee xiga?

a) Haddii tixraacu (sequence) yahay Joometri (geometric), waa maxay seddexda xubnood ee xiga?

a) Ku sii wad tixraacan (sequence) qaab kale, sharax qaanuunka (rule) aad isticmaashay.

1) Kala saar tixraacyadan (sequences) tiirka saxda ah ee jaantuska.

Xisaabeed (arithmetic)	joomatari (geometric)	midna (neither)
a) 1, 2, 3, 4, 5,...	b) 3, 9, 27, 81,...	d) 1, 1, 2, 4, 7,...
g) -1, 5, 11, 17, 23,...	c) 0.5, 1, 2, 4,...	e) 1, 2, 4, 7, 11,...
i) 36, 12, -12, -36,...	f) -2, 4, -8, 16,...	h) 18, 35, 52, 68,...
	j) 13.5, 9, 6, 4, ...	k) 12, 6, 3, 0, ...

- a) 1, 2, 3, 4, 5, ...
- b) 3, 9, 27, 81,
- c) 0.5, 1, 2, 4, ...
- d) 1, 1, 2, 4, 7, ...
- e) 1, 2, 4, 7, 11, ...
- f) -2, 4, -8, 16, ...
- g) -1, 5, 11, 17, 23, ...
- h) 18, 35, 52, 68, ...
- i) 36, 12, -12, -36 ...
- j) 13.5, 9, 6, 4, ...
- k) 12, 6, 3, 0, ...

2) Kala saar tixraacyadan shaxda ee tiirka saxda ah.

xisaabeed (arithmetic)	joomatari (geometric)	midna (neither)
a) $\frac{3}{2}, 1, \frac{1}{2}, 0, \dots$	b) $\frac{3}{8}, \frac{3}{4}, \frac{3}{2}, 3, \dots$	d) $\frac{3}{5}, \frac{3}{10}, \frac{3}{15}, \frac{3}{20}, \dots$
g) $-\frac{2}{5}, -\frac{2}{3}, -\frac{8}{15}, -\frac{2}{5}, \dots$	c) $\frac{1}{6}, \frac{5}{3}, \frac{50}{3}, \frac{500}{3}, \dots$	f) $-\frac{8}{5}, 1, \frac{18}{5}, 6, \dots$
	e) $-3, 1, -\frac{1}{3}, \frac{1}{9}, \dots$	

- a) $\frac{3}{2}, 1, \frac{1}{2}, 0, \dots$
 b) $\frac{3}{8}, \frac{3}{4}, \frac{3}{2}, 3, \dots$
 c) $\frac{1}{6}, \frac{5}{3}, \frac{50}{3}, \frac{500}{3}, \dots$
 d) $\frac{3}{5}, \frac{3}{10}, \frac{3}{15}, \frac{3}{20}, \dots$
 e) $-\frac{8}{5}, 1, \frac{18}{5}, 6, \dots$
 f) $-3, 1, -\frac{1}{3}, \frac{1}{9}, \dots$
 g) $-\frac{8}{5}, 1, \frac{18}{5}, 6, \dots$
 $-\frac{4}{5}, -\frac{2}{3}, -\frac{8}{15}, -\frac{2}{5}, \dots$

3) Tixraac wuxuu ku bilaabmaa $2a$, $6a$, ...

a) Haddii tixraacu yahay xisaabeed (arithmetic), waa maxay saddexda xubnood ee xiga?

$10a$, $14a$, $18a$,

a) Haddii tixraacu yahay joomatari (geometric), waa maxay saddexda xubnood ee xiga?

$18a$, $54a$, $162a$, ...

a) Sii wad tixraacan qaab kale, sharax qaanuunka aad isticmaashay.

Jawaabo badan ayaa suurtagal ah.

Qaabka casharka

Aqoonsiga tixraacyada tirooyinka gaarka ah



Tixraacyada xisaabeed iyo joomatari (Arithmetic and geometric sequences)



Sahminta tixraacyada kale

Waxaa jira noocyo kale oo tixraacyo ah oo aan ku aqoonsan karno astaamahooda muhiimka ah.



Tixraacani ma aha joomatari (geometric) maxaa yeelay ma jiro saami guud (common ratio).

$$3 \times 2 = 6 \text{ laakiin } 6 \times 2 \neq 11 \text{ iyo } 11 \times 2 \neq 18$$

Tixraacani ma aha xisaabeed (arithmetic) maxaa yeelay ma jiro farqi guud (common difference).

Ma sharxi kartaa qaanuun xubnaha isku xira oo shaqeeya shanta xubnood?

$$\begin{array}{ccccccc} 3, & 6, & 11, & 18, & 27, & \dots \\ \underbrace{\hspace{1.5cm}} & \underbrace{\hspace{1.5cm}} & \underbrace{\hspace{1.5cm}} & \underbrace{\hspace{1.5cm}} \\ + 3 & + 5 & + 7 & + 9 \end{array}$$

Ma qeexi kartaa qaanuun eray-ku-eray (term-to-term rule) oo u shaqeeya shantaan eray?

Waxaa laga yaabaa inaad tidhi:

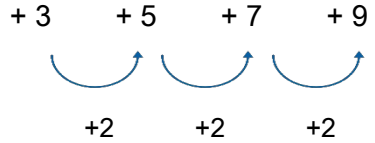
Taxanuhu wuxuu ku darayaa 3, ka dib 5, ka dib 7, ka dib 9,

Taxanuhu wuxuu ku darayaa tirooyinka khayaaliga ah (odd numbers).

Waxaa jira qaab toosan (linear pattern) oo ku jira kala-duwanaanshaha (differences).

Kala-duwanaanshuhu (differences) wuxuu kordhayaa 2 mar kasta.

3, 6, 11, 18, 27, ...



kala-duwanaanshaha koowaad (first difference)

kala-duwanaanshaha labaad (second difference)

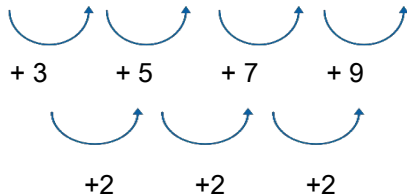
Waxaan tan hore u arkay. Tirooyinka laba jibaaran (square numbers) waxay sameeyaan wax la mid ah.



Isra

Taxanuhu ma aha xisaabeed (arithmetic) sababtoo ah kala-duwanaanshaha (differences) ee erayada isku xigxiga ma aha mid joogto ah. Laakiin kala-duwanaanshaha u dhexeeya kala-duwanaanshaha ayaa joogto ah.

Waxaan dhihi karnaa waxaa jira kala-duwanaansho labaad oo guud (common second difference) oo ah 2



Taxanaha dhammaan tirooyinka laba jibaaran (square numbers) ee kor u kaca wuxuu leeyahay qaanuun erayga nth (nth term rule) oo ah n^2 sababtoo ah laba jibaarista (squaring) lambarka erayga (term number) waxay bixisaa erayga (term).

Lambarka erayga (n)	1	2	3	4	5	...	n
Erayga (T)	1	4	9	16	25		n^2

+2 +2 +2 +2 +2

Lambarka erayga (n)	1	2	3	4	5	...	n
Erayga (T)	3	6	11	18	27		$n^2 + 2$

Taxanahayagu wuxuu leeyahay qaanuun erayga nth (nth term rule) oo ah $n^2 + 2$ sababtoo ah eray kasta wuxuu ka badan yahay 2 tirooyinka laba jibaaran (square numbers).

Maxaa dhacaya haddii aan ka jarnay 2 tirooyinka laba jibaaran (square numbers)?



Cabdi

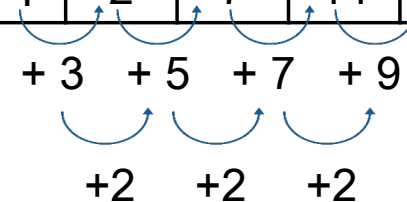
Sidaan (sequence) weli leedahay farqi labaad oo guud oo ah 2?

Haa

Nambarka term-ka	1	2	3	4	5	n
Term	1	4	9	16	25	n^2



Nambarka term-ka	1	2	3	4	5	n
Term	-1	2	7	14	23	$n^2 - 2$



Ka warran haddii aan laba jibaarno tirooyinka laba jibaaran?



Cabdi

Sidaan waxay leedahay farqi labaad oo guud oo ah 4

Nambarka term-ka	1	2	3	4	5	n
Term	1	4	9	16	25	n^2

$\times 2$
 $\downarrow$

$\times 2$
 $\downarrow$

$\times 2$
 $\downarrow$

$\times 2$
 $\downarrow$

Nambarka term-ka	1	2	3	4	5	n
Term	2	8	18	32	50	$2n^2$

$+6$
 $\uparrow$

$+10$
 $\uparrow$

$+14$
 $\uparrow$

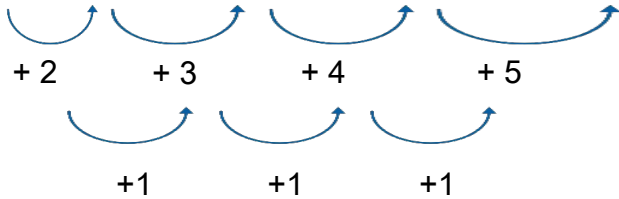
$+18$
 $\uparrow$

$+4$
 $\uparrow$

$+4$
 $\uparrow$

$+4$
 $\uparrow$

Qor shanta tiro ee saddexagalka ee ugu horreeya si aad u aragto in Isra sax tahay.



Sidaan kasta oo leh farqi labaad oo guud waxaa loo yaqaan sidan quadratic (quadratic sequence) (uma baahnid inaad xusuusato magaca noocan sidan hadda).

Waxaan u malaynayaa in tirooyinka saddexagalka (triangular numbers) ay leeyihiin farqi labaad oo guud sidoo kale



Isra

Isra sax, tirooyinka saddexagalka waxay leeyihiin farqi labaad oo guud oo ah 1

Sahaminta taxanaha kale

Kuwee oo ka mid ah kuwani leh kala duwanaansho labaad oo guud?
(waxaa loo yaqaan taxanayaal quadratic).

a

$$\begin{array}{ccccccc} 7, & 8, & 10, & 13, & 17, & \dots \\ & \uparrow & \uparrow & \uparrow & \uparrow & \\ & +1 & +2 & +3 & +4 & \\ & \uparrow & \uparrow & \uparrow & & \\ & +1 & +1 & +1 & & \end{array}$$

✓

b

$$\begin{array}{ccccccc} 5, & 7, & 11, & 17, & 25, & \dots \\ & \uparrow & \uparrow & \uparrow & \uparrow & \\ & +2 & +4 & +6 & +8 & \\ & \uparrow & \uparrow & \uparrow & & \\ & +2 & +2 & +2 & & \end{array}$$

✓

c

$$\begin{array}{ccccccc} 6, & 8, & 12, & 20, & 36, & \dots \\ & \uparrow & \uparrow & \uparrow & \uparrow & \\ & +2 & +4 & +8 & +16 & \\ & \uparrow & \uparrow & \uparrow & & \\ & +2 & +4 & +8 & & \end{array}$$

✗

Layla iyo Caasha waxay eegayaan taxanaha ka bilaabma

2, 3, 5, 8, 13, ...



Layla

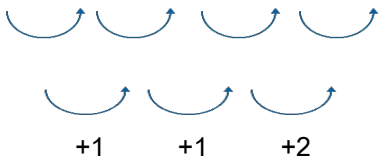
Kani ma noqon karo taxane xisaabeed (arithmetic) ama joomatari (geometric)

Waxaa laga yaabaa inuu yahay quadratic?



Caasha

Layla waa sax, si kastaba ha ahaatee taxanahani sidoo kale ma aha quadratic.



Ereyga xiga ee taxanaha waa 21

2,	3,	5,	8,	13,	21, ...	
----	----	----	----	-----	---------	--

Ma arki kartaa qaanuun kuu sheegaya sida taxanahan loo soo saaray?

Waxaa laga yaabaa inaad aragtay:

$$2 + 3 = 5$$



Layla

Taxanahaygu wuxuu ka bilaabmaa 10, erey kastana wuxuu ka yimaadaa isku darka labada erey ee hore

Ereyga labaad waa 4

Maxay tahay sababta aan u awoodi karin inaan qorno taxanaha Layla?

Ma naqaano ereyga labaad.

Qor shanta erey ee ugu horreeya ee taxanaha Layla.

10, 4, 14, 18, 32, ...

Ma beddeli kartaa ereyga labaad si ereyga saddexaad uu uga yaraado kii ugu horreeyay?

Haddii ereyga labaad uu yahay taban (negative)

Tusaale: 10, -2, 8, 6, 14, ... ama 10, -12, -2, -14, -16, ...

Taxanahan, erey kasta waxaa lagu sameeyaa isku darka labada erey ee hore. Soo hel saddexda erey ee xiga ee taxane kasta.

a 1, 1, 2, ...

b 7, 1, 8, ...

c 8, 5, ...

d 5, -3, ...

Taxanahan, erey kasta waxaa lagu sameeyaa isku darka labada erey ee hore. Soo hel saddexda erey ee xiga ee taxane kasta.

a

1, 1, 2, 3, 5, 8 ...

b

7, 1, 8, 9, 17, 26, ...

c

8, 5, 13, 18, 31, ...

d

5, -3, 2, -1, 1 ...

1) Adigoo ogaanaya qaabka (pattern), soo hel labada erey ee xiga ee taxane kasta.

a) 2, 8, 32, 128, ...

b) 2, 8, 14, 20, ...

c) 2, 8, 15, 23, ...

d) 2, 8, 16, 26, ...

e) 2, 8, 10, 18, ...

f) 2, 8, 17, 29, ...

g) 8, 2, 10, 12, ...

h) 8, 2, -4, -10, ...

i) 3, 5, 11, 21, ...

i) 4, 6, 12, 22, ...

i) 6, 10, 22, 42, ...

i) -3, -5, -8, -13, ...

i) -3, -5, -7, -9, ...

i) 2, -6, 18, -54, ...

i) 1, -7, -10, -8, ...

2) Caasha, Isra iyo Cabdi waxay abuureen taxane oo ka bilaabmaya ereyada

$$\frac{1}{6}, \frac{1}{2}, \dots$$

Su'aal kasta, sharax jawaabtaada.

- a) Yaa abuuray taxane xisaabeed (arithmetic sequence)?
- b) Yaa abuuray taxane joomatari (geometric sequence)?
- c) Yaa abuuray taxane laba jibaaran (quadratic sequence)?
(taxane leh kala duwanaansho labaad oo wada mid ah)



$$\frac{1}{6}, \frac{1}{2}, 1\frac{1}{6}, 2\frac{1}{6}, \dots$$

Caasha

$$\frac{1}{6}, \frac{1}{2}, \frac{5}{6}, 1\frac{1}{6}, \dots$$



Isra



$$\frac{1}{6}, \frac{1}{2}, 1\frac{1}{2}, 4\frac{1}{2}, \dots$$

Cabdi

1) By working out the pattern, find the next two terms in each sequence.

- a) 2, 8, 32, 128, ... 512, 2048 Taxane joomatari oo leh saami guud (common ratio) $\times 2$
- b) 2, 8, 14, 20, ... 26, 32, Arithmetic sequence with common difference +6
- c) 2, 8, 15, 23, ... 32, 42 Quadratic sequence with second difference +1
- d) 2, 8, 16, 26, ... 38, 52 Quadratic sequence with second difference +2
- e) 2, 8, 10, 18, ... 28, 46 Ku dar labada xilli ee hore si aad u hesho xiga
- f) 2, 8, 17, 29, ... 44, 62 Quadratic sequence with second difference +3
- g) 8, 2, 10, 12, ... 22, 34 Ku dar labada xilli ee hore si aad u hesho xiga
- h) 8, 2, -4, -10, ... -16, -22 Linear sequence with common difference -6

1) By working out the pattern, find the next two terms in each sequence.

i) 3, 5, 11, 21, ... 35, 53 Quadratic sequence with second difference +4

i) 4, 6, 12, 22, ... 36, 54 Quadratic sequence with second difference +4

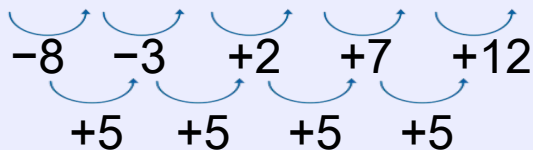
i) 6, 10, 22, 42, ... 70, 106 Quadratic sequence with second difference +8

i) -3, -5, -8, -13, ... -21, -34 Ku dar labada xilli ee hore si aad u hesho xiga

i) -3, -5, -7, -9, ... -11, -13 Arithmetic sequence with common difference -2

i) 2, -6, 18, -54, ... 162, -486 Geometric sequence with common ratio $\times(-3)$

i) 1, -7, -10, -8, ... -1 11 Quadratic sequence with second difference + 5



2) Aisha, Izzy iyo Lucas dhamaantood waxay abuureen taxane oo ka bilaabmaya xilliyada

$$\frac{1}{6}, \frac{1}{2}, \dots$$

Su'aal kasta, sharax jawaabtaada.

a) Who has created an arithmetic sequence?

Izzy, common difference

b) Yaa abuuray taxane joomatan (geometric sequence)?

Cabdi, saamiga guud (common ratio) $\times 3$

c) Yaa abuuray taxane laba jibaaran (quadratic sequence)?

Caasha, taxanaha ka dib ka dib

farqiga labaad ee guud (common second difference) waa

$$\begin{array}{cccc} & +\frac{1}{3} & & \\ & & +\frac{2}{3} & \\ & & & +\frac{1}{3} \\ & & & & +\frac{3}{3} \end{array}$$



$$\frac{1}{6}, \frac{1}{2}, 1\frac{1}{6}, 2\frac{1}{6}, \dots$$

Caasha

$$\frac{1}{6}, \frac{1}{2}, \frac{5}{6}, 1\frac{1}{6}, \dots$$



Isra



$$\frac{1}{6}, \frac{1}{2}, 1\frac{1}{2}, 4\frac{1}{2}, \dots$$

Cabdi

Soo koobid Aqoonsiga taxanayaasha gaarka ah

Taxanaha xisaabeed (arithmetic sequences) waxaa lagu gartaa hubinta farqiga guud (common difference) ee xubnaha.

Taxanaha joomatari (geometric sequences) waxaa lagu gartaa hubinta saamiga guud (common ratio) ee xubnaha.

Qaar ka mid ah taxanayaasha waxay leeyihiin farqi labaad oo guud, tirooyinka laba jibaaran iyo saddexagalka waa tusaale.

(Waxaa loo yaqaan taxanayaasha laba jibaaran (quadratic sequences).)

Xeerar kale ayaa loo isticmaali karaa in lagu abuuro noocyo badan oo taxane ah.