Equations

- $5x - 3 = 12$

$5x = 12 + 3$

$5x = 15$

$$x = \frac{15}{5} = 3.$$

- $4 - 3x = 8.$

$-3x = 8 - 4$

$-3x = 4$

$$x = -\frac{4}{3}$$

. $-3 + 5x = 12 + 3x$

$5x - 3x = 12 + 3$

$2x = 15$

$$x = \frac{15}{2}$$

. $8(3 - x) + 4x - 8 = 11$

$24 - 8x + 4x - 8 = 11$

$-4x = -5$

$x = \frac{-5}{-4}$

$$x = \frac{5}{4}$$

. $3(2-3x)-(4+5x)=0$

$6-9x-4-5x=0$

$-14x=-6+4=-2$

$x=\frac{-2}{-14}$

$\boxed{x=\frac{1}{7}}$

. $(5x-14)(3-10x)=0$

$5x-14=0$ $\qquad$ $3-10x=0$

$x=\frac{14}{5}$ $\qquad$ $x=\frac{3}{10}$

donc $S = \left\{ \frac{14}{5} ; \frac{3}{10} \right\}$.

- $(2x - 1)(x - 7) = 0$.

$\Leftrightarrow S = \left\{ \frac{1}{2} ; 7 \right\}$.

- $x(x + 2) = 0$

$\Leftrightarrow S = \{ 0 ; -2 \}$

- $(x+1)(5x-1) - (x+1)(3x-12) = 0$

$(x+1)(5x - 1 - (3x - 12)) = 0$

$(x+1)(2x + 11) = 0$

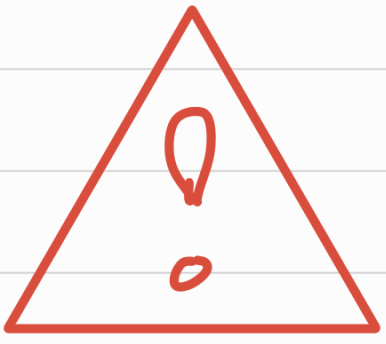
$\Leftrightarrow S = \left\{ -1 ; -\frac{11}{2} \right\}$.

$$x^2 = a$$

$x = \sqrt{a}$ $\qquad$ $x = -\sqrt{a}$

- $x^2 - 5 = 0$

$S = \{\sqrt{5} ; -\sqrt{5}\}$



$\sqrt{x} \Rightarrow x \geq 0$

- $x^2 = 9$

$x = 3$ et $x = -3$

• $x^2 = -16$

$\Leftrightarrow S = \varnothing$

ensemble vide

• $(2x-1)^2 = 4$

on pose $X = 2x-1$

$\Leftrightarrow X^2 = 4$

$X = 2$ $\qquad$ $X = -2$

$2x-1 = 2$ $\qquad$ $2x-1 = -2$

$x = \frac{3}{2}$ $\qquad$ $x = -\frac{1}{2}$.

- $\frac{3x-5}{x+2} = 0$ $\quad x+2 \neq 0$

$\iff 3x - 5 = 0$

$\iff x = \frac{5}{3}$.

- $\frac{3x+1}{4} = \frac{5x-2}{5}$

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

$15x + 5 = 20x - 8$

$15x - 20x = -8 - 5$

$$-5x = -13$$

$$x = \frac{-13}{-5}$$

$$x = \frac{13}{5}.$$

Inéquations

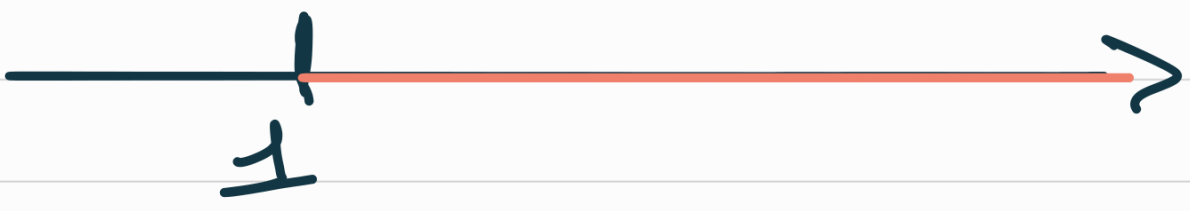
- $5x - 3 \geqslant 2$

$5x \geqslant 5$

$x \geqslant \frac{5}{5}$

$x \geqslant 1$

donc $S = [1 ; +\infty[$



. $-2x + 4 > -1$

$-2x > -5$

$x < \frac{-5}{-2}$

$x < \frac{5}{2}$

donc $S =]-\infty ; \frac{5}{2}[$

. $-2(5x-3) \geq 10(x-2)$

$-10x+6 \geq 10x-20$

$-10x-10x \geq -20-6$

$-20x \geq -26$

$x \leq \frac{-26}{-20}$

$x \leq \frac{13}{10}$.

$S =]-\infty ; \frac{13}{10}]$.

$$\cdot \frac{5x-8}{3} \geq \frac{7x+12}{2} .$$

$$2(5x-8) \geq 3(7x+12)$$

$$10x - 16 \geq 21x + 36$$

$$-11x \geq 52$$

$$x \leq -\frac{52}{11}$$

$$\xi \quad S =]-\infty ; -\frac{52}{11}] .$$

- $x^2 \geq a$

$|x| \geq \sqrt{a}$

$$|x| = \begin{cases} x & \text{si } x \geq 0 \\ -x & \text{si } x < 0 \end{cases}$$

$x \leq -a$ ou $x \geq a$

$\mathcal{S} =]-\infty ; -a] \cup [a ; +\infty[$

- $x^2 \leq a$

$|x| \leq \sqrt{a}$

$-a \leq x \leq a$

$S = [-a; a]$

Exercices à faire :

• Développer

Exercice 1

Développer, réduire et ordonner les expressions suivantes :

$A = (x+1)(x+3)$

$B = (2x+8)(x+5)$

$C = (4x-1)(x+2)$

$D = (5x+4)(4x+7)$

$E = (4x+3)(3x-2)$

$F = (7x-4)(2x-1)$

Exercice 2

Développer, réduire et ordonner les expressions suivantes en utilisant les identités remarquables.

$A = (4x + 3)^2$

$B = (6x - 7)^2$

$C = (5x + 4)(5x - 4)$

$D = (3x + 7)^2$

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

$F = (3x - 5)(3x + 5)$

$G = (7 - 4x)^2$

$H = (2x + 9)^2$

$I = (6 - 2x)(6 + 2x)$

Exercice 4

Développer, réduire et ordonner les expressions suivantes.

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

$B = (4x - 1)(5x - 3) + 7(3x - 1)$

$C = (5x - 4)(3x + 7) + (4x - 2)(5x + 9)$

$D = (x - 2)(x + 2) - (2x + 1)(3x - 2)$

$E = 4(3x + 1)^2 - (2x + 3)(2x - 3)$

- Factoriser :

Exercice 5

Factoriser

$A = 5(x+1) + x(x+1)$

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

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

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

$E = 2(3-x)(2x+5) - (2x+5)$

$F = -3(x+1)(1-x) + (1-x)(7x-8)$

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

Exercice 6

Factoriser en utilisant des identités remarquables.

$A = x^2 - 10x + 25$

$B = 9 + 6x + x^2$

$C = 1 - x^2$

$D = 4x^2 + 12x + 9$

$E = x^2 - 16$

$F = 9x^2 - 4$

$G = 9x^2 - 6x + 1$

$H = 25 - 4x^2$

Fractions :

Exercice 9

Effectuer :

$$A = \left(2 + \frac{5}{3}\right)\left(3 - \frac{4}{5}\right)$$

$$B = 3 \times \frac{5}{6} - \frac{4}{3} \times 6 + \frac{3}{2}$$

$$C = -\frac{8}{3} \times \left(-\frac{3}{7}\right) - \frac{4}{14} - \frac{11}{7}$$

Exercice 10

Calculer :

$$A = \left(5 + \frac{7}{3}\right)\left(8 - \frac{5}{7}\right)$$

$$B = 1 - \frac{1}{2 - \frac{1}{2}}$$

$$C = \frac{3}{2} - \frac{2}{3} \times \frac{5}{3}$$

$$D = \frac{1 + \frac{3}{4}}{2 - \frac{1}{5}}$$