

## EXERCICIOS FINALES

1.

$$\begin{aligned} \text{a) } 5x^2 - 20x + 15 &= 0 & \boxed{x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}} &= \frac{20 \pm \sqrt{20^2 - 4 \cdot 5 \cdot 15}}{2 \cdot 5} = \frac{20 \pm \sqrt{400 - 300}}{10} \\ & \quad \text{a} \quad \text{b} \quad \text{c} & & \\ & & &= \frac{20 \pm \sqrt{100}}{10} = \frac{20 \pm 10}{10} = \begin{cases} \frac{20+10}{10} = \frac{30}{10} = \boxed{3} \\ \frac{20-10}{10} = \frac{10}{10} = \boxed{1} \end{cases} \end{aligned}$$

$$\begin{aligned} \text{b) } 2x^2 + 5x + 2 &= 0 & \boxed{x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}} &= \frac{-5 \pm \sqrt{5^2 - 4 \cdot 2 \cdot 2}}{2 \cdot 2} = \frac{-5 \pm \sqrt{25 - 16}}{4} = \frac{-5 \pm \sqrt{9}}{4} \\ & \quad \text{a} \quad \text{b} \quad \text{c} & & \\ & & &= \frac{-5 \pm 3}{4} = \begin{cases} \frac{-5+3}{4} = \frac{-2}{4} = \boxed{-\frac{1}{2}} \\ \frac{-5-3}{4} = \frac{-8}{4} = \boxed{-2} \end{cases} \end{aligned}$$

$$\text{c) } 3x^2 + 6x = 0; \quad x(3x+6) = 0$$

a      b

$$\begin{aligned} & \swarrow \\ \boxed{x=0} & \quad 3x+6=0 \\ & \quad 3x=-6 \Rightarrow \boxed{x = \frac{-6}{3} = -2} \end{aligned}$$

$$\text{d) } 2x^2 - 32 = 0; \quad 2x^2 = 32; \quad x^2 = \frac{32}{2} = 16; \quad \boxed{x = \sqrt{16} = \pm 4}$$

a      c

2.

$$\begin{aligned} \text{a) } x &\rightarrow \text{billetes de } 5\text{€} & \begin{cases} x+y=12 \\ 5x+10y=105 \end{cases} & \begin{array}{r} 5x+10y=105 \\ -5x-5y=-60 \\ \hline 5y=45 \end{array} \\ y &\rightarrow \text{billetes de } 10\text{€} & & \end{aligned}$$

He entregado 3 billetes de 5€ y 12 billetes de 10€

$$\boxed{y = \frac{45}{5} = 9} \quad \boxed{x = 12 - y = 12 - 9 = 3}$$

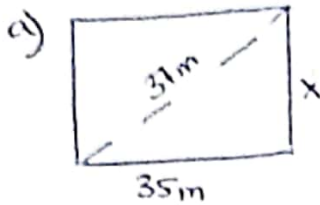
$$\text{b) } \begin{array}{|c|} \hline \text{Diagrama de un rectángulo con ancho } a \text{ y largo } l \\ \hline \end{array} \quad \begin{cases} 2l + 2a = 320 \\ l = 3a \end{cases}$$

$$\begin{aligned} 2l + 2a &= 320 \\ -2l + 6a &= 320 \\ \hline 8a &= 320 \end{aligned}$$

La parcela mide 40m de ancho y 120m de largo.

$$\boxed{a = \frac{320}{8} = 40} \quad \boxed{l = 3a = 3 \cdot 40 = 120}$$

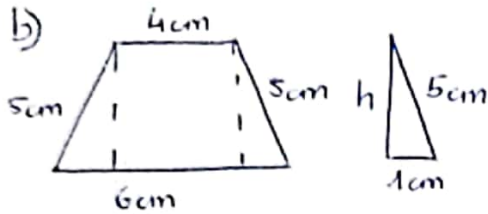
3.



$$37^2 = x^2 + 35^2; x^2 = 37^2 - 35^2 = 1369 - 1225 = 144$$

$$x = \sqrt{144} = 12\text{m}$$

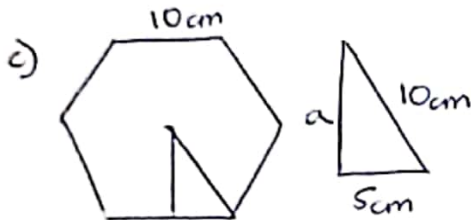
$$\boxed{A = b \cdot h = 35\text{m} \cdot 12\text{m} = 420\text{m}^2}$$



$$5^2 = h^2 + 1^2; h^2 = 5^2 - 1^2 = 25 - 1 = 24$$

$$h = \sqrt{24}\text{ cm}$$

$$\boxed{A = \frac{(B+b)h}{2} = \frac{(6+4)\sqrt{24}}{2} = \frac{10\sqrt{24}}{2} = 5\sqrt{24}\text{ cm}^2}$$

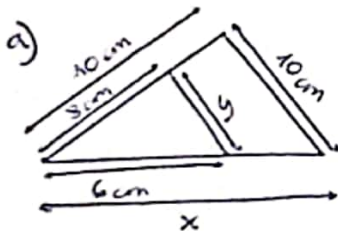


$$2a \cdot 10^2 = a^2 + 5^2; a^2 = 10^2 - 5^2 = 100 - 25 = 75$$

$$a = \sqrt{75}\text{ cm}$$

$$\boxed{A = \frac{P \cdot a}{2} = \frac{6 \cdot 10 \cdot \sqrt{75}}{2} = 30\sqrt{75}\text{ cm}^2}$$

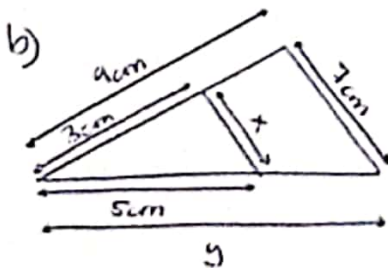
4.



$$\frac{x}{6} = \frac{10}{8}; \boxed{x = \frac{6 \cdot 10}{8} = \frac{60}{8} = 7,5\text{ cm}}$$

$$\frac{y}{10} = \frac{8}{10}; \boxed{y = \frac{10 \cdot 8}{10} = 8\text{ cm}}$$

Puede resolverse de otras formas.

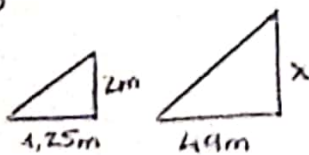


$$\frac{x}{7} = \frac{3}{9}; \boxed{x = \frac{7 \cdot 3}{9} = \frac{21}{9} = 2,33}$$

$$\frac{y}{5} = \frac{9}{3}; \boxed{y = \frac{5 \cdot 9}{3} = \frac{45}{3} = 15}$$

Puede resolverse de otras formas.

5.

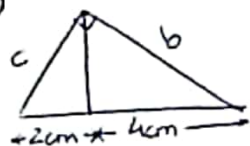


$$\frac{x}{2} = \frac{4,4}{1,25}; \boxed{x = \frac{2 \cdot 4,4}{1,25} = \frac{8,8}{1,25} = 7,04\text{ m}}$$

El edificio mide 7,04 m.

6.

a)



$$a = m + n = 2 + 4 = 6 \text{ cm}$$

$$b^2 = n \cdot a = 4 \cdot 6 = 24; \quad b = \sqrt{24} \text{ cm}$$

$$c^2 = m \cdot a = 2 \cdot 6 = 12; \quad c = \sqrt{12} \text{ cm}$$

b)



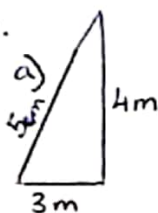
$$h^2 = m \cdot n; \quad m = \frac{h^2}{n} = \frac{3^2}{4} = \frac{9}{4} = 2,25 \text{ cm} \quad a = m + n = 4 + 2,25 = 6,25 \text{ cm}$$

$$b^2 = n \cdot a = 4 \cdot 6,25 = 25; \quad b = \sqrt{25} = 5 \text{ cm}$$

$$c^2 = m \cdot a = 2,25 \cdot 6,25 = 14; \quad c = \sqrt{14} \text{ cm}$$

7.

a)



$$A_1 = \frac{b \cdot h}{2} = \frac{3 \cdot 4}{2} = 6 \text{ m}^2$$

$$K_a = \frac{A_1}{A_2} = \frac{6}{24} = \frac{1}{4} = 0,25$$

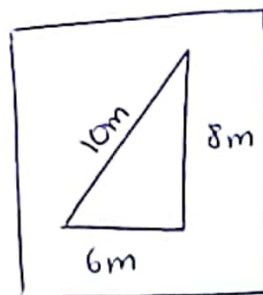
$$K_a = K^2; \quad K = \sqrt{K_a} = \sqrt{0,25} = 0,5$$

$$K = \frac{e_1}{e_2}; \quad e_2 = \frac{e_1}{K}$$

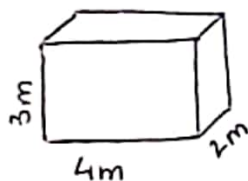
$$x = \frac{3}{0,5} = 6 \text{ m}$$

$$x = \frac{4}{0,5} = 8 \text{ m}$$

$$x = \frac{5}{0,5} = 10 \text{ m}$$



b)



$$V_1 = b \cdot h \cdot f = 4 \cdot 3 \cdot 2 = 24 \text{ m}^3$$

$$K_v = \frac{V_1}{V_2} = \frac{24}{3} = 8$$

$$K_v = K^3; \quad K = \sqrt[3]{K_v} = \sqrt[3]{8} = 2$$

$$K = \frac{e_1}{e_2}; \quad e_2 = \frac{e_1}{K}$$

$$x = \frac{2}{2} = 1 \text{ m}$$

$$x = \frac{3}{2} = 1,5 \text{ m}$$

$$x = \frac{4}{2} = 2 \text{ m}$$

