

Resuelva las siguientes ecuaciones (¡ojo con la propiedad distributiva!):

1) $-x^2 - 9x - 40 = 0$

2) $\frac{x}{2}\left(x + \frac{1}{30}\right) = \frac{x}{3}\left(x + \frac{2}{5}\right)$

3) $3x(5x + 2) = 0$

4) $\frac{x}{3}\left(x - \frac{1}{20}\right) = \frac{x^2}{2} - \frac{1}{15}\left(2x - \frac{1}{2}\right)$

5) $5x^2 = 45$

6) $\frac{x^2}{2} + x = \frac{2x^2 - 5}{3} - 1$

7) $5x^2 = x^2 - 2x$

8) $x^2 - \frac{1}{4} = \frac{1}{5}\left(\frac{x}{4} - 1\right)$

RESUELVA LAS SIGUIENTES ECUACIONES

1) $-x^2 - 9x - 40 = 0$

$$x^2 + 9x + 40 = 0$$

$$\begin{cases} a = 1 \\ b = 9 \\ c = 40 \end{cases}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-9 \pm \sqrt{81 - 4(1)(40)}}{2} = \frac{-9 \pm \sqrt{81 - 160}}{2} =$$

$$= \frac{-9 \pm \sqrt{-79}}{2} \quad \text{No tiene solución real}$$

2) $\frac{x}{2} \left(x + \frac{1}{30} \right) = \frac{x}{3} \left(x + \frac{2}{5} \right)$

$$\text{mcm}(2, 60, 3, 15) = 60$$

$$\frac{x^2}{2} + \frac{x}{60} = \frac{x^2}{3} + \frac{2x}{15}$$

$$2 = 2$$

$$60 = 2^2 \cdot 3 \cdot 5$$

$$3 = 3$$

$$15 = 3 \cdot 5$$

$$\frac{30x^2}{60} + \frac{x}{60} = \frac{20x^2}{60} + \frac{8x}{60}$$

$$30x^2 + x = 20x^2 + 8x$$

$$30x^2 + x - 20x^2 - 8x = 0$$

$$10x^2 - 7x = 0$$

$$x(10x - 7) = 0 \Rightarrow \begin{cases} x = 0 \\ 10x - 7 = 0 \Rightarrow 10x = 7 \Rightarrow x = \frac{7}{10} \end{cases}$$

$$3) \quad 3x \cdot (5x + 2) = 0 \Rightarrow \begin{cases} 3x = 0 \Rightarrow x = \frac{0}{3} = 0 \\ 5x + 2 = 0 \Rightarrow 5x = -2 \Rightarrow x = \frac{-2}{5} \end{cases}$$

$$4) \quad \frac{x}{3} \left(x - \frac{1}{20} \right) = \frac{x^2}{2} - \frac{1}{15} \left(2x - \frac{1}{2} \right)$$

$$\text{mcm}(3, 60, 2, 15, 30) = 60$$

$$\frac{x^2}{3} - \frac{x}{60} = \frac{x^2}{2} - \frac{2x}{15} + \frac{1}{30}$$

$$3 = 3$$

$$60 = 2^2 \cdot 3 \cdot 5$$

$$2 = 2$$

$$15 = 3 \cdot 5$$

$$30 = 2 \cdot 3 \cdot 5$$

$$\frac{20x^2}{60} - \frac{x}{60} = \frac{30x^2}{60} - \frac{8x}{60} + \frac{2}{60}$$

$$20x^2 - x = 30x^2 - 8x + 2$$

$$20x^2 - x - 30x^2 + 8x - 2 = 0$$

$$-10x^2 + 7x - 2 = 0$$

$$10x^2 - 7x + 2 = 0$$

$$\begin{cases} a = 10 \\ b = -7 \\ c = 2 \end{cases}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{7 \pm \sqrt{49 - 4(10)(2)}}{20} =$$

$$= \frac{7 \pm \sqrt{49 - 80}}{20} = \frac{7 \pm \sqrt{-31}}{20}$$

No tiene solución real

$$5) \quad 5x^2 = 45$$

$$x^2 = \frac{45}{5} = 9 \Rightarrow x^2 = 9 \Rightarrow x = \pm \sqrt{9} = \pm 3$$

$$6) \frac{x^2}{2} + x = \frac{2x^2 - 5}{3} - 1$$

$$\frac{3x^2}{6} + \frac{6x}{6} = \frac{2(2x^2 - 5)}{6} - \frac{6}{6}$$

$$3x^2 + 6x = 2(2x^2 - 5) - 6$$

$$3x^2 + 6x = 4x^2 - 10 - 6$$

$$3x^2 + 6x - 4x^2 + 10 + 6 = 0$$

$$-x^2 + 6x + 16 = 0$$

$$x^2 - 6x - 16 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{6 \pm \sqrt{36 + 64}}{2} = \frac{6 \pm \sqrt{100}}{2} =$$

$$= \frac{6 \pm 10}{2} \Rightarrow \begin{cases} \frac{6+10}{2} = \frac{16}{2} = 8 \\ \frac{6-10}{2} = \frac{-4}{2} = -2 \end{cases}$$

$$7) 5x^2 = x^2 - 2x$$

$$x^2 - 2x - 5x^2 = 0$$

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

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

$$8) \quad x^2 - \frac{1}{4} = \frac{1}{5} \left(\frac{x}{4} - 1 \right)$$

$$x^2 - \frac{1}{4} = \frac{x}{20} - \frac{1}{5}$$

$$\frac{20x^2}{20} - \frac{5}{20} = \frac{x}{20} - \frac{4}{20}$$

$$20x^2 - 5 = x - 4$$

$$20x^2 - x - 5 + 4 = 0$$

$$20x^2 - x - 1 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{+1 \pm \sqrt{1 + 80}}{40} = \frac{1 \pm \sqrt{81}}{40} =$$

$$= \frac{1 \pm 9}{40} = \rightarrow \frac{1+9}{40} = \frac{10}{40} = \frac{1}{4}$$

$$\rightarrow \frac{1-9}{40} = \frac{-8}{40} = \frac{-1}{5}$$

$$\text{mcm}(4, 20, 5) = 20$$

$$4 = 2^2$$

$$20 = 2^2 \cdot 5$$

$$5 = 5$$