

Problemas resoltos 3 ESO 18/03/2020

Equations:

④ a) $x^2(x+1)(x+2)^2=0$ $\begin{cases} x^2=0 \Rightarrow x=0 \\ x+1=0 \Rightarrow x=-1 \\ (x+2)^2=0 \Rightarrow x+2=0 \Rightarrow x=-2 \end{cases}$

b) $(x-8)(8x-1)=0$ $\begin{cases} x-8=0 \Rightarrow x=8 \\ 8x-1=0 \Rightarrow x=\frac{1}{8} \end{cases}$

c) $\frac{2}{7} = \frac{5(2+x)}{3(x-1)}$ $\Leftrightarrow$ (multiplicamos en cruz)

$\Leftrightarrow 6(x-1) = 35(2+x) \Leftrightarrow 6x-6 = 70+35x \Leftrightarrow$

$\Leftrightarrow 6x-35x = 70+6 \Leftrightarrow -29x = 76 \Leftrightarrow x = \frac{76}{-29} = -\frac{76}{29}$

d) $2x^2+3x+2=0 \Leftrightarrow x = \frac{-3 \pm \sqrt{9-4 \cdot 2 \cdot 2}}{2 \cdot 2} = \frac{-3 \pm \sqrt{9-16}}{4} \notin \mathbb{R}$

Non ten solucións reais

$$e) 4(2-3x)^2 - 5(-2-3x) = 9(5+2x)^2 \Leftrightarrow$$

$$\Leftrightarrow 4(4+9x^2-12x) + 10 + 15x = 9(25+4x^2+20x) \Leftrightarrow$$

$$\Leftrightarrow 16 + 36x^2 - 48x + 10 + 15x = 225 + 36x^2 + 180x$$

$$\Leftrightarrow -48x + 15x - 180x = 225 - 16 - 10 \Leftrightarrow -213x = 199$$

$$\Leftrightarrow x = \frac{199}{-213} = -\frac{199}{213}$$

$$f) x^3 - 6x^2 + 8x = 0 \Leftrightarrow x(x^2 - 6x + 8) = 0 \begin{cases} x=0 \\ x^2 - 6x + 8 = 0 \end{cases}$$

$$\Leftrightarrow x^2 - 6x + 8 = 0 \Leftrightarrow x = \frac{6 \pm \sqrt{36 - 4 \cdot 1 \cdot 8}}{2 \cdot 1} = \frac{6 \pm \sqrt{36 - 32}}{2}$$

$$= \frac{6 \pm \sqrt{4}}{2} = \frac{6 \pm 2}{2} \begin{cases} \frac{6+2}{2} = \frac{8}{2} = 4 \\ \frac{6-2}{2} = \frac{4}{2} = 2 \end{cases}$$

$$\text{Solutions: } x_1 = 0, x_2 = 2, x_3 = 4$$

$$g) x^4 - 16 = 0 \Leftrightarrow x^4 = 16 \Leftrightarrow x = \sqrt[4]{16} = \pm 2$$

As raízes positivas de índice par (nesta caso) sempre têm solução $\pm$ porque:

$$(+2)^4 = 2 \cdot 2 \cdot 2 \cdot 2 = 16$$

$$(-2)^4 = (-2)(-2)(-2)(-2) = +16$$

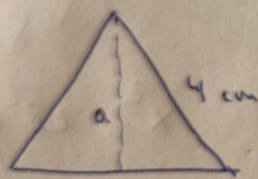
h) $2x^2 - 18 = 0$ (Igual que na g, despetamos porque a incógnita só está num monómio)

$$2x^2 - 18 = 0 \Leftrightarrow 2x^2 = 18 \Leftrightarrow x^2 = \frac{18}{2} \Leftrightarrow x = \sqrt{\frac{18}{2}} =$$

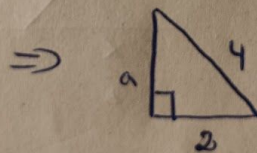
$$= \sqrt{9} = \pm 3$$

Geometria

(14)



é um triângulo equilátero, todos os lados medem 4 cm



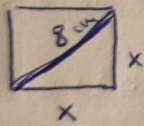
Pelo teorema de Pitágoras:

$$a^2 + 2^2 = 4^2 \Leftrightarrow a^2 + 4 = 16 \Leftrightarrow a^2 = 16 - 4 \Leftrightarrow a = \sqrt{12} = 3,46$$

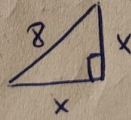
Solução: a altura do triângulo mede 3,46 cm

Solución: a altura do triângulo mide 5 cm

(15)



$\Rightarrow$



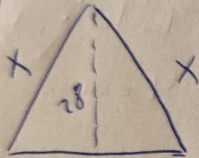
Por teorema de Pitágoras:

$$x^2 + x^2 = 8^2 \Leftrightarrow$$

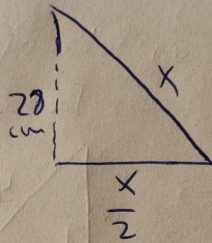
$$\Leftrightarrow 2x^2 = 64 \Leftrightarrow x^2 = \frac{64}{2} = 32 \Leftrightarrow x = \sqrt{32} = 5'66$$

o lado do quadrado debe medir 5'66 cm

(16)



$\Rightarrow$



$\Rightarrow$

Teorema de Pitágoras

$$x^2 = 28^2 + \left(\frac{x}{2}\right)^2$$

$$\Leftrightarrow x^2 = 784 + \frac{x^2}{4} \Leftrightarrow 4x^2 = 3136 + x^2 \Leftrightarrow$$

$$\Leftrightarrow 4x^2 - x^2 = 3136 \Leftrightarrow 3x^2 = 3136 \Leftrightarrow x^2 = \frac{3136}{3} \Leftrightarrow$$

$$\Leftrightarrow x^2 = 1'045,3 \Leftrightarrow x = \sqrt{1045,3} = 32'33 \text{ cm}$$

sol: o lado do triângulo mide 32'33 cm