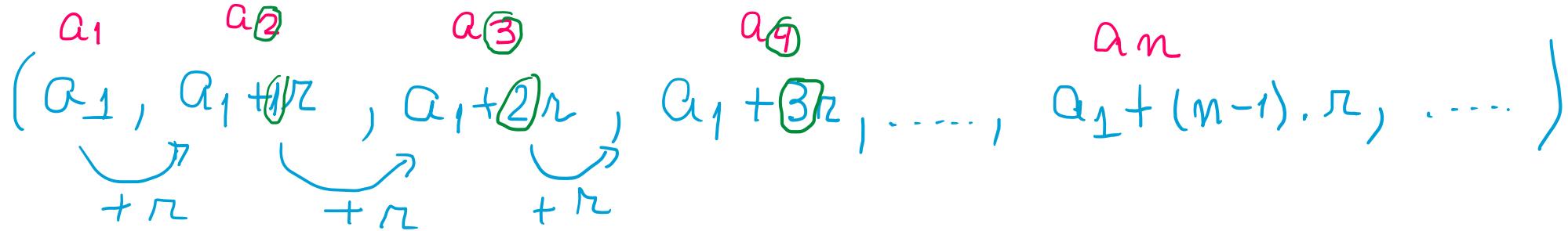


PA 1º termo  $a_1$  e razão  $r$

$$(a_1, a_1 + \cancel{1}r, a_1 + \cancel{2}r, a_1 + \cancel{3}r, \dots, a_1 + (n-1) \cdot r, \dots)$$


$$Q_n = a_1 + (n-1) \cdot r, n \in \mathbb{N}^*$$

⑪ PA (-33, -29, -25, -21, ...)

$$r = a_2 - a_1 = a_3 - a_2 = a_4 - a_3 = -29 - (-33) = -29 + 33 = 4$$

$$Q_n = -33 + (n-1) \cdot 4$$

$$Q_n = -33 + 4n - 4$$

$$\boxed{Q_n = 4n - 37, n \in \mathbb{N}^*}$$

$$\left. \begin{array}{l} n=1 \Rightarrow a_1 = 4 \cdot 1 - 37 = -33 \\ n=2 \Rightarrow a_2 = 4 \cdot 2 - 37 = -29 \end{array} \right\} \text{etc. -}$$

28b  $(2, \frac{7}{3}, \frac{8}{3}, \dots, 18)$  PA

$$r = \frac{7}{3} - 2 = \frac{8}{3} - \frac{7}{3} = \frac{1}{3}$$

$$a_n = 2 + (n-1) \cdot r$$

$$18 = 2 + (n-1) \cdot \frac{1}{3}$$

$$18 - 2 = (n-1) \cdot \frac{1}{3}$$

$$16 \cdot 3 = n - 1$$

$$\boxed{n = 49}$$

Carl F. Gauss (1777 - 1855) alemão

$$S = 1 + 2 + 3 + \dots + 98 + 99 + 100$$
$$S = 100 + 99 + 98 + \dots + 3 + 2 + 1$$

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$$2S = \underbrace{101 + 101 + 101 + \dots + 101 + 101 + 101}_{100 \text{ parcelas}}$$

$$2S = 100 \cdot 101$$

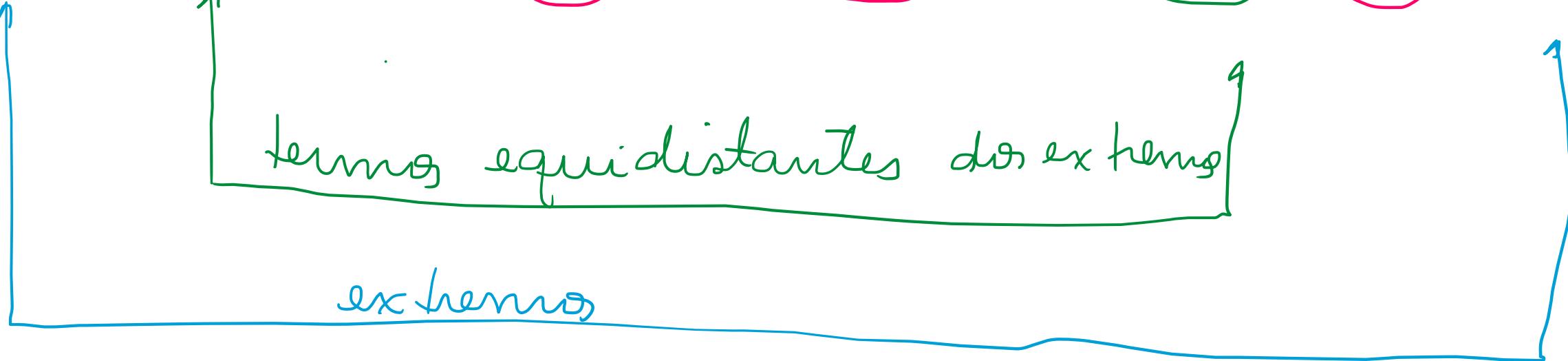
$$S = \frac{100 \cdot 101}{2}$$

$$S = \frac{(a_1 + a_{100}) \cdot \frac{n^{\circ} \text{ termos}}{2}}{2}$$

$$S = 5050$$

seq. finita

$$(a_1, \underbrace{a_2, a_3}, \dots, a_k, \underbrace{a_{k+1}}, \dots, \underbrace{a_{m-k}}, \dots, \underbrace{a_{n-2}}, \underbrace{a_{n-1}, a_n})$$



PA finita 1º termo  $a_1$  e razão  $r$

$$(a_1, \underbrace{a_2, a_3, \dots, a_{k+1}}_{\text{termos equidistantes dos extremos}}, \dots, \underbrace{a_{n-k}, \dots, a_{n-2}, a_{n-1}, a_n})$$

$$a_k + a_{n-k} = [a_1 + (k+1-1) \cdot r] + [a_1 + (n-k-1) \cdot r]$$

$$a_k + a_{n-k} = a_1 + k \cdot r + a_1 + \underbrace{(n-k-1) \cdot r}$$

$$a_k + a_{n-k} = a_1 + a_1 + (k + n-k-1) \cdot r$$

$$a_k + a_{n-k} = a_1 + \underbrace{a_1 + (n-1) \cdot r}$$

$$a_k + a_{n-k} = a_1 + a_n$$

$$a_{k+1} = a_1 + \underbrace{(k+1-1)}_k \cdot r$$

Em toda PA finita, a soma de termos equidistantes dos extremos é igual à soma dos extremos.

termo central

$$(3, 8, 13, \overbrace{18}, 23, 28, 33) \quad \cdot 7 \text{ termos}$$

↑  
↑  
 $13 + 23 = 26$   
↑  
↑  
 $8 + 28 = 36$   
↑  
 $3 + 33 = 36$

$$a_4 = 18$$

$$a_4 + a_4 = 36$$

$$S = (3 + 33) + (8 + 28) + (13 + 23) + (18 + 18) + (23 + 13) + (28 + 8) + (33 + 3)$$
$$S = \frac{36}{36} + \frac{36}{36} + \frac{36}{36} + \frac{36}{36} + \frac{36}{36} + \frac{36}{36} + \frac{36}{36}$$

$(a_1, a_2, a_3, \dots, a_n, \dots)$  PA

$S_m$ : soma dos  $m$  primeiros termos da PA

$$S_m = a_1 + a_2 + a_3 + \dots + a_{m-2} + a_{m-1} + a_m +$$
$$S_m = a_n + a_{n-1} + a_{n-2} + \dots + a_3 + a_2 + a_1 +$$

$$\overline{2S_m = (a_1 + a_n) + \underbrace{(a_2 + a_{n-1})}_{a_1 + a_n} + \underbrace{(a_3 + a_{n-2})}_{a_1 + a_n} + \dots + \underbrace{(a_{n-1} + a_2)}_{a_1 + a_n} + (a_n + a_1)}$$

$$2S_m = m \cdot (a_1 + a_n)$$

$$\boxed{S_m = \frac{(a_1 + a_n) \cdot m}{2}, m \in \mathbb{N}^*}$$

Gauss

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

① PA (3, 7, 11, 15, ...) soma dos 20 primeiros termos

$$a_1 = 3 \quad r = 4 \quad a_{20} = 3 + 19 \cdot 4 = 79$$

$$S_{20} = \frac{(a_1 + a_{20}) \cdot 20}{2} = \frac{(3 + 79) \cdot 20}{2} \Rightarrow S_{20} = 820$$

— //

② PA (6, 10, 14, 18, ...) soma dos n primeiros termos

$$a_1 = 6 \quad r = 4 \quad a_n = 6 + (n-1) \cdot 4 \Rightarrow a_n = 6 + 4n - 4 \\ a_n = 2 + 4n$$

$$S_m = \frac{(6 + 2 + 4m) \cdot m}{2} = \frac{(8 + 4m) \cdot m}{2} = \cancel{2} \cdot \cancel{m} \cdot (4 + 2m)$$

$$\boxed{S_m = m \cdot (4 + 2m), m \in \mathbb{N}^*}$$

$$\boxed{\text{DBS} \quad S_1 = a_1}$$

$\sum$  letra grega Rigma maiúscula

$$\sum_{i=1}^7 \alpha^i = (\alpha \cdot 1) + (\alpha \cdot 2) + (\alpha \cdot 3) + (\alpha \cdot 4) + (\alpha \cdot 5) + (\alpha \cdot 6) + (\alpha \cdot 7)$$

soma dos 7 primeiros termos de uma PA

termo geral da parcela

$$\sum_{i=1}^7 \alpha^i = \frac{(\alpha + 14) \cdot 7}{2} = 56$$

$$\sum_{i=1}^{40} (3^i - 1) = \underbrace{(3 \cdot 1 - 1)}_2 + \underbrace{(3 \cdot 2 - 1)}_5 + \underbrace{(3 \cdot 3 - 1)}_8 + \dots + \underbrace{(3 \cdot 40 - 1)}_{119}$$

Soma dos 40 primeiros termos da PA

$$\sum_{i=1}^{40} (3^i - 1) = \frac{(2 + 119) \cdot 40}{2} = 2420$$

$$a_i = 3^i - 1$$

$$a_{i+1} = 3^{(i+1)} - 1 = 3^i + 2$$

$$a_{i+1} - a_i = 3^i + 2 - 3^i + 1$$

$$a_{i+1} - a_i = 3, \quad \forall i \in \mathbb{N}^*$$

Logo, a seq. é PA

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nº exerc       $51 - 37 + 1 = 15$

$$\left\{ \begin{array}{l} a_n - a_1 = (n-1) \cdot r \\ n-1 = \frac{a_n - a_1}{r} \end{array} \right.$$

de 1 a 10  $\rightarrow 10 \text{ n } \Rightarrow$   
 $10 - 1 + 1 = 10$

$$a, b \in \mathbb{R}^*$$

$$a = b$$

$$a^2 = ab$$

$$a^2 - b^2 = ab - b^2$$

$$(a-b)(a+b) = (a-b) \cdot b$$

$$= 0 \quad a+b = b$$

Como  $a = b$ , então

$$2b = 15$$

$$a = 1$$

absurdo!

sofisismo  
ou  
falácia

$$\begin{array}{l} 2x = 2y \Rightarrow x = y \\ 2 \neq 0 \end{array}$$

Propriedade do cancelamento

$$x + a = y + a \Leftrightarrow x = y$$

$$ab = ac \quad \text{e} \quad a \neq 0 \Rightarrow b = c$$

$$0 \cdot 2 = 0 \cdot 3 \quad \not\Rightarrow 2 = 3$$

$$\begin{array}{ll} \text{ex} & x^2 = x \quad \Rightarrow x \cdot x \cancel{=} x \\ & x^2 - x = 0 \\ & x \cdot (x-1) = 0 \end{array}$$

não!

$$x = 0 \quad \text{ou} \quad x-1 = 0 \quad \text{ou} \quad x = 1$$

$$36 + 16 = 16 + 36$$

$$36 - 48 + 16 = 16 - 48 + 36$$

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

$$(6-4)^2 = (4-6)^2 \text{ error!}$$

$$(2)^2 = (-2)^2$$

$$6-4 = 4-6$$

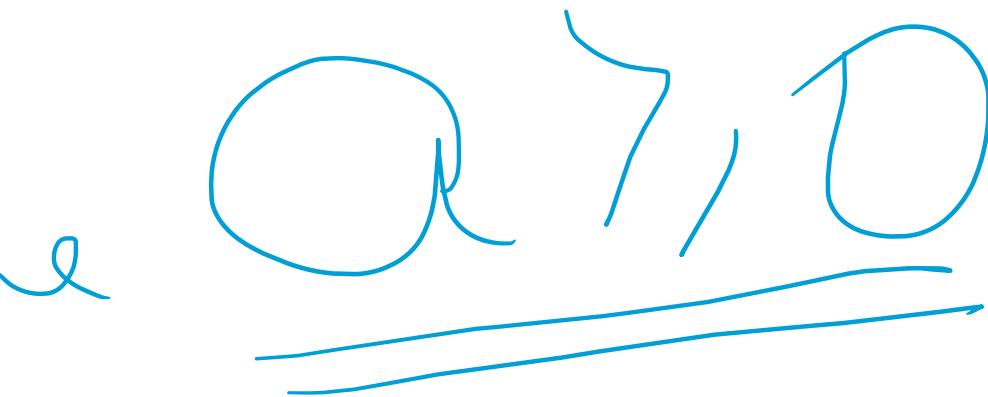
$$2 = -2$$

$$a^2 = b^2 \Rightarrow a = 5 \text{ or } a = -5$$

$$2 = \sqrt[4]{16} = \sqrt[4]{2^4} = \sqrt[4]{(-2)^4} \cancel{=} -2$$

$$n, p \in \mathbb{N}^* \text{ and } m \in \mathbb{Z}$$

$$\sqrt[n \cdot p]{a^{m \cdot p}} = \sqrt[n]{a^m}$$



$$\sqrt[4]{16} = \sqrt[4]{2^4} = 2$$