

LDDR - Niveau 1 - TES : Calcul - Algèbre

EXERCICE 1

$$1) x - (2x-3)^2 = 1 \Leftrightarrow x - (4x^2 - 12x + 9) = 1 \Leftrightarrow \\ \Leftrightarrow x - 4x^2 + 12x - 9 = 1 \Leftrightarrow 4x^2 - 13x + 10 = 0 \\ \Delta = 9 \quad x_{1,2} = \frac{13 \pm 3}{8} = \begin{cases} 2 = x_1 \\ \frac{5}{4} = x_2 \end{cases}$$

$$2) \sqrt{3x+1} = 3x-11 \quad 3x+1 \geq 0 \Leftrightarrow x \geq -\frac{1}{3} \\ \Leftrightarrow 3x+1 = 9x^2 - 66x + 121 \Leftrightarrow 3x-11 \geq 0 \Leftrightarrow x \geq \frac{11}{3}$$

$$\Leftrightarrow 9x^2 - 69x + 120 = 0 \\ \Delta = 441 \quad x_{1,2} = \frac{69 \pm 21}{18} = \begin{cases} x_1 = 5 \checkmark \\ x_2 = \frac{8}{3} \text{ impossible} \end{cases} \\ \text{car } \frac{8}{3} < \frac{11}{3}$$

$$3) x-1 = |2x+1| - x^2 \Leftrightarrow$$

$$\Leftrightarrow x^2 + x - 1 = |2x+1| \quad (1) \Leftrightarrow$$

$$\bullet x \geq -\frac{1}{2} \quad |2x+1| = 2x+1$$

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

$$x_1 = 2 \quad x_2 = -1 < -\frac{1}{2} \quad \times$$

$$\bullet x < -\frac{1}{2} \quad |2x+1| = -2x-1$$

$$(1) \Rightarrow x^2 + x - 1 = -2x - 1 \Leftrightarrow$$

$$\Leftrightarrow x^2 + 3x = 0 \Leftrightarrow x(x+3) = 0 \Leftrightarrow \begin{cases} x_1 = 0 > -\frac{1}{2} \\ x_2 = -3 \checkmark \end{cases}$$

Alors les racines sont $x_1 = 2$ $x_2 = -3$

EXERCICE 2

$$\frac{2x^2+5x-3}{4x^2+15x+9} = \frac{2(x+3)(x-\frac{1}{2})}{4(x+\frac{3}{4})(x+3)} = \frac{2x-1}{4x+3}$$

EXERCICE 3

$$1) f_1(x) = x^2 - 3x \quad D_f = \mathbb{R}$$

$$f_1(x) = 0 \Leftrightarrow x(x-3) = 0 \Leftrightarrow x_1 = 0 \quad x_2 = 3$$

$$f_1(0) = 0$$

$$\text{TS: } \begin{array}{c|ccc} x & -\infty & 0 & 3 & +\infty \\ \hline x^2-3x & + & 0 & - & 0 & + \end{array}$$

-2-

$$2) f_2(x) = \frac{2x+5}{x-1} \quad D_f = \mathbb{R} \setminus \{1\}$$

$$f_2(x) = 0 \Leftrightarrow 2x+5=0 \Leftrightarrow x = -\frac{5}{2}$$

$$f_2(0) = -5$$

x	$-\infty$	$-\frac{5}{2}$	1	$+\infty$
$2x+5$	-	0	+	+
$x-1$	-	-	0	+
f	+	0	-	+

$$g(x) = \sqrt{f_2(x)} \quad f_2(x) \geq 0 \Leftrightarrow x \in]-\infty; -\frac{5}{2}] \cup [1; +\infty[$$

EXERCISE 4

$$A(1, 2) \quad B(\frac{3}{2}; -\frac{1}{2}) \quad m = \frac{-\frac{1}{2} - 2}{\frac{3}{2} - 1} = \frac{-\frac{5}{2}}{\frac{1}{2}} = -5$$

$$2 = -5 \cdot 1 + h = 0 \Leftrightarrow h = 7$$

$$y = -5x + 7$$

EXERCISE 5

$$y = \frac{1}{2}x^2 + 3x + 2k$$

$$x_0 = -\frac{b}{2a} = -\frac{3}{1} = -3$$

$$f(-3) = 0 \Leftrightarrow \frac{9}{2} - 9 + 2k = 0 \Leftrightarrow$$

$$\Leftrightarrow -\frac{9}{2} + 2k = 0 \Leftrightarrow 2k = \frac{9}{2} \Leftrightarrow k = \frac{9}{4}$$