Pag 175

17) PA

$$\begin{cases} a_3 + a_8 = 14 \\ a_5 = 2a_{10} + 88 \end{cases} \Longrightarrow \begin{cases} a_1 + 2r + a_1 + 7r = 14 \\ a_1 + 4r = 2 \cdot (a_1 + 9r) + 88 \end{cases}$$

$$\begin{cases} 2a_1 + 9r = 14 \\ a_1 + 4r - 2a_1 - 18r = 88 \end{cases} \Longrightarrow \begin{cases} 2a_1 + 9r = 14 & (I) \\ -a_1 - 14r = 88 & (\times 2) \end{cases}$$

$$\begin{cases} 2a_1 + 9r = 14 \\ -2a_1 - 28r = 176 \end{cases}$$

$$-19r = 190$$

$$r = -\frac{190}{19}$$

$$\boxed{r = -10}$$

$$r = -10 \Longrightarrow 2 \cdot a_1 - 90 = 14$$

$$2a_1 = 104$$

$$\boxed{a_1 = 52}$$

Resp a) $r = -10$ b) $a_1 = 52$

21) a) PA $(3x-5;\ 3x+1;\ 25)$

Prop. Média Aritmética

$$3x+1 = \frac{3x-5+25}{2}$$

ou

$$(3x+1)-(3x-5) = 25-(3x+1)$$

c) $(x+3;\ x^2;\ 6x+1)$ PA

$$x^2 = \frac{x+3+6x+1}{2}$$

$$2x^2 = 7x+4$$

$$2x^2-7x-4=0$$

$$\Delta = (-7)^2 - 4 \cdot 2 \cdot (-4) = 81$$

$$x = \frac{7+9}{4} \text{ ou } x = \frac{7-9}{4} \Rightarrow x = 4 \text{ ou } x = -\frac{1}{2}$$

22) PA $\quad a_n = 28 + 4n, \; n \in \mathbb{N}^* \qquad r = ?$

$n = 1 \Rightarrow a_1 = 28 + 4$

$n = 2 \Rightarrow a_2 = 28 + 4 \cdot 2$

$r = a_2 - a_1$

$r = (28 + 8) - (28 + 4)$

$\boxed{r = 4}$

PA

$r = a_n - a_{n-1} = (28 + 4n) - (\underbrace{28 + 4(n-1)}_{28 + 4n - 4})$

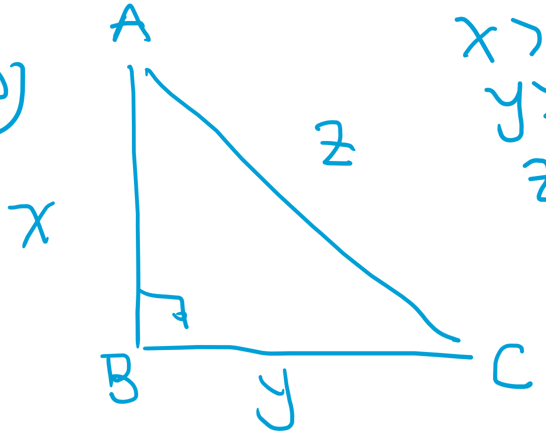
$r = 28 + 4n - 28 - 4n + 4$

$\boxed{r = 4}$

23) PA $(x - r, x, x + r)$

$$\begin{cases} x - \cancel{r} + x + x + \cancel{r} = 72 \\ (x - r)(x + r) = 560 \end{cases}$$

25



$x > 0$
$y > 0$
$z > 0$

$$\begin{cases} x + y + z = 96 & \text{(I)} \\ \dfrac{xy}{2} = 384 & \text{(II)} \end{cases}$$

(x, y, z) é PA de razão r

$(y - r, \ y, \ y + r)$

$$y - \cancel{r} + y + y + \cancel{r} = 96$$

$$\boxed{y = 32\,cm}$$

$$y = 32 \xRightarrow{\text{II}} x \cdot 32 = 384 \cdot 2$$

$$\boxed{x = 24\,cm}$$

ΔABC é retângulo

Teor. de Pitágoras

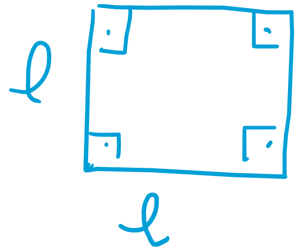
$$z^2 = 24^2 + 32^2 = (8 \cdot 3)^2 + (8 \cdot 4)^2$$

$$z^2 = 8^2 \cdot 3^2 + 8^2 \cdot 4^2 = 8^2 \cdot (9 + 16) = 8^2 \cdot 25$$

$$z > 0 \Rightarrow z = 8 \cdot 5$$

$$\boxed{z = 40\,cm}$$

26

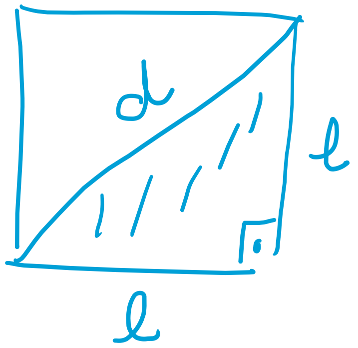


perímetro: 4ℓ

diagonal: $\ell\sqrt{2}$

área: ℓ^2

$\ell > 0$



T. Pit

$d^2 = \ell^2 + \ell^2$

$d^2 = 2\ell^2 \quad (d>0)$

$d = \ell\sqrt{2}$

$(4\ell, \ell\sqrt{2}, \ell^2)$ PA?

Prop. Média Aritm

$a_3 - a_2 = a_2 - a_1$

$\ell^2 - \ell\sqrt{2} = \ell\sqrt{2} - 4\ell$

$\ell^2 - \ell\sqrt{2} - \ell\sqrt{2} + 4\ell = 0$

$\ell^2 + 4\ell - 2\ell\sqrt{2} = 0$

$\ell^2 + (4 - 2\sqrt{2})\,\ell = 0$

$\ell \cdot (\ell + 4 - \sqrt{2}) = 0$

$\ell \neq 0$ ou $\ell + 4 - \sqrt{2} = 0$

$\ell > 0$

$\ell = \sqrt{2} - 4 < 0$

não convém, pois $\ell > 0$

Logo, os $n^{\underline{os}}$ não formam PA

24) PA $(x-r,\ x,\ x+r)$ decrescente $\underline{r<0}$

$$\begin{cases} (x-r)^2 + x^2 + (x+r)^2 = 126 & (\mathrm{I}) \\ x - r = x + x + r & (\mathrm{II}) \end{cases} \longrightarrow \boxed{x = -2r}$$

(I) $x^2 - \cancel{2xr} + r^2 + x^2 + x^2 + \cancel{2xr} + r^2 = 126$

$$3x^2 + 2r^2 = 126$$

$$\Downarrow\ x = -2r$$

$$3\cdot(-2r)^2 + 2r^2 = 126$$

$$3\cdot 4r^2 + 2r^2 = 126$$

$$14r^2 = 126$$

$$r^2 = 9$$

$$r = 3 \text{ ou } \boxed{r = -3}$$

soma de quadrados

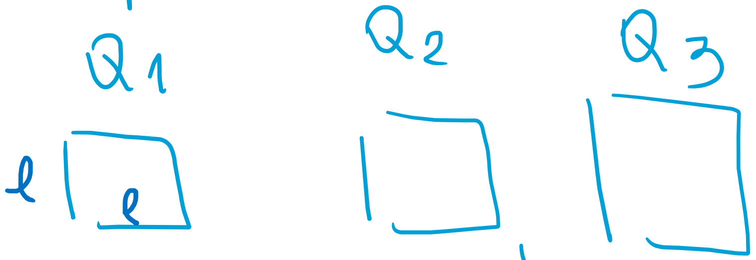
$a^2 + b^2$

$\neq$

quadrado da soma

$(a+b)^2$

34) seq. de quadrados $(Q_1, Q_2, Q_3, \ldots)$



(pelo 3 termos p/ provar que é PA)

perímetro $\quad p_1\,cm \quad (p_1+16)\,cm \quad (p_1+2\cdot16)\,cm$

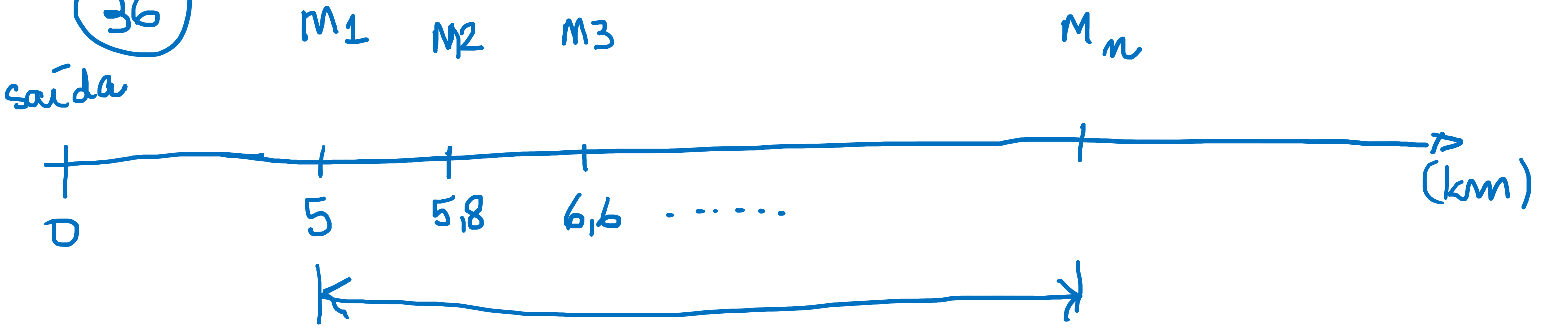
$(p_1, p_1+16, \underbrace{p_1+2\cdot16}_{p_3}, \ldots)$ PA $\quad$ 1º termo p_1 e $r=16$

$p_1 + 2\cdot16 = 80 \Rightarrow p_1 = 48\,cm$

a) $p_1 = 4\ell \Rightarrow \boxed{\ell = 12\,cm}$

36)

$D = 42{,}195\ km$



PA $\quad a_1 = 5 \quad r = 0{,}8 \quad a_n = \underbrace{5 + (n-1)\cdot 0{,}8}$

$\boxed{a_n = 42{,}195}$? não

$a_n \leqslant 42{,}195$

$5 + (n-1)\cdot 0{,}8 \leqslant 42{,}195$

$(n-1)\,0{,}8 \leqslant 37{,}195$

$n - 1 \leqslant 46{,}49\ldots$

$\underbrace{n \leqslant 47{,}4\ldots}$ e $n \in \mathbb{N}^*$

maior valor n

$\therefore \boxed{n = 47}$ a)

b) $a_{47} = 5 + 46\cdot 0{,}8 = 41{,}8\ km$

$D - a_{47} =$

c) $5 + (n-1)\cdot 0{,}8 = 30,\ n \in \mathbb{N}^*$

$n - 1 = \dfrac{30 - 5}{0{,}8}$

$\boxed{n = 32{,}25}$ estimativa

$a_{32} = 5 + 31\cdot 0{,}8 = 29{,}8$ km

$a_{33} = 5 + 32\cdot 0{,}8 = 30{,}6$ km