

SECOND DEGRÉ

Equations 2

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<https://bit.ly/41A78lm>



Résous les équations suivantes, sans calculatrice, en utilisant la méthode la plus rapide (mise en évidence, produit remarquable, isolement ou méthode du discriminant Δ) :

Termine chaque exercice en indiquant l'ensemble des solutions.



Toutes les équations sont à résoudre sans calculatrice. Joue le jeu, mets-toi dans les mêmes conditions que l'interrogation.

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

$$\Leftrightarrow x \cdot (-2x + 1) = 0$$

$$\begin{array}{cc} \downarrow & \downarrow \\ x=0 & x=\frac{1}{2} \end{array}$$

$$S = \left\{ 0; \frac{1}{2} \right\}$$

(2) $3x^2 - x - 4 = 0$

$$\Delta = (-1)^2 - 4 \cdot 3 \cdot (-4)$$

$$= 1 + 48$$

$$= 49$$

$$x_{1,2} = \frac{1 \pm 7}{6} \quad \left\{ \begin{array}{l} \frac{8}{6} = \frac{4}{3} \\ \frac{-6}{6} = -1 \end{array} \right.$$

$$S = \left\{ -1; \frac{4}{3} \right\}$$

(3) $2x^2 + 4x - 2 = 0$

$$\Delta = 4^2 - 4 \cdot 2 \cdot (-2)$$

$$= 16 + 16$$

$$= 32$$

$$x_{1,2} = \frac{-4 \pm 4\sqrt{2}}{4} = \frac{4 \cdot (-1 \pm \sqrt{2})}{4} = -1 \pm \sqrt{2}$$

$$S = \left\{ -1 \pm \sqrt{2} \right\}$$

(4) $(5x+1)(x-2) = (3+x)(x-2)$

$$\Leftrightarrow 5x^2 - 10x + x - 2 = 3x - 6 + x^2 - 2x$$

$$\Leftrightarrow 4x^2 - 10x + 4 = 0$$

$$\Delta = (-10)^2 - 4 \cdot 4 \cdot 4$$

$$= 100 - 64$$

$$= 36$$

$$x_{1,2} = \frac{10 \pm 6}{8} \quad \left\{ \begin{array}{l} \frac{16}{8} = 2 \\ \frac{4}{8} = \frac{1}{2} \end{array} \right.$$

$$S = \left\{ \frac{1}{2}; 2 \right\}$$

$$(5) \quad 25x^2 + 10x + 1 = 0$$

$$\Leftrightarrow (5x+1)^2 = 0$$

$$\Leftrightarrow 5x+1 = 0$$

$$\Leftrightarrow x = -\frac{1}{5}$$

$$S = \left\{ -\frac{1}{5} \right\}$$

$$(6) \quad -2x^2 + x + 6 = 0$$

$$\Delta = 1^2 - 4 \cdot (-2) \cdot 6$$

$$= 1 + 48$$

$$= 49$$

$$x_{1,2} = \frac{-1 \pm 7}{-4} \quad \left\{ \begin{array}{l} \frac{-6}{4} = -\frac{3}{2} \\ \frac{-8}{-4} = 2 \end{array} \right.$$

$$S = \left\{ -\frac{3}{2}; 2 \right\}$$

$$(7) \quad 13x^2 - 14x + 1 = 0$$

$$\Delta = (-14)^2 - 4 \cdot 13 \cdot 1$$

$$= 196 - 52$$

$$= 144$$

$$x_{1,2} = \frac{14 \pm 12}{26} \quad \left\{ \begin{array}{l} \frac{26}{26} = 1 \\ \frac{+2}{26} = \frac{1}{13} \end{array} \right.$$

$$S = \left\{ \frac{1}{13}; 1 \right\}$$

$$(8) \quad x^2 - \sqrt{3}x - 18 = 0$$

$$\Delta = (-\sqrt{3})^2 - 4 \cdot 1 \cdot (-18)$$

$$= 3 + 72$$

$$= 75$$

$$x_{1,2} = \frac{\sqrt{3} \pm 5\sqrt{3}}{2} \quad \left\{ \begin{array}{l} \frac{6\sqrt{3}}{2} = 3\sqrt{3} \\ \frac{-4\sqrt{3}}{2} = -2\sqrt{3} \end{array} \right.$$

$$S = \left\{ -2\sqrt{3}; 3\sqrt{3} \right\}$$

$$(9) \quad (x-2)^2 - 3 \cdot (x+4) = 4 \cdot (1-2x)$$

$$\Leftrightarrow x^2 - 4x + 4 - 3x - 12 = 4 - 8x$$

$$\Leftrightarrow x^2 - 7x - 8 = 4 - 8x$$

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

$$\Delta = 1^2 - 4 \cdot 1 \cdot (-12)$$

$$= 1 + 48$$

$$= 49$$

$$x_{1,2} = \frac{-1 \pm 7}{2} \quad \left\{ \begin{array}{l} \frac{6}{2} = 3 \\ \frac{-8}{2} = -4 \end{array} \right.$$

$$(10) (x+3)^2 - 9x^2 = 0$$

$$\Leftrightarrow x^2 + 6x + 9 - 9x^2 = 0$$

$$\Leftrightarrow -8x^2 + 6x + 9 = 0$$

$$\Delta = 6^2 - 4 \cdot (-8) \cdot 9$$

$$= 36 + 288$$

$$= 324$$

$$x_{1,2} = \frac{-6 \pm 18}{-16} \quad \left\{ \begin{array}{l} \frac{-12}{16} = -\frac{3}{4} \\ \frac{-24}{-16} = \frac{3}{2} \end{array} \right.$$

$$S = \left\{ -\frac{3}{4}; \frac{3}{2} \right\}$$

$$(11) (x+3)^2 = 2 \cdot (2x+6)(3x-2)$$

$$\Leftrightarrow x^2 + 6x + 9 = (4x+12) \cdot (3x-2)$$

$$\Leftrightarrow x^2 + 6x + 9 = 12x^2 - 8x + 36x - 24$$

$$\Leftrightarrow -11x^2 - 22x + 33 = 0$$

$$\Leftrightarrow -x^2 - 2x + 3 = 0$$

$$\Delta = (-2)^2 - 4 \cdot (-1) \cdot 3$$

$$= 4 + 12$$

$$= 16$$

$$x_{1,2} = \frac{2 \pm 4}{-2} \quad \left\{ \begin{array}{l} \frac{-6}{-2} = 3 \\ \frac{-2}{-2} = 1 \end{array} \right.$$

$$S = \{-3; 1\}$$

$$(12) (3x+2)^2 + 3 - (x+3)^2 = 0$$

$$\Leftrightarrow 9x^2 + 12x + 4 + 3 - (x^2 + 6x + 9) = 0$$

$$\Leftrightarrow 9x^2 + 12x + 7 - x^2 - 6x - 9 = 0$$

$$\Leftrightarrow 8x^2 + 6x - 2 = 0$$

$$\Leftrightarrow 4x^2 + 3x - 1 = 0$$

$$\Delta = 3^2 - 4 \cdot 4 \cdot (-1)$$

$$= 9 + 16$$

$$= 25$$

$$x_{1,2} = \frac{-3 \pm 5}{8} \quad \begin{cases} \frac{2}{8} = \frac{1}{4} \\ -\frac{8}{8} = -1 \end{cases}$$

$$S = \left\{ -1; \frac{1}{4} \right\}$$

$$(13) \frac{x^2}{5} + \frac{x}{5} - \frac{3}{20} = 0$$

$$a = \frac{1}{5}, b = \frac{1}{5}, c = -\frac{3}{20}$$

$$\Delta = \left(\frac{1}{5}\right)^2 - 4 \cdot \left(\frac{1}{5}\right) \cdot \left(-\frac{3}{20}\right)$$

$$= \frac{1}{25} + \frac{3}{25}$$

$$= \frac{4}{25}$$

$$x_{1,2} = \frac{-\frac{1}{5} \pm \frac{2}{5}}{\frac{2}{5}} \quad \begin{cases} \frac{1}{2} \\ -\frac{3}{5} \end{cases}$$

$$S = \left\{ -\frac{3}{5}; \frac{1}{2} \right\}$$