

1) Resolução de fiche m.º 5 - Geometria - 10.º ANO

1) a) $A(4, 0, 10)$ $B(4, 4, 10)$ $C(0, 4, 10)$ $F(4, 4, 0)$ $G(0, 4, 0)$

b) Recta AB e recta CG (m exemplo)

c) $B'(4, 4, -10)$

d) $E(4, 0, 0)$ $C(0, 4, 10)$ $\vec{EC} = C - E = (-4, 4, 10)$

e) $(x, y, z) = (4, 0, 10) + k(0, 4, 0)$; $k \in \mathbb{R}$ $\vec{AB} = (0, 4, 0)$

f) $x = 4$

2) a) Centro $(2, 2, 5)$ $r_{\text{circ}} = 2$

b) $(x-2)^2 + (y-2)^2 + (z-5)^2 \leq 4$

c) $V_{\text{resfendido}} = V_{\text{prisma}} - V_{\text{esfera}} = 160 - 4\pi \approx 147,4 \text{ dm}^3$

2)

2.1.1) $\overline{AC}^2 + \overline{AB}^2 = \overline{BC}^2$? $A(0, 1)$

$\overline{AC} = \sqrt{(2-0)^2 + (3-1)^2} = \sqrt{8} = 2\sqrt{2}$ $B(2, -1)$

$\overline{AB} = 2\sqrt{2}$ $C(2, 3)$

$\overline{BC} = 4$ $\overline{AC}^2 + \overline{AB}^2 = (2\sqrt{2})^2 + (2\sqrt{2})^2 = 4 \times 2 + 4 \times 2 = 16$ e $\overline{BC}^2 = 16$ c.g.d.

2.1.2) $r = \sqrt{(6-2)^2 + (1-3)^2} = \sqrt{16+4} = \sqrt{20}$

2.2) $B(2, -1)$ Recta AB: $y = -x + 1$
Se $x = 2 \rightarrow y = -1$ logo $B(2, -1)$

2.3) $(x-6)^2 + (y-1)^2 > 20 \wedge y > -x + 1 \wedge y < x + 1$

3) $r_{\text{circ}} = \sqrt{(1+1)^2 + (1-0)^2} = \sqrt{4+1} = \sqrt{5}$

3.1) $(x-1)^2 + (y-1)^2 \leq 5 \wedge ((x > 0 \wedge y > 0) \vee (x < 0 \wedge y < 0))$

3.2) $x^2 + y^2 - 2x - 2y - 3 = 0$ (*)

(*) $x^2 - 2x + y^2 - 2y = 3$ (**)

(**) $(x-1)^2 + (y-1)^2 = 3+1+1$ (***)

(***) $(x-1)^2 + (y-1)^2 = 5$ Centro $(1, 1)$ $r_{\text{circ}} = \sqrt{5}$ c.g.d.

3) Como o raio = $\sqrt{5}$, temos

$$y = 1 + \sqrt{5} \text{ e } y = 1 - \sqrt{5}$$

$$3.4) \begin{cases} x^2 + y^2 - 2x - 2y - 3 = 0 \\ y = -x \end{cases} \Leftrightarrow \begin{cases} x^2 + x^2 - 2x + 2x - 3 = 0 \end{cases} \Leftrightarrow$$

$$\Leftrightarrow \begin{cases} 2x^2 = 3 \\ x^2 = \frac{3}{2} \end{cases} \Rightarrow x = \pm \sqrt{\frac{3}{2}}$$

$$\text{Se } x = \sqrt{\frac{3}{2}} \text{ então } y = -\sqrt{\frac{3}{2}} \quad \text{P.I.} \left(\sqrt{\frac{3}{2}}; -\sqrt{\frac{3}{2}} \right)$$

$$\text{Se } x = -\sqrt{\frac{3}{2}} \text{ então } y = \sqrt{\frac{3}{2}} \quad \text{P.I.} \left(-\sqrt{\frac{3}{2}}; \sqrt{\frac{3}{2}} \right)$$

$$4) \begin{matrix} (2,0) \\ (0,4) \end{matrix} \quad \vec{u} = (-2, 4) \quad m = -2 \quad \begin{matrix} (-4,0) \\ (0,4) \end{matrix}$$

$$y = -2x + 4$$

$$y = -2x + 4$$

$$y = x + 4$$

$$x^2 + y^2 \leq 16 \wedge y \leq -2x + 4 \wedge y \geq x + 4$$