

CORRECTION fiche entraînement 1 :

développer, factoriser, Eq produit

8) $f(x) = (5x+6)^2 - (2x-7)^2$

A) On développe :

$$\begin{aligned}f(x) &= 25x^2 + 60x + 36 - (4x^2 - 28x + 49) \\&= 25x^2 + 60x + 36 - 4x^2 + 28x - 49 \\&= 21x^2 + 88x - 13\end{aligned}$$

$$\Rightarrow \forall x \in \mathbb{R} : f(x) = 21x^2 + 88x - 13$$

B) On factorise :

$$\begin{aligned}f(x) &= (5x+6)^2 - (2x-7)^2 \\&= (5x+6 - 2x+7)(5x+6 + 2x-7) \\&= (3x+13)(7x-1) \\&\Rightarrow \forall x \in \mathbb{R} : f(x) = (3x+13)(7x-1)\end{aligned}$$

C) On résout :

$$\begin{aligned}f(x) = 0 &\Leftrightarrow (3x+13)(7x-1) = 0 \\&\Leftrightarrow 3x+13 = 0 \text{ ou } 7x-1 = 0 \\&\Leftrightarrow 3x = -13 \quad \text{ou} \quad 7x = 1 \\&\Leftrightarrow x = -\frac{13}{3} \quad \text{ou} \quad x = \frac{1}{7}\end{aligned}$$

$$S = \left\{ -\frac{13}{3}, \frac{1}{7} \right\}$$

$$9) f(x) = (3x-5)(2x-5) + (3x-5)^2$$

A) On développe :

$$\begin{aligned}f(x) &= 6x^2 - 27x - 10x + 45 + 9x^2 - 30x + 25 \\&= 15x^2 - 67x + 70\end{aligned}$$

$$\Rightarrow \forall x \in \mathbb{R}: f(x) = 15x^2 - 67x + 70$$

B) On factorise :

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

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

$$= (3x-5)(5x-14)$$

$$\Rightarrow \forall x \in \mathbb{R}: f(x) = (3x-5)(5x-14)$$

C) On résout :

$$f(x) = 0 \Leftrightarrow (3x-5)(5x-14) = 0$$

$$\Leftrightarrow 3x-5 = 0 \text{ ou } 5x-14 = 0$$

$$\Leftrightarrow 3x = 5 \text{ ou } 5x = 14$$

$$\Leftrightarrow x = \frac{5}{3} \text{ ou } x = \frac{14}{5}$$

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

$$10) f(x) = (7x+2)(9x-1) - (9x-1)^2$$

A) On développe :

$$f(x) = (7x+2)(9x-1) - \Delta (9x-1)^2$$

$$= 63x^2 - 7x + 18x - 2 - (81x^2 - 18x + 1)$$

$$= 63x^2 + 11x - 2 - 81x^2 + 18x - 1$$

$$= -18x^2 + 29x - 3$$

$$\Rightarrow \forall x \in \mathbb{R} : f(x) = -18x^2 + 29x - 3$$

B) on factorise :

$$\begin{aligned}f(x) &= (7x+2)(9x-1) - (9x-1)^2 \\&= (9x-1)(7x+2 - 9x+1) \\&= (9x-1)(-2x+3)\end{aligned}$$

$$\Rightarrow \forall x \in \mathbb{R} : f(x) = (9x-1)(-2x+3)$$

c) on résout :

$$\begin{aligned}f(x) = 0 &\iff (9x-1)(-2x+3) = 0 \\&\iff 9x-1 = 0 \quad \text{ou} \quad -2x+3 = 0 \\&\iff 9x = 1 \quad \text{ou} \quad -2x = -3 \\&\iff x = \frac{1}{9} \quad \text{ou} \quad x = \frac{-3}{-2} \\&\iff x = \frac{1}{9} \quad \text{ou} \quad x = \frac{3}{2}\end{aligned}$$

$$S = \left\{ \frac{1}{9}; \frac{3}{2} \right\}$$