Correction des exercices

Les règles de priorité

Exercice 1

- $-7+3\times 11=-7+33=26$
- $5-6\times(3-4)=5-6\times(-1)=5+6=11$
- $9\times 7+(3+2)^3=63+5^3=63+125=188$
- $3\times 10-5\times(-2)^4=30-5\times 16=30-80=-50$
- $3\times\left(4-(1+3^3)\right)-2=3\times\left(4-(1+27)\right)-2=3\times(4-28)-2=3\times(-24)-2=-72-2=-74$
- $5+5^{7-3\times 2}=5+5^{7-6}=5+5^1=5+5=10$

Exercice 2

- $6\times\frac{4+5}{5}=6\times\frac{9}{5}=\frac{54}{5}$
- $\frac{7+8}{5-1}\times 3=\frac{15}{4}\times 3=\frac{45}{4}$
- $\frac{7-1^2\times 4}{8^2}-1=\frac{7-1\times 4}{64}-1=\frac{7-4}{64}-1=\frac{3}{64}-\frac{64}{64}=-\frac{61}{64}$
- $5\times\frac{\frac{5}{4}-\frac{1}{4}}{3}=5\times\frac{\frac{4}{4}}{3}=5\times\frac{1}{3}=\frac{5}{3}$
- $\frac{4x}{7}-\frac{2x}{7}=\frac{2x}{7}$
- $\frac{3x+1}{x+1}-\frac{5}{x+1}=\frac{3x+1-5}{x+1}=\frac{3x-4}{x+1}$
- $\frac{4x+2}{x+2}-\frac{x-1}{x+2}=\frac{4x+2-(x-1)}{x+2}=\frac{4x+2-x+1}{x+2}=\frac{3x+3}{x+2}$
- $\frac{4x^2-7}{2x+1}-\frac{3x^2-8}{2x+1}=\frac{4x^2-7-(3x^2-8)}{2x+1}=\frac{4x^2-7-3x^2+8}{2x+1}=\frac{x^2+1}{2x+1}$

Les fractions

Exercice 3

- $\frac{65}{55}=\frac{13}{11}$
- $\frac{78}{56}=\frac{39}{28}$
- $\frac{90}{396}=\frac{45}{198}=\frac{5}{22}$
- $\frac{150}{165}=\frac{30}{33}=\frac{10}{11}$
- $\frac{4x}{x^2}=\frac{4}{x}$
- $\frac{4-x}{3-x}$ pas de simplification possible
- $\frac{x^2(3x-1)}{2x(3x-1)}=\frac{x}{2}$

- $\frac{2x^2-3}{x+2}$ pas de simplification possible
- $\frac{3(x+4)}{x^2(x+4)} = \frac{3}{x^2}$
- $\frac{4(2x+1)}{(2x+1)(x+2)} = \frac{4}{x+2}$

Exercice 4

- $\frac{13}{4} + \frac{7}{8} = \frac{26}{8} + \frac{7}{8} = \frac{33}{8}$
- $\frac{4}{25} - \frac{6}{5} = \frac{4}{25} - \frac{30}{25} = -\frac{26}{25}$ (attention à ne pas oublier le signe $-$)
- $4 - \frac{3}{8} = \frac{4}{1} - \frac{3}{8} = \frac{32}{8} - \frac{3}{8} = \frac{29}{8}$
- $\frac{5}{9} - 3 = \frac{5}{9} - \frac{27}{9} = -\frac{22}{9}$
- $\frac{7}{3} + \frac{5}{2} = \frac{14}{6} + \frac{15}{6} = \frac{29}{6}$
- $\frac{7}{9} + \frac{1}{4} = \frac{28}{36} + \frac{9}{36} = \frac{37}{36}$
- $\frac{4}{x} - \frac{2}{x^2} = \frac{4x}{x^2} - \frac{2}{x^2} = \frac{4x-2}{x^2}$
- $\frac{5}{x^2} - \frac{x+1}{x} = \frac{5}{x^2} - \frac{x^2+x}{x^2} = \frac{5-x^2-x}{x^2}$
- $3 - \frac{2}{x} = \frac{3x}{x} - \frac{2}{x} = \frac{3x-2}{x}$
- $\frac{4}{x+1} + 5 = \frac{4}{x+1} + \frac{5(x+1)}{x+1} = \frac{4}{x+1} + \frac{5x+5}{x+1} = \frac{5x+9}{x+1}$
- $\frac{2}{x+1} - \frac{3}{x+2} = \frac{2(x+2)}{(x+1)(x+2)} - \frac{3(x+1)}{(x+1)(x+2)} = \frac{2x+4}{(x+1)(x+2)} - \frac{3x+3}{(x+1)(x+2)} = \frac{-x+1}{(x+1)(x+2)}$
- $\frac{x}{2x+1} + \frac{1}{3-x} = \frac{x(3-x)}{(2x+1)(3-x)} + \frac{2x+1}{(2x+1)(3-x)} = \frac{3x-x^2}{(2x+1)(3-x)} + \frac{2x+1}{(2x+1)(3-x)} = \frac{-x^2+5x+1}{(2x+1)(3-x)}$

Exercice 5

- $\frac{4}{7} \times \frac{9}{5} = \frac{36}{35}$
- $-\frac{13}{4} \times \frac{3}{11} = -\frac{39}{44}$
- $\frac{8}{15} \times 4 = \frac{8}{15} \times \frac{4}{1} = \frac{32}{15}$
- $-6 \times \left(-\frac{20}{7}\right) = \frac{6}{1} \times \frac{20}{7} = \frac{120}{7}$
- $\frac{35}{51} \times \frac{11}{15} = \frac{7}{51} \times \frac{11}{3} = \frac{77}{153}$
- $-\frac{18}{7} \times \frac{1}{42} = -\frac{3}{7} \times \frac{1}{7} = -\frac{3}{49}$
- $\frac{3}{x} \times \frac{x+1}{4} = \frac{3x+3}{4x}$
- $-\frac{2x}{3} \times \frac{5}{x-1} = -\frac{10x}{3x-3}$
- $\frac{5}{2x-1} \times 4 = \frac{20}{2x-1}$
- $-6 \times \left(-\frac{x+1}{x}\right) = \frac{6x+6}{x}$
- $\frac{x+1}{3x} \times \frac{x+2}{x+1} = \frac{x+2}{3x}$
- $-\frac{x^2}{2x-1} \times \frac{2x-1}{x^3} = -\frac{1}{x}$

Exercice 6

- $\frac{\frac{5}{6}}{\frac{3}{5}} = \frac{5}{6} \times \frac{5}{3} = \frac{25}{18}$
- $\frac{2}{\frac{7}{9}} = 2 \times \frac{9}{7} = \frac{18}{7}$
- $\frac{-\frac{4}{9}}{25} = -\frac{4}{9} \times \frac{1}{25} = -\frac{4}{225}$
- $\frac{-\frac{16}{15}}{-\frac{1}{2}} = \frac{16}{15} \times 2 = \frac{32}{15}$
- $\frac{\frac{15}{2}}{\frac{6}{17}} = \frac{15}{2} \times \frac{17}{6} = \frac{5}{2} \times \frac{17}{2} = \frac{85}{4}$
- $\frac{\frac{18}{11}}{-\frac{27}{22}} = -\frac{18}{11} \times \frac{22}{27} = -\frac{2}{1} \times \frac{2}{3} = -\frac{4}{3}$
- $\frac{\frac{x+1}{6}}{\frac{3}{x}} = \frac{x+1}{6} \times \frac{x}{3} = \frac{x(x+1)}{18} = \frac{x^2+x}{18}$
- $\frac{2}{\frac{3}{x+3}} = 2 \times \frac{x+3}{3} = \frac{2x+6}{3}$
- $\frac{-\frac{4}{x}}{5} = -\frac{4}{x} \times \frac{1}{5} = -\frac{4}{5x}$
- $\frac{-\frac{x}{x+1}}{-\frac{1}{2}} = \frac{x}{x+1} \times 2 = \frac{2x}{x+1}$
- $\frac{\frac{x+5}{2}}{\frac{x+3}{4}} = \frac{x+5}{2} \times \frac{4}{x+3} = \frac{x+5}{1} \times \frac{2}{x+3} = \frac{2x+10}{x+3}$
- $\frac{\frac{8}{x}}{-\frac{7}{x}} = \frac{8}{x} \times \left(-\frac{x}{7}\right) = -\frac{8}{7}$

Les puissances

Exercice 7

- $5^4 = 5 \times 5 \times 5 \times 5 = 625$
- $4^3 = 4 \times 4 \times 4 = 64$
- $(-3)^2 = (-3) \times (-3) = 9$
- $(-2)^3 = (-2) \times (-2) \times (-2) = -8$
- $-9^2 = -(9 \times 9) = -81$
- $-3^4 = -(3 \times 3 \times 3 \times 3) = -81$
- $5^{-3} = \frac{1}{5^3} = \frac{1}{125}$
- $8^{-2} = \frac{1}{8^2} = \frac{1}{64}$
- $(-7)^{-2} = \frac{1}{(-7)^2} = \frac{1}{49}$
- $-9^{-2} = -\frac{1}{9^2} = -\frac{1}{81}$

Exercice 8

- $3^2 \times 3^{-4} = 3^{2-4} = 3^{-2}$
- $(-4)^{-3} \times (-4)^{-2} = (-4)^{-3-2} = (-4)^{-5}$
- $\frac{7^{10}}{7^4} = 7^{10-4} = 7^6$
- $\frac{5^8}{4^8} = \left(\frac{5}{4}\right)^8$
- $(-10)^{11} \times 8^{11} = (-10 \times 8)^{11} = (-80)^{11}$
- $(4^5)^2 = 4^{5\times 2} = 4^{10}$
- $((-2)^4)^{-5} = (-2)^{4\times(-5)} = (-2)^{-20}$
- $\frac{14^3}{5^3} = \left(\frac{14}{5}\right)^3$

Développements

Exercice 9

- $4(2x + 7) = 8x + 28$
- $5(x - 9) = 5x - 45$
- $x(3x - 6) = 3x^2 - 6x$
- $-5(2x + 2) = -10x - 10$
- $4(x + 7) - 5 + 3(2x + 3) = 4x + 28 - 5 + 6x + 9 = 10x + 32$
- $5 - 3(3x - 5) - 6(3 - x) = 5 - 9x + 15 - 18 + 6x = -3x + 2$
- $4x - 6(x^2 - 2x + 4) = 4x - 6x^2 + 12x - 24 = -6x^2 + 16x - 24$
- $-3(5x + 6) - (5x^2 + 3x) = -15x - 18 - 5x^2 - 3x = -5x^2 - 18x - 18$

Exercice 10

- $(3x + 1)(2x + 3) = 6x^2 + 9x + 2x + 3 = 6x^2 + 11x + 3$
- $(2 + 4x)(x - 2) = 2x - 4 + 4x^2 - 8x = 4x^2 - 6x - 4$
- $(-3x + 2)(6x - 10) = -18x^2 + 30x + 12x - 20 = -18x^2 + 42x - 20$
- $3(x - 4)(x + 7) = (3x - 12)(x + 7) = 3x^2 + 21x - 12x - 84 = 3x^2 + 9x - 84$
- $-2(3 - x)(2x + 4) = (-6 + 2x)(2x + 4) = -12x - 24 + 4x^2 + 8x = 4x^2 - 4x - 24$
- $-(x + 8)(8 - 3x) = (-x - 8)(8 - 3x) = -8x + 3x^2 - 64 + 24x = 3x^2 + 16x - 64$
- $5(x + 6) + (3x + 7)(-x - 9) = 5x + 30 - 3x^2 - 27x - 7x - 63 = -3x^2 - 29x - 33$
- $4 - (4 - x)(3x + 2) = 4 - (12x + 8 - 3x^2 - 2x) = 4 - 12x - 8 + 3x^2 + 2x = 3x^2 - 10x - 4$
- $3(x + 3) - (x + 3)(2x - 1) = 3x + 9 - (2x^2 - x + 6x - 3) = 3x + 9 - 2x^2 + x - 6x + 3 = -2x^2 - 2x + 12$

- $2(6x+9)(1-x)-(6-x)(x+7)=(12x+18)(1-x)-(6x+42-x^2-7x)$
$=12x-12x^2+18-18x-6x-42+x^2+7x=-11x^2-5x-24$

Exercice 11

- $(x+4)^2=x^2+8x+16$
- $(5+2x)^2=25+20x+4x^2=4x^2+20x+25$
- $(7x+1)^2=49x^2+14x+1$
- $(x-1)^2=x^2-2x+1$
- $(2-x)^2=4-4x+x^2=x^2-4x+4$
- $(6x-10)^2=36x^2-120x+100$
- $(x+4)(x-4)=x^2-16$
- $(2x-3)(2x+3)=4x^2-9$
- $(5x+1)(5x-1)=25x^2-1$
- $(8x+3)(8x-3)-5(x-6)=64x^2-9-5x+30=64x^2-5x+21$
- $(x+2)^2-(x+4)(3x-1)=x^2+4x+4-(3x^2-x+12x-4)=x^2+4x+4-3x^3+x-12x+4=-2x^2-7x+8$
- $5(2x+3)-(3x-2)^2=10x+15-(9x^2-12x+4)=10x+15-9x^2+12x-4=-9x^2+22x+11$

Factorisations

Exercice 12

- $7x+14=7(x+2)$
- $3x-3=3(x-1)$
- $x^2+2x=x(x+2)$
- $3x^2-x=x(3x-1)$
- $(x+2)(x+1)+(x+2)(3x-4)$
$=(x+2)((x+1)+(3x-4))$
$=(x+2)(x+1+3x-4)$
$=(x+2)(4x-3)$
- $4x(3x-2)-(x+2)(3x-2)$
$=(3x-2)(4x-(x+2))$
$=(3x-2)(4x-x-2)$
$=(3x-2)(3x-2)$
$=(3x-2)^2$
- $(3-x)(5x+1)-4(3-x)$
$=(3-x)((5x+1)-4)$
$=(3-x)(5x+1-4)$

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

- $(x + 4)^2 + (x + 4)(x + 5)$

$$= (x + 4)((x + 4) + (x + 5))$$
$$= (x + 4)(x + 4 + x + 5)$$
$$= (x + 4)(2x + 9)$$

- $(5 - x)(6 + x) + (6 + x)$

$$= (6 + x)((5 - x) + 1)$$
$$= (6 + x)(5 - x + 1)$$
$$= (6 + x)(-x + 6)$$

- $(8 + 2x) - (8 + 2x)(x + 9)$

$$= (8 + 2x)(1 - (x + 9))$$
$$= (8 + 2x)(1 - x - 9)$$
$$= (8 + 2x)(-x - 8)$$

- $(5x - 1)^2 - (5x - 1)$

$$= (5x - 1)((5x - 1) - 1)$$
$$= (5x - 1)(5x - 1 - 1)$$
$$= (5x - 1)(5x - 2)$$

- $(7x + 2) - (7x + 2)^2$

$$= (7x + 2)(1 - (7x + 2))$$
$$= (7x + 2)(1 - 7x - 2)$$
$$= (7x + 2)(-7x - 1)$$

Exercice 13

- $x^2 + 6x + 9 = (x + 3)^2$
- $4x^2 + 4x + 1 = (2x + 1)^2$
- $x^2 - 8x + 16 = (x - 4)^2$
- $9x^2 - 6x + 1 = (3x - 1)^2$
- $x^2 - 9 = (x - 3)(x + 3)$
- $49 - x^2 = (7 - x)(7 + x)$
- $4x^2 - 1 = (2x - 1)(2x + 1)$
- $25 - 9x^2 = (5 - 3x)(5 + 3x)$

Les équations du premier ordre

Exercice 14

- $4x - 5 = 0$

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

L'ensemble solution est $S = \{\frac{5}{4}\}$

- $-\frac{2}{5}x+4=\frac{1}{7}x-\frac{1}{2}$

$$\Leftrightarrow -\frac{2}{5}x-\frac{1}{7}x=-\frac{1}{2}-4$$
$$\Leftrightarrow -\frac{14}{35}x-\frac{5}{35}x=-\frac{1}{2}-\frac{8}{2}$$
$$\Leftrightarrow -\frac{19}{35}x=-\frac{9}{2}$$
$$\Leftrightarrow x=-\frac{9}{2}\times\left(-\frac{35}{19}\right)$$
$$\Leftrightarrow x=\frac{315}{38}$$
$$S=\{\frac{315}{38}\}$$

- $\frac{1}{3}x+\frac{4}{5}=6x-7$

$$\Leftrightarrow \frac{1}{3}x-6x=-7-\frac{4}{5}$$
$$\Leftrightarrow \frac{1}{3}x-\frac{18}{3}x=-\frac{35}{5}-\frac{4}{5}$$
$$\Leftrightarrow -\frac{17}{3}x=-\frac{39}{5}$$
$$\Leftrightarrow x=-\frac{39}{5}\times\left(-\frac{3}{17}\right)$$
$$\Leftrightarrow x=\frac{117}{85}$$
$$S=\{\frac{117}{85}\}$$

- $-9x+1=1$

$$\Leftrightarrow -9x=0$$
$$\Leftrightarrow x=0$$
$$S=\{0\}$$

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

$$\Leftrightarrow x^2+2x=x^2-1$$
$$\Leftrightarrow 2x=-1$$
$$\Leftrightarrow x=-\frac{1}{2}$$
$$S=\{-\frac{1}{2}\}$$

- $2x(x+5)+x(4-2x)=7$

$$\Leftrightarrow 2x^2+10x+4x-2x^2=7$$
$$\Leftrightarrow 14x=7$$
$$\Leftrightarrow x=\frac{7}{14}$$
$$\Leftrightarrow x=\frac{1}{2}$$
$$S=\{\frac{1}{2}\}$$

- $(3x+1)(6-x)=x(-3x+8)$

$$\Leftrightarrow 18x-3x^2+6-x=-3x^2+8x$$
$$\Leftrightarrow 9x=-6$$
$$\Leftrightarrow x=-\frac{6}{9}$$

$$\Leftrightarrow x = -\frac{2}{3}$$
$$S = \{-\frac{2}{3}\}$$

Exercice 15

- $(5x + 4)(4 + x) = 0$

$$\Leftrightarrow 5x + 4 = 0 \; ou \; 4 + x = 0$$
$$\Leftrightarrow 5x = -4 \; ou \; x = -4$$
$$\Leftrightarrow x = -\frac{4}{5} \; ou \; x = -4$$
$$S = \left\{-4; -\frac{4}{5}\right\}$$

- $(-x + 8)(9x + 1) = 0$

$$\Leftrightarrow -x + 8 = 0 \; ou \; 9x + 1 = 0$$
$$\Leftrightarrow -x = -8 \; ou \; 9x = -1$$
$$\Leftrightarrow x = 8 \; ou \; x = -\frac{1}{9}$$
$$S = \left\{-\frac{1}{9}; 8\right\}$$

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

$$\Leftrightarrow x + 3 = 0$$
$$\Leftrightarrow x = -3$$
$$S = \{-3\}$$

- $(6x - 3)^2 = 0$

$$\Leftrightarrow 6x - 3 = 0$$
$$\Leftrightarrow 6x = 3$$
$$\Leftrightarrow x = \frac{3}{6}$$
$$\Leftrightarrow x = \frac{1}{2}$$
$$S = \left\{\frac{1}{2}\right\}$$

- $(2x + 1)(x + 3) + (2x + 1)(x + 4) = 0$

$$\Leftrightarrow (2x + 1)((x + 3) + (x + 4)) = 0$$
$$\Leftrightarrow (2x + 1)(2x + 7) = 0$$
$$\Leftrightarrow 2x + 1 = 0 \; ou \; 2x + 7 = 0$$
$$\Leftrightarrow 2x = -1 \; ou \; 2x = -7$$
$$\Leftrightarrow x = -\frac{1}{2} \; ou \; x = -\frac{7}{2}$$
$$S = \left\{-\frac{7}{2}; -\frac{1}{2}\right\}$$

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

$$\Leftrightarrow (x - 5)((x + 5) - (1 - x)) = 0$$
$$\Leftrightarrow (x - 5)(x + 5 - 1 + x) = 0$$
$$\Leftrightarrow (x - 5)(2x + 4) = 0$$
$$\Leftrightarrow x - 5 = 0 \; ou \; 2x + 4 = 0$$
$$\Leftrightarrow x = 5 \; ou \; 2x = -4$$

$$\Leftrightarrow x = 5 \; ou \; x = -2$$
$$S = \{-2; 5\}$$

Résoudre une inéquation

Exercice 16

- $3x - 6 > 0$

$$\Leftrightarrow 3x > 6$$
$$\Leftrightarrow x > 2$$
$$S =]2; +\infty[$$

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

$$\Leftrightarrow -\frac{3}{4}x - \frac{2}{3}x \leq -\frac{2}{5} - 3$$
$$\Leftrightarrow -\frac{9}{12}x - \frac{8}{12}x \leq -\frac{2}{5} - \frac{15}{5}$$
$$\Leftrightarrow -\frac{17}{12}x \leq -\frac{17}{5}$$
$$\Leftrightarrow x \geq -\frac{17}{5} \times \left(-\frac{12}{17}\right)$$
$$\Leftrightarrow x \geq \frac{12}{5}$$
$$S = [\frac{12}{5}; +\infty[$$

- $\frac{1}{3}x + 3 < 5x + 5$

$$\Leftrightarrow \frac{1}{3}x - 5x < 5 - 3$$
$$\Leftrightarrow \frac{1}{3}x - \frac{15}{3}x < 2$$
$$\Leftrightarrow -\frac{14}{3}x < 2$$
$$\Leftrightarrow x > 2 \times \left(-\frac{3}{14}\right)$$
$$\Leftrightarrow x > -\frac{3}{7}$$
$$S =]-\frac{3}{7}; +\infty[$$

- $-3x + 1 \geq 1$

$$\Leftrightarrow -3x \geq 0$$
$$\Leftrightarrow x \leq 0$$
$$S =]-\infty; 0]$$

- $x(x + 3) > x^2 - \frac{2}{3}$

$$\Leftrightarrow x^2 + 3x > x^2 - \frac{2}{3}$$
$$\Leftrightarrow 3x > -\frac{2}{3}$$
$$\Leftrightarrow x > -\frac{2}{3} \times \frac{1}{3}$$
$$\Leftrightarrow x > -\frac{2}{9}$$

$$S =]-\frac{2}{9}; +\infty[$$

- $x(2-3x)+3x(x-1) < 7$

$$\Leftrightarrow 2x - 3x^2 + 3x^2 - 3x < 7$$
$$\Leftrightarrow -x < 7$$
$$\Leftrightarrow x > -7$$
$$S =]-7; +\infty[$$

Résoudre un système d'équations

Exercice 17

Par substitution

$$\begin{cases} x - 2y - 4 = 0 \\ -2x + 3y + 5 = 0 \end{cases} \Leftrightarrow \begin{cases} x = 2y + 4 \\ -2(2y+4) + 3y + 5 = 0 \end{cases} \Leftrightarrow \begin{cases} x = 2y + 4 \\ -4y - 8 + 3y + 5 = 0 \end{cases}$$
$$\Leftrightarrow \begin{cases} x = 2y + 4 \\ -y = 3 \end{cases} \Leftrightarrow \begin{cases} x = 2 \times (-3) + 4 \\ y = -3 \end{cases} \Leftrightarrow \begin{cases} x = -2 \\ y = -3 \end{cases}$$

Par substitution

$$\begin{cases} 4x + y + 3 = 0 \\ 2x + 2y - 3 = 0 \end{cases} \Leftrightarrow \begin{cases} y = -4x - 3 \\ 2x + 2(-4x - 3) - 3 = 0 \end{cases} \Leftrightarrow \begin{cases} y = -4x - 3 \\ 2x - 8x - 6 - 3 = 0 \end{cases}$$
$$\Leftrightarrow \begin{cases} y = -4x - 3 \\ -6x = 9 \end{cases} \Leftrightarrow \begin{cases} y = -4 \times \left(-\frac{3}{2}\right) - 3 \\ x = -\frac{3}{2} \end{cases} \Leftrightarrow \begin{cases} y = 3 \\ x = -\frac{3}{2} \end{cases}$$

Par substitution

$$\begin{cases} -3x - y + 1 = 0 \\ -5x + 5y - 4 = 0 \end{cases} \Leftrightarrow \begin{cases} y = -3x + 1 \\ -5x + 5(-3x + 1) - 4 = 0 \end{cases} \Leftrightarrow \begin{cases} y = -3x + 1 \\ -5x - 15x + 5 - 4 = 0 \end{cases}$$
$$\Leftrightarrow \begin{cases} y = -3x + 1 \\ -20x = -1 \end{cases} \Leftrightarrow \begin{cases} y = -3 \times \frac{1}{20} + 1 \\ x = \frac{1}{20} \end{cases} \Leftrightarrow \begin{cases} y = \frac{17}{20} \\ x = \frac{1}{20} \end{cases}$$

Par combinaison

$$\begin{cases} 5x - 2y - 6 = 0 \\ 3x + 3y - 1 = 0 \end{cases} \Leftrightarrow \begin{cases} 3(5x - 2y - 6) - 5(3x + 3y - 1) = 3 \times 0 - 5 \times 0 \\ 3x + 3y - 1 = 0 \end{cases}$$
$$\Leftrightarrow \begin{cases} 15x - 6y - 18 - 15x - 15y + 5 = 0 \\ 3x + 3y - 1 = 0 \end{cases} \Leftrightarrow \begin{cases} -21y = 13 \\ 3x + 3y - 1 = 0 \end{cases} \Leftrightarrow \begin{cases} y = -\frac{13}{21} \\ 3x + 3 \times \left(-\frac{13}{21}\right) - 1 = 0 \end{cases}$$
$$\Leftrightarrow \begin{cases} y = -\frac{13}{21} \\ 3x = \frac{20}{7} \end{cases} \Leftrightarrow \begin{cases} y = -\frac{13}{21} \\ x = \frac{20}{21} \end{cases}$$

Par combinaison

$$\begin{cases} -2x + 5y + 3 = 0 \\ 3x - 7y + 2 = 0 \end{cases} \Leftrightarrow \begin{cases} 3(-2x + 5y + 3) + 2(3x - 7y + 2) = 3 \times 0 + 2 \times 0 \\ 3x - 7y + 2 = 0 \end{cases}$$
$$\Leftrightarrow \begin{cases} -6x + 15y + 9 + 6x - 14y + 4 = 0 \\ 3x - 7y + 2 = 0 \end{cases} \Leftrightarrow \begin{cases} y = -13 \\ 3x - 7 \times (-13) + 2 = 0 \end{cases}$$
$$\Leftrightarrow \begin{cases} y = -13 \\ 3x = -93 \end{cases} \Leftrightarrow \begin{cases} y = -13 \\ x = -31 \end{cases}$$

Par combinaison

$$\begin{cases} -3x + 2y = 4 \\ 2x + 7y = 2 \end{cases} \Leftrightarrow \begin{cases} 2(-3x + 2y) + 3(2x + 7y) = 2 \times 4 + 3 \times 2 \\ 2x + 7y = 2 \end{cases}$$

$$\Leftrightarrow \begin{cases} -6x+4y+6x+21y=14 \\ 2x+7y=2 \end{cases} \Leftrightarrow \begin{cases} y=\frac{14}{25} \\ 2x+7\times\frac{14}{25}=2 \end{cases}$$
$$\Leftrightarrow \begin{cases} y=\frac{14}{25} \\ 2x=-\frac{48}{25} \end{cases} \Leftrightarrow \begin{cases} y=\frac{14}{25} \\ x=-\frac{24}{25} \end{cases}$$

Par substitution

$$\begin{cases} 3x-y-7=0 \\ x-5y=10 \end{cases} \Leftrightarrow \begin{cases} 3(5y+10)-y-7=0 \\ x=5y+10 \end{cases} \Leftrightarrow \begin{cases} 15y+30-y-7=0 \\ x=5y+10 \end{cases}$$
$$\Leftrightarrow \begin{cases} 14y=-23 \\ x=5y+10 \end{cases} \Leftrightarrow \begin{cases} y=-\frac{23}{14} \\ x=5\times\left(-\frac{23}{14}\right)+10 \end{cases} \Leftrightarrow \begin{cases} y=-\frac{23}{14} \\ x=\frac{25}{14} \end{cases}$$

Par substitution

$$\begin{cases} x=\frac{1}{2}y+1 \\ 4x-5y=20 \end{cases} \Leftrightarrow \begin{cases} x=\frac{1}{2}y+1 \\ 4\left(\frac{1}{2}y+1\right)-5y=20 \end{cases} \Leftrightarrow \begin{cases} x=\frac{1}{2}y+1 \\ 2y+4-5y=20 \end{cases}$$
$$\Leftrightarrow \begin{cases} x=\frac{1}{2}y+1 \\ -3y=16 \end{cases} \Leftrightarrow \begin{cases} x=\frac{1}{2}\times\left(-\frac{16}{3}\right)+1 \\ y=-\frac{16}{3} \end{cases} \Leftrightarrow \begin{cases} x=-\frac{5}{3} \\ y=-\frac{16}{3} \end{cases}$$

Autre méthode

$$\begin{cases} 3x=2y+3 \\ 4x-2y=3 \end{cases} \Leftrightarrow \begin{cases} 3x=2y+3 \\ 4x=2y+3 \end{cases} \Leftrightarrow \begin{cases} 3x=4x \\ 4x=2y+3 \end{cases} \Leftrightarrow \begin{cases} x=0 \\ 0=2y+3 \end{cases} \Leftrightarrow \begin{cases} x=0 \\ y=-\frac{3}{2} \end{cases}$$