

Interrogation de mathématique - 5*(Algèbre – chapitre 2)*Résoudre dans \mathbb{R} les équations suivantes :

1) $-x^2 + x + 12 = 0$

2) $9x^2 + 6x - 2 = 0$

3) $9x^2 - 63 = 0$

4) $x^2 - 10x + 22 = 0$

5) $25x^2 - 20x = -4$

6) $2x^2 + \frac{27}{7}x = \frac{20}{7}$

7) $7x^2 - 18x + 12 = 0$

8) $8x^2 - 12x + 1 = 0$

9) $3x^2 + \sqrt{12}x = 0$

10) $2x^2 + 7x - 15 = 0$

$$1) -x^2 + x + 12 = 0 \text{ et } x \in \mathbb{R}$$

$$\Leftrightarrow x^2 - x - 12 = 0$$

$$\Leftrightarrow (x-4)(x+3) = 0$$

$$\Leftrightarrow x \in \{4; -3\}$$

$$\begin{cases} m+n = -1 \\ m \cdot n = -12 \end{cases} \Leftrightarrow \begin{cases} m = -4 \\ n = 3 \end{cases}$$

$$2) 9x^2 + 6x - 2 = 0 \text{ et } x \in \mathbb{R}$$

$$\begin{cases} m+n = +6 \\ m \cdot n = -18 \end{cases} \Leftrightarrow \begin{cases} m = ? \\ n = ? \end{cases}$$

$$\Leftrightarrow \Delta' = (3)^2 - 9 \cdot (-2) = 9 + 18 = 27 > 0$$

$$\text{et } x = \frac{-3 \pm \sqrt{27}}{9} = \frac{-3 \pm 3\sqrt{3}}{9} = \frac{3(-1 \pm \sqrt{3})}{9 \cdot 3} = \frac{-1 \pm \sqrt{3}}{3}$$

$$\Leftrightarrow x \in \left\{ \frac{-1 + \sqrt{3}}{3}; \frac{-1 - \sqrt{3}}{3} \right\}$$

$$3) 9x^2 - 63 = 0 \text{ et } x \in \mathbb{R}$$

$$\Leftrightarrow x^2 - 7 = 0 \Leftrightarrow (x - \sqrt{7})(x + \sqrt{7}) = 0$$

$$\Leftrightarrow x \in \{-\sqrt{7}; +\sqrt{7}\}$$

$$4) x^2 - 10x + 22 = 0 \text{ et } x \in \mathbb{R}$$

$$\begin{cases} m+n = -10 \\ m \cdot n = 22 \end{cases} \Leftrightarrow \begin{cases} m = ? \\ n = ? \end{cases}$$

$$\Leftrightarrow \Delta' = (-5)^2 - 22 = 25 - 22 = 3 > 0$$

$$\text{et } x = \frac{5 \pm \sqrt{3}}{2}$$

$$\Leftrightarrow x \in \left\{ \frac{5 - \sqrt{3}}{2}; \frac{5 + \sqrt{3}}{2} \right\}$$

$$5) 25x^2 - 20x = -4 \text{ et } x \in \mathbb{R}$$

$$\Leftrightarrow 25x^2 - 20x + 4 = 0 \Leftrightarrow (5x - 2)^2 = 0 \Leftrightarrow x \in \left\{ \frac{2}{5} \right\}$$

$$6) 2x^2 + \frac{27}{7}x = \frac{20}{7} \text{ et } x \in \mathbb{R}$$

$$\Leftrightarrow 14x^2 + 27x - 20 = 0$$

$$\begin{cases} m+n = 27 \\ m \cdot n = 14 \cdot (-20) = 2 \cdot 7 \cdot (-4) \cdot 5 \end{cases}$$

$$\Leftrightarrow 14x^2 + 35x - 8x - 20 = 0$$

$$\Leftrightarrow \begin{cases} m = +35 \\ n = -8 \end{cases}$$

$$\Leftrightarrow 7x(2x+5) - 4(2x+5) = 0$$

$$\Leftrightarrow (2x+5)(7x-4) = 0 \Leftrightarrow x \in \left\{ -\frac{5}{2}; \frac{4}{7} \right\}$$

$$7) 7x^2 - 18x + 12 = 0 \text{ et } x \in \mathbb{R}$$

$$\Leftrightarrow \Delta' = (-9)^2 - 7 \cdot 12 = 81 - 84 = -3 < 0$$

$$\begin{cases} m+n = -18 \\ m \cdot n = 7 \cdot 12 = 7 \cdot 3 \cdot 4 \end{cases}$$

$$\text{et } x \in \emptyset$$

$$\Leftrightarrow \begin{cases} m = ? \\ n = ? \end{cases}$$

$$8) \quad 8x^2 - 12x + 1 = 0 \quad \text{et } x \in \mathbb{R}$$

$$\Leftrightarrow \Delta' = (-6)^2 - 8 = 36 - 8 \\ = 28 > 0$$

$$\begin{cases} m+n = -12 \\ m \cdot n = 8 \end{cases} \Leftrightarrow \begin{cases} m = ? \\ n = ? \end{cases}$$

$$\text{et } x = \frac{6 \pm \sqrt{28}}{8} = \frac{6 \pm 2\sqrt{7}}{8} = \frac{2(3 \pm \sqrt{7})}{8} = \frac{3 \pm \sqrt{7}}{4}$$

$$\Leftrightarrow x \in \left\{ \frac{3+\sqrt{7}}{4}; \frac{3-\sqrt{7}}{4} \right\}$$

$$9) \quad 3x^2 + \sqrt{12}x = 0 \quad \text{et } x \in \mathbb{R}$$

$$\Leftrightarrow x(3x + \sqrt{12}) = 0 \quad \Leftrightarrow x \in \left\{ 0; -\frac{\sqrt{12}}{3} \right\}$$

$$10) \quad 2x^2 + 7x + 15 = 0 \quad \text{et } x \in \mathbb{R}$$

$$\Leftrightarrow \Delta = 7^2 - 4 \cdot 2 \cdot 15$$

$$= 49 - 120 = -71 < 0$$

$$\text{et } x \in \emptyset$$

$$\begin{cases} m+n = 7 \\ m \cdot n = 30 \end{cases} \Leftrightarrow \begin{cases} m = ? \\ n = ? \end{cases}$$