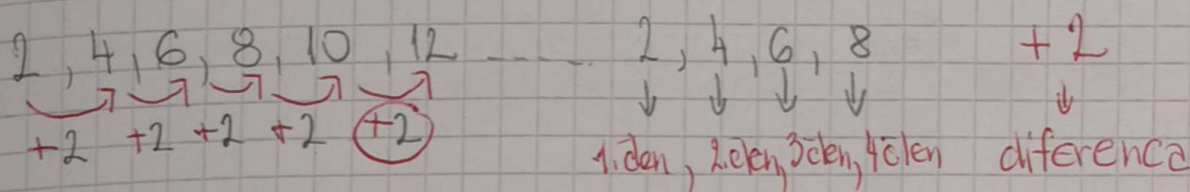


1. ZAPOREDJA

1a ARITMETIČNO ZAPOREDJE



* Pri ARITMETIČNEM ZAPOREDJU člene SEŠTEVAŠ (+, diferenca)

FORMULA ARITMETIČNEGA ZAPOREDJA

$$d = a_n - a_{n-1}$$

d = diferenca

$$a_n = a_m + (n - m) \cdot d$$

a_n = splošni člen

$$a_5 = a_4 + d$$

$$a_5 = a_2 + 3d$$

$$a_{100} = a_{10} + 90d$$

$$S_n = \frac{n}{2} \cdot (2 \cdot a_1 + (n-1) \cdot d)$$

S_n = vsota poljubnih členov

$$S_{100} = \frac{100}{2} \cdot (2 \cdot 2 + (100-1) \cdot 2) =$$

$$S_{100} = 50 \cdot (4 + 99 \cdot 2) =$$

$$S_{100} = 50 \cdot 202 = 10100$$

Vaje aritmetičnega zaporedja

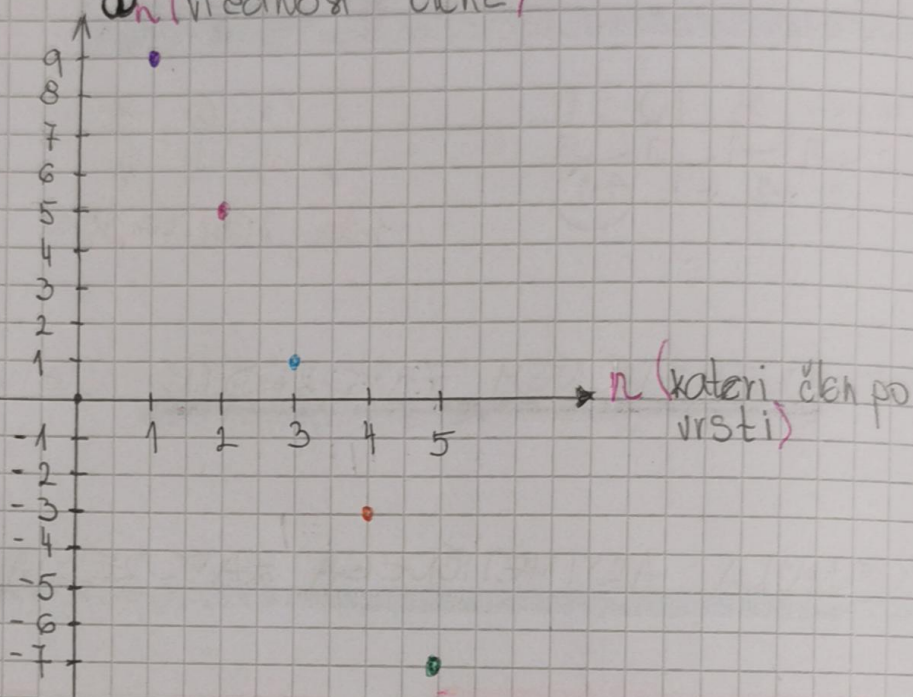
1. Zapiši diferenco zaporedja in graf zaporedja

AZ

$$\frac{9}{(1.\text{člen})}, \frac{5}{(2.\text{člen})}, \frac{1}{(3.\text{člen})}, \frac{-3}{(4.\text{člen})}, \frac{-7}{(5.\text{člen})}$$

$d = -4$

a_n (vrednost člena)



2. Zapiši prve štiri člene zaporedja in nariši graf

AZ

$$a_n = \frac{n + (-1)^n}{2}$$

$$a_1 = \frac{1 + (-1)^1}{2} = \frac{1 - 1}{2} = \frac{0}{2} = 0$$

$$a_2 = \frac{2 + (-1)^2}{2} = \frac{2 + 1}{2} = \frac{3}{2} = 1\frac{1}{2}$$

$$a_3 = \frac{3 + (-1)^3}{2} = \frac{3 - 1}{2} = \frac{2}{2} = 1$$

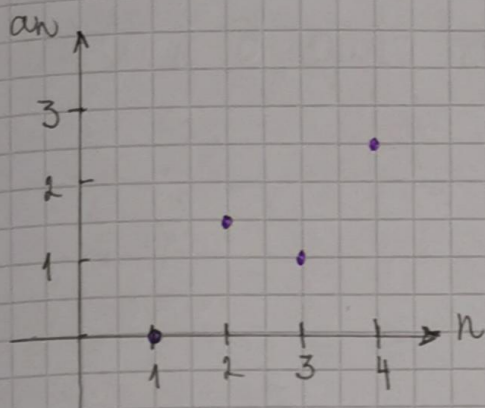
$$a_4 = \frac{4 + (-1)^4}{2} = \frac{4 + 1}{2} = \frac{5}{2} = 2\frac{1}{2}$$

$$(-1)^2 = (-1) \cdot (-1) = 1 \quad (-n = +)$$

$$(-1)^3 = (-1) \cdot (-1) \cdot (-1) = -1$$

* kadar so potence
SODE (parna števila) je
pozitiven predznak

+
* kadar so potence
LIFE (neparna števila) je
negativen predznak



3. Zapiši prve štiri točke zaporedja in nariši graf

4Z

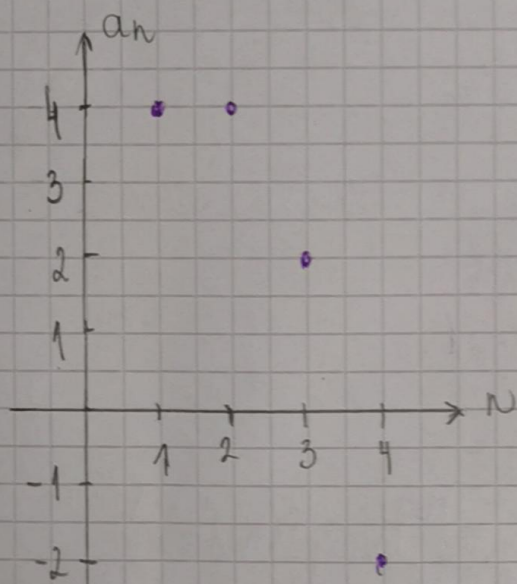
$$a_n = -n^2 + 3n + 2$$

$$a_1 = -1^2 + 3 \cdot 1 + 2 = -1 + 3 + 2 = 4$$

$$a_2 = -2^2 + 3 \cdot 2 + 2 = -4 + 6 + 2 = 4$$

$$a_3 = -3^2 + 3 \cdot 3 + 2 = -9 + 9 + 2 = 2$$

$$a_4 = -4^2 + 3 \cdot 4 + 2 = -16 + 12 + 2 = -2$$



$$* -1^2 = -1; -1^3 = -(-1)$$

$$* (-1)^2 = 1; (-1)^3 = -1$$

Kadar negativen predznak

NI v OXLEPAJU,

je število pozitivno

8. Za dano zaporedje zapiši diferenco, ker njega 5 in 50 člen

$$\Delta Z$$

$$-2, 1, 4, 7$$

$$a_1 = -2$$

$$a_2 = 1$$

$$a_3 = 4$$

$$a_4 = 7$$

$$a_5 = 10$$

$$a_{50} = 145$$

$$d = a_2 - a_1$$

$$d = 1 - (-2)$$

$$d = 1 + 2$$

$$d = 3$$

$$a_n = a_m + (n-m) \cdot d$$

$$a_{50} = a_1 + a_{49} \cdot (50-1) \cdot d$$

$$a_{50} = -2 + 49 \cdot 3$$

$$a_{50} = -2 + 147$$

$$a_{50} = 145$$

9. Izračunaj 17 člen in vsoto prvih 15 členov

$$\Delta Z$$

$$a_1 = -4$$

$$a_8 = 10$$

$$a) d = 2$$

$$b) a_{17} = -128$$

$$c) S_{15} = 150$$

$$a) a_8 = a_1 + 7 \cdot d$$

$$10 = -4 + 7 \cdot d$$

$$-7d = -4 - 10$$

$$-7d = 14 / : -7$$

$$d = 2$$

$$b) a_{17} = a_1 + 16 \cdot d$$

$$a_{17} = -4 + 16 \cdot 2$$

$$a_{17} = -4 + 32$$

$$a_{17} = -128$$

$$c) S_{15} = \frac{n}{2} \cdot (2a_1 + (n-1) \cdot d)$$

$$S_{15} = \frac{15}{2} \cdot (2 \cdot (-4) + (15-1) \cdot 2)$$

$$S_{15} = 7,5 \cdot (-8 + 28)$$

$$S_{15} = 7,5 \cdot 20$$

$$S_{15} = 7,5 \cdot 20$$

$$S_{15} = 150$$

13) Pri zidavi 26 m visokega dimnika stane prvi meter 8000 evrov, vsak naslednji meter pa 3000 evrov več kakor prejšnji.

a) koliko stane zidati meter dimnika?

b) Koliko stane zidava dimnika v celoti? c) Ali lahko za 20000 evrov zgradimo prvih 10 m?

$$a_1 = 8000 \text{ €}$$

$$d = 3000 \text{ €}$$

$$a) a_{26} = 83000 \text{ €}$$

$$b) S_{26} = 1183000$$

c) za 20000 € zgradimo prvih 10 m dimnika?

$$a) a_{26} = a_1 + 25 \cdot d$$

$$a_{26} = 8000 + 25 \cdot 3000$$

$$a_{26} = 8000 + 75000$$

$$a_{26} = 83000$$

$$b) S_{26} = \frac{n}{2} \cdot (2a_1 + (n-1) \cdot d)$$

$$S_{26} = \frac{26}{2} \cdot (2 \cdot 8000 + (26-1) \cdot 3000)$$

$$S_{26} = 13 \cdot (16000 + 25 \cdot 3000)$$

$$S_{26} = 13 \cdot (16000 + 75000)$$

$$S_{26} = 13 \cdot 91000 = 1183000$$

2) Izračunajte x , $2x-1$, $3x+2$, $6x+1$, prvi trije členi aritmetičnega zaporedja. Izračunajte 5 člen

$$a_1 = 2x-1$$

$$a_2 = 3x+2$$

$$a_3 = 6x+1$$

$$a_5 = 23$$

$$d = 5$$

$$2x-1$$

$$3x+2$$

$$6x+1$$

$$a_1$$

$$a_2$$

$$a_3$$

$$a_2 - a_1 = a_3 - a_2$$

$$3x+2 - (2x-1) = 6x+1 - (3x+2)$$

$$3x - 2x - 6x + 3x = 1 - 2 - 2 - 1$$

$$-2x = -4 \quad / : -2$$

$$x = 2$$

$$a_1 = 2x-1 = 2 \cdot 2 - 1 = 4-1=3$$

$$a_2 = 3x+2 = 3 \cdot 2 + 2 = 6+2=8$$

$$a_3 = 6x+1 = 6 \cdot 2 + 1 = 12+1=13$$

1b GEOMETRIJSKO ZAPOREZJE

1, 3, 9, 27

a_1 a_2 a_3 a_4

$\cdot 3 \cdot 3 \cdot 3 \rightarrow$ količnik

FORMULA ZA KOLIČNIK

$$q = \frac{a_2}{a_1} = \frac{a_3}{a_2} = \frac{a_{100}}{a_{99}}$$

$$q = \frac{a_n}{a_{n-1}}$$

$$a_2 = a_1 \cdot q$$

$$a_3 = a_1 \cdot q^2$$

$$a_4 = a_1 \cdot q^3$$

$$a_{70} = a_{20} \cdot q^{50}$$

$$a_{70} = a_{20} \cdot q^{50} \quad (a_{70} - a_{20} = 50)$$

FORMULA ZA VSOTO SPLOŠNIH ČLENOV

$$a_n = a_m \cdot q^{n-m}$$

FORMULA ZA VSOTO PODOBNIH ČLENOV (n-členov)

$$S_n = \frac{a_1 \cdot (q^n - 1)}{q - 1}$$

VAJE

GEOMETRIJSKEGA

ZAPOREDJA

1. Zapiši količnik zaporedja

$$a) 27, 9, 3, \boxed{1}$$

$$q = \boxed{\frac{1}{3}}$$

$$b) 2, \boxed{4}, 8, 16, \boxed{32}$$

$$q = \boxed{2}$$

3. Določi manjšajoči člen, tako da bo zaporedje 2, 4, $\square$, 16... izračunaj vsoto prvih osmih členov.

$$2, 4, \underline{8}, 16$$

$$a) a_3 = \underline{8}$$

$$b) S_8 = \underline{510}$$

$$b) S_n = \frac{a_1 \cdot (q^n - 1)}{q - 1}$$

$$S_8 = \frac{2 \cdot (2^8 - 1)}{2 - 1}$$

$$S_8 = \frac{2 \cdot (256 - 1)}{1}$$

$$S_8 = 2 \cdot 255 = \underline{510}$$

6. V. vrsti je po velikosti razvrščenih 6 kamnov. Najlažji tehta 0,25 kg. Vsak naslednji dvakrat toliko kot prejšnji. Koliko tehta najtežji kamen in koliko tehtajo vsi skupaj?

$$a_1 = 0,25 \text{ kg}$$

$$\underline{q = 2}$$

$$a_6 = 8$$

$$S_6 = 15,75 \text{ kg}$$

$$a_n = a_m \cdot q^{n-m}$$

$$a_6 = a_1 \cdot q^{6-1}$$

$$a_6 = 0,25 \cdot 2^5$$

$$a_6 = 0,25 \cdot 32, a_6 = 8$$

$$S_n = \frac{a_1 \cdot (q^n - 1)}{q - 1}$$

$$S_6 = \frac{0,25 \cdot (2^6 - 1)}{2 - 1}$$

$$S_6 = \frac{0,25 \cdot (64 - 1)}{1}$$

$$S_6 = 0,25 \cdot 63$$

$$S_6 = 15,75 \text{ kg}$$

8. V družini po starosti sin, hčerke in oče a zaporedni členi geom. zaporedja s količnikom 3.

Skupaj so stari 65 let. Izračunajte starost očeta.

$$\text{sin} = a_1 = 5$$

$$\text{hči} = a_2 = 15$$

$$\text{oče} = a_3 = 45$$

$$q = 3$$

$$S_3 = 65$$

$$a_3 = a_1 \cdot q^2$$

$$S_n = \frac{a_1 \cdot (q^n - 1)}{q - 1}$$

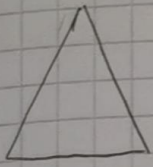
$$S_3 = \frac{a_1 \cdot (3^3 - 1)}{3 - 1} \rightarrow (27 - 1)$$

$$65 = \frac{a_1 \cdot 26}{2} =$$

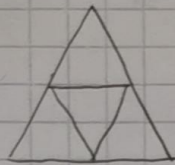
$$65 = 13 \cdot a_1 \quad / : 13$$

$$5 = a_1$$

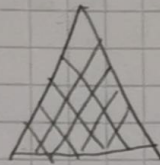
16



$$a_1 = 1$$



$$a_2 = 4$$



$$a_3 = 16$$

$$q_n = \frac{a_2}{a_1} = \frac{4}{1} = 4$$

$$a_5 = a_1 \cdot q_n^4 = 1 \cdot 4^4 = 256$$

2) števila 2, $\sqrt{x}$, 8 so prvi trije členi GZ. Izračunaj x in peti člen.

$$\begin{array}{ccc} 2 & , & \sqrt{x} & , & 8 \\ a_1 & & a_2 & & a_3 \end{array}$$

$$q = \frac{a_2}{a_1}$$

$$q = \frac{a_3}{a_2}$$

$$\boxed{\frac{a_2}{a_1} = \frac{a_3}{a_2}}$$

$$a_1 = 2$$

$$a_2 = \sqrt{x} = \sqrt{16} = 4$$

$$a_3 = 8$$

$$a_5 = 32$$

$$\begin{aligned} \text{a)} \quad & \frac{\sqrt{x}}{2} = \frac{8}{\sqrt{x}} \\ & \sqrt{x} \cdot \sqrt{x} = 2 \cdot 8 \\ & \sqrt{x}^2 = 16 \\ & x = 16 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & a_5 = a_1 \cdot q^4 \\ & a_5 = 2 \cdot 2^4 \\ & a_5 = 2 \cdot 16 \\ & a_5 = 32 \end{aligned}$$

4. Prvi trije člani zaporedja su: $x, x+4, 9x$

$$x \quad x+4 \quad 9x$$

$$a_1 = x$$

$$a_2 = x+4$$

$$a_3 = 9x$$

$$\frac{a_2}{a_1} = \frac{a_3}{a_2}$$

$$\frac{x+4}{x} \cdot \frac{9x}{x+4}$$

$$(x+4)(x+4) = x \cdot 9x$$

$$x^2 + 4x + 4x + 16 = 9x^2$$

$$x^2 + 4x + 4x + 16 - 9x^2 = 0$$

$$-8x^2 + 8x + 16 = 0$$

Kvadratna
lunčba

$$a = -8 \quad D = b^2 - 4ac$$

$$b = 8 \quad D = 8^2 - 4 \cdot (-8) \cdot 16$$

$$c = 16 \quad D = 64 + 32 \cdot 16$$

$$D = 64 + 512 = 576$$

$$x_1 = \frac{-b + \sqrt{D}}{2a}$$

$$x_2 = \frac{-b - \sqrt{D}}{2a}$$

$$x_1 = \frac{-8 + \sqrt{576}}{2 \cdot (-8)}$$

$$x_2 = \frac{-8 - \sqrt{576}}{2 \cdot (-8)}$$

$$x_1 = \frac{-8 + 24}{-16}$$

$$x_2 = \frac{-8 - 24}{-16} = 2$$

$$x = \frac{16}{-16} = -1$$

$$x_1 = -1$$

$$a_1 = x = -1$$

$$a_2 = x+4 = -1+4 = 3$$

$$a_3 = 9x = -9$$

$$x_2 = 2$$

$$a_1 = x = 2$$

$$a_2 = x+4 = 2+4 = 6$$

$$a_3 = 9x = 9 \cdot 2 = 18$$