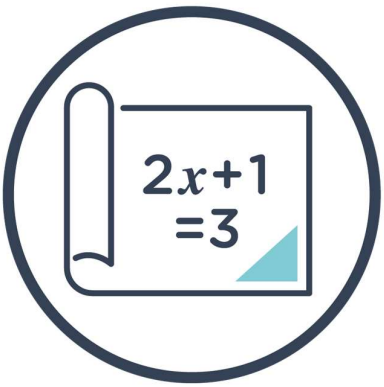
AURORE
Automatisation et rétroaction
Outils de renforcement
par exercices différenciés

Math

# Algèbre – cahier 2

# Equations

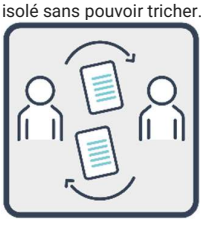
version TEST sans solution




1. Les élèves prêts pour un test se réunissent et s'assoient dans un endroit isolé sans pouvoir tricher.

2. Le prof choisit des numéros d'exercices à faire.

3. Avec le livret d'exercices sans les solutions, l'élève répond sur une feuille, dans un temps raisonnable.



4. A la fin, les élèves s'échangent leurs feuilles pour les corriger.

5. Les élèves corrigent en rouge la feuille d'un camarade en s'aidant de la version avec solutions.


6. Le prof vérifie d'un rapide coup d'œil. Plus de 80 %, le test est réussi. Sinon, il sera repassé après entraînement.

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## module I : équations du type $x + b = c$

page

| | | | |
|---|---|---|---|
| niv.1 | avec naturels | x + 1 = 3 | 3 |
| niv.2 | avec entiers | x + 3 = 1 | 4 |
| niv.3 | avec fractions | x + ½ = 1 | 5 |

## module II : équations du type $ax = b$

| | | | |
|---|---|---|---|
| niv.1 | avec naturels | 3x = 21 | 6 |
| niv.2 | avec entiers | -3x = 21 | 7 |
| niv.3 | avec fractions | -4x = ⅔ | 8 |

## module III : équations du type $x + b = c$ ou $ax = b$

| | | | |
|---|---|---|---|
| niv.1 | avec entiers | x - 4 = -8  3x = 9 | 9 |
| niv.2 | avec fractions | -2 + x = $\frac{1}{5}$  $\frac{5x}{3}$= 12 | 12 |

## module IV : équations du type $ax + b = c$

| | | | |
|---|---|---|---|
| niv.1 | avec des entiers et sans parenthèses | 8x - 3 = 13 | 13 |
| niv.2 | avec des entiers et parenthèses | 4(x + 5) = 60 ou 5 (4x + 3) = 75 | 14 |
| niv.3 | avec des fractions | $\frac{3x}{4}$ + 5 = 36 | 15 |

## module V : équations du type $ax + b = cx + d$

| | | | |
|---|---|---|---|
| niv.1 | avec des entiers et sans parenthèses | x - 7 = -4x - 2 | 16 |
| niv.2 | avec des entiers et parenthèses | -2(x - 3) = -x + 12 | 17 |
| niv.3 | avec des fractions | $\frac{11x}{5}$ - 5 = x + 7 | 18 |

## module VI : équations complexes et à deux inconnues

| | | | |
|---|---|---|---|
| niv.1 | complexes fractionnaires | $\frac{(4x-9)}{3} = \frac{(9x+3)}{4}$ | 19 |
| niv.2 | deux inconnues par substitution simple | 3x = - 9<br>-8x + 4y = 0 | 20 |
| niv.3 | deux inconnues par substitution ou combinaison | 9x - 10y = 62<br>2x + 7y = 23 | 23 |

# module I

$x + b = c$


**niv.1 :** Résous les équations avec des naturels.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | x + 17 = 26 | x + 8 = 14 | x + 3 = 11 | 1 |
| 2 | x + 14 = 15 | x + 14 = 24 | x + 8 = 12 | 2 |
| 3 | x + 6 = 17 | x + 7 = 26 | x + 13 = 21 | 3 |
| 4 | x +1 = 6 | x + 9 = 18 | x + 9 = 15 | 4 |
| 5 | x + 11 = 14 | x + 3 = 11 | x + 4 = 11 | 5 |
| 6 | x + 10= 13 | x + 17 = 26 | x + 7 = 11 | 6 |
| 7 | x + 17 = 17 | x +14 = 15 | x - 9 = 17 | 7 |
| 8 | x + 8 = 13 | x + 13 = 18 | x - 12 = 13 | 8 |
| 9 | x + 15 = 24 | x + 15 = 22 | x + 3 = 5 | 9 |
| 10 | x + 14 = 15 | x + 13 = 20 | x + 4 = 7 | 10 |
| 11 | x + 10 = 13 | x - 10 = 20 | x + 12 = 14 | 11 |
| 12 | x - 13 = 18 | x + 11 = 11 | x + 7 = 13 | 12 |
| 13 | x + 11 = 14 | x - 3 = 6 | x + 9 = 23 | 13 |
| 14 | x + 13 = 17 | x + 8 = 20 | x + 8 = 16 | 14 |
| 15 | x + 6 = 13 | x + 3 = 9 | x + 23 = 27 | 15 |
| 16 | x + 2 = 10 | x + 4 = 8 | x + 15 = 25 | 16 |
| 17 | x + 1 = 5 | x + 13 = 17 | x - 1 = 9 | 17 |
| 18 | x + 13 = 16 | x + 13 = 18 | x + 16 = 22 | 18 |
| 19 | x - 7 = 10 | x - 19 = 12 | x + 6 = 56 | 19 |
| 20 | x - 16 = 29 | x + 11 = 12 | x + 2 = 4 | 20 |

# module I

$x + b = c$


niv.2 : Résous les équations avec des entiers.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | -x + 5 = -7 | x + 14 = -22 | -x + 8 = 41 | 1 |
| 2 | -x - 4 = -31 | x - 1= -2 | -x + 12 = 12 | 2 |
| 3 | -x + 8 = 12 | x - 6 = 6 | x - 21 = 9 | 3 |
| 4 | -x - 8 = 19 | x + 18 = 4 | -x - 1 = -9 | 4 |
| 5 | x + 2 = -18 | -x - 2 = -20 | -x + 41 = 23 | 5 |
| 6 | 40 - x = -18 | -x + 10 = 14 | x - 1 = 8 | 6 |
| 7 | x - 22 = -44 | -x + 11 = 16 | x - 19 = -4 | 7 |
| 8 | x + 12 = -12 | -x + 41 = -41 | x - 3 = -12 | 8 |
| 9 | x + 10 = 3 | x - 12 = 5 | x + 19 = 19 | 9 |
| 10 | x + 2 = 1 | x + 15 = 9 | x - 16 = -10 | 10 |
| 11 | x - 16 = 19 | -x + 4 = 7 | x - 19 = -17 | 11 |
| 12 | x - 10 = -20 | x + 1 = -5 | x + 2 = -10 | 12 |
| 13 | x + 8 = 2 | -x + 10 = 7 | x - 1 = 8 | 13 |
| 14 | x - 4 = -4 | x + 11 = 11 | x - 2 = -4 | 14 |
| 15 | -x + 12 = 21 | -x + 3 = 7 | x - 18 = -13 | 15 |
| 16 | -x + 8 = 12 | x - 11 = -19 | x + 1 = 12 | 16 |
| 17 | -x + 2 = -23 | x + 16 = 12 | -x + 17 = 9 | 17 |
| 18 | x + 12 = -8 | x - 5 = 12 | x + 19 = 25 | 18 |
| 19 | x - 2 = 3 | x + 3 = -6 | x - 6 = -10 | 19 |
| 20 | -x + 4 = -17 | x + 7 = 0 | -x + 9 = 21 | 20 |

# module I

$x + b = c$


**niv.3 :** Résous les équations avec des fractions.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | $-2 + x = \frac{1}{5}$ | $14 - x = \frac{-3}{2}$ | $\frac{1}{2} + x = \frac{1}{4}$ | 1 |
| 2 | $x + 4 = \frac{8}{3}$ | $x + 2 = \frac{1}{2}$ | $x - 1 = \frac{-1}{5}$ | 2 |
| 3 | $3 - x = \frac{14}{4}$ | $x - 4 = \frac{8}{7}$ | $x - \frac{3}{2} = 4$ | 3 |
| 4 | $x + 5 = \frac{4}{3}$ | $3 = x + \frac{1}{5}$ | $x + 4 = \frac{1}{8}$ | 4 |
| 5 | $x + \frac{9}{2} = 4$ | $-2 + x = \frac{1}{6}$ | $\frac{3}{5} - x = 5$ | 5 |
| 6 | $x - 4 = \frac{15}{4}$ | $x + 4 = \frac{8}{11}$ | $x - \frac{4}{3} = 2$ | 6 |
| 7 | $2 + x = \frac{8}{5}$ | $3 = \frac{5}{2} + x$ | $\frac{1}{5} - x = -2$ | 7 |
| 8 | $x - \frac{5}{2} = 12$ | $x + 3 = \frac{11}{3}$ | $x + 8 = \frac{4}{6}$ | 8 |
| 9 | $-2 + x = \frac{1}{5}$ | $x - \frac{7}{2} = \frac{7}{2}$ | $x + \frac{4}{5} = 2$ | 9 |
| 10 | $x + 3 = \frac{6}{5}$ | $x + \frac{4}{3} = 17$ | $x + \frac{1}{3} = 12$ | 10 |
| 11 | $\frac{1}{6} = -2 + x$ | $\frac{1}{3} = -3 + x$ | $-x + 1 = \frac{4}{9}$ | 11 |
| 12 | $x - \frac{3}{2} = \frac{1}{4}$ | $\frac{-1}{5} = x - 1$ | $x + 3 = \frac{5}{3}$ | 12 |
| 13 | $-4 + x = \frac{1}{4}$ | $-2 + x = \frac{2}{3}$ | $x - \frac{4}{7} = 1$ | 13 |
| 14 | $\frac{1}{3} = -3 + x$ | $\frac{5}{6} = -2 + x$ | $-x + 9 = \frac{7}{3}$ | 14 |
| 15 | $-3 + x = \frac{2}{3}$ | $x + 2 = \frac{1}{2}$ | $x + \frac{4}{3} = 5$ | 15 |
| 16 | $1 = \frac{3}{2} + x$ | $3 = \frac{-2}{5} + x$ | $10 - x = \frac{29}{3}$ | 16 |
| 17 | $5 = \frac{-2}{3} + x$ | $\frac{4}{3} + x = 3$ | $x + 2 = \frac{10}{3}$ | 17 |
| 18 | $-3 + 2x = \frac{2}{5}$ | $-1 + 2x = \frac{3}{2}$ | $2x - \frac{5}{6} = 2$ | 18 |

# module II

$ax = b$


**niv.1 :** Résous les équations avec des naturels.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | 3x = 9 | 2x = 10 | 2x = 20 | 1 |
| 2 | 4x = 20 | 10x = 30 | 7x = 0 | 2 |
| 3 | 6x = 24 | 3x = 15 | 4x = 4 | 3 |
| 4 | 5x = 0 | 9x = 36 | 8x = 24 | 4 |
| 5 | 9x = 18 | 4x = 28 | 12x = 48 | 5 |
| 6 | 4x = 12 | 8x = 48 | 7x = 7 | 6 |
| 7 | 5x = 10 | 5x = 45 | 11x = 99 | 7 |
| 8 | 2x = 22 | 7x = 49 | 9x = 63 | 8 |
| 9 | 16x = 32 | 6x = 48 | 3x = 24 | 9 |
| | 6x = 18 | 11x = 55 | 6x = 12 | 10 |
| 11 | 12x = 96 | 4x = 44 | 10x = 90 | 11 |
| 12 | 3x = 12 | 8x = 32 | 5x = 15 | 12 |
| 13 | 6x = 42 | 3x = 39 | 9x = 18 | 13 |
| 14 | 8x = 32 | 7x = 35 | 4x = 20 | 14 |
| 15 | 7x = 49 | 2x = 28 | 8x = 48 | 15 |
| 16 | 9x = 9 | 6x = 48 | 3x = 21 | 16 |
| 17 | 4x = 12 | 4x = 8 | 7x = 28 | 17 |
| 18 | 11x = 22 | 5x = 75 | 2x = 4 | 18 |
| 19 | 8x = 40 | 9x = 81 | 6x = 78 | 19 |
| 20 | 5x = 25 | 10x = 70 | 3x = 18 | 20 |

# module II

$ax = b$


niv.2 : Résous les équations avec entiers.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | 3x = 15 | 17x = -51 | 14x = -42 | 1 |
| 2 | -5x = 30 | -4x = 8 | -7x = -28 | 2 |
| 3 | 4x = -16 | -3x = -21 | 13x = -117 | 3 |
| 4 | -8x = 56 | -14x = 140 | -8x = 64 | 4 |
| 5 | 5x = -45 | -16x = -176 | -12x = 156 | 5 |
| 6 | -7x = 84 | -15x = 75 | 9x = 81 | 6 |
| 7 | -x = 3 | 7x = -49 | -11x = 109 | 7 |
| 8 | -3x = 24 | -3x = 0 | 10x = 40 | 8 |
| 9 | 2x = -12 | 20x = -60 | -10x = 170 | 9 |
| 10 | 10x = -60 | -x = -6 | -x = 29 | 10 |
| 11 | -9x = 72 | -19x = 95 | 2x = 102 | 11 |
| 12 | -4x = 12 | 2x = -42 | -3x = 39 | 12 |
| 13 | 3x = 9 | -18x = -54 | -5x = 175 | 13 |
| 14 | 7x = 91 | 3x = -3 | 7x = -42 | 14 |
| 15 | 4x = -68 | 17x = -68 | 11x = 121 | 15 |
| 16 | -3x = -48 | -4x = 72 | -13x = 182 | 16 |
| 17 | 8x = -120 | 16x = -256 | 17x = 187 | 17 |
| 18 | 5x = -30 | 5x = 95 | -23x = 115 | 18 |
| 19 | -20x = 40 | -15 x= -165 | -19x = -361 | 19 |
| 20 | 11x = 33 | -6 x= 12 | -24x = -216 | 20 |

# module II

$ax = b$


**niv.3 :** Résous les équations avec des fractions.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | $4x = \frac{2}{3}$ | $3 = \frac{x}{5}$ | $\frac{5x}{3} = 1$ | 1 |
| 2 | $-4x = \frac{2}{5}$ | $\frac{x}{3} = -2$ | $\frac{2}{3} = 4x$ | 2 |
| 3 | $\frac{x}{2} = 6$ | $6 = \frac{x}{4}$ | $\frac{2x}{9} = 4$ | 3 |
| 4 | $\frac{x}{5} = -2$ | $\frac{14x}{7} = 3$ | $\frac{-2x}{5} = 3$ | 4 |
| 5 | $10x = \frac{50}{3}$ | $\frac{2}{5} = 3x$ | $-1 = \frac{x}{3}$ | 5 |
| 6 | $3x = \frac{23}{3}$ | $6 = \frac{2x}{7}$ | $\frac{x}{4} = 3$ | 6 |
| 7 | $2x = \frac{3}{4}$ | $\frac{-21x}{3} = -4$ | $\frac{-5}{7} = 3x$ | 7 |
| 8 | $8x = \frac{3}{4}$ | $-5 = \frac{-x}{7}$ | $\frac{-x}{2} = 4$ | 8 |
| 9 | $-5 = \frac{x}{3}$ | $\frac{9}{5} = 3x$ | $\frac{3x}{5} = 10$ | 9 |
| 10 | $4 = \frac{x}{5}$ | $\frac{6}{5} = -4x$ | $\frac{x}{5} = 3$ | 10 |
| 11 | $\frac{x}{3} = 4$ | $\frac{-5}{7} = 3x$ | $\frac{4}{9} = 4x$ | 11 |
| 12 | $\frac{2}{5} = 3x$ | $\frac{-2x}{3} = -7$ | $-7x = \frac{5}{6}$ | 12 |
| 13 | $\frac{2x}{5} = 8$ | $\frac{5}{2} = 3x$ | $10x = \frac{2}{5}$ | 13 |
| 14 | $\frac{5x}{3} = 7$ | $\frac{x}{5} = -3$ | $4x = \frac{-2}{6}$ | 14 |
| 15 | $\frac{2x}{7} = -3$ | $2 = \frac{2x}{4}$ | $-7x = \frac{2}{9}$ | 15 |
| 16 | $\frac{-7x}{3} = 21$ | $\frac{3x}{2} = -3$ | $\frac{2x}{3} = 5$ | 16 |
| 17 | $\frac{5x}{4} = 15$ | $\frac{2}{5} = 5x$ | $\frac{x}{6} = 9$ | 17 |
| 18 | $6 = \frac{3x}{7}$ | $\frac{8}{3} = -2x$ | $\frac{3x}{4} = 5$ | 18 |
| 19 | $\frac{4x}{13} = 4$ | $\frac{-4}{9} = 5x$ | $\frac{5}{12} = 7x$ | 19 |

# module III

$x + b = c$ ou $ax = b$


**niv.1 :** Résous les équations avec des entiers.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | x - 18 = -10 | x - 2 = -12 | x - 2 = -12 | 1 |
| 2 | x + 17 = 26 | x + 16 = 13 | x - 18 = -13 | 2 |
| 3 | x + 2 = -4 | x - 18 = -13 | -4x = -12 | 3 |
| 4 | x - 4 = -8 | x - 1 = -6 | x + 8 = 13 | 4 |
| 5 | -2x = -20 | -4x = -12 | x + 15 = 24 | 5 |
| 6 | 3x = 9 | x + 17 = 17 | x + 17 = 26 | 6 |
| 7 | x - 18 = -26 | x + 8 = 13 | x - 4 = -8 | 7 |
| 8 | x - 5 = -7 | 4x = 24 | 3x = 9 | 8 |
| 9 | x + 14 = 15 | x + 15 = 24 | x - 5 = -7 | 9 |
| 10 | x + 6 = 15 | -5x = -10 | x + 6 = 15 | 10 |
| 11 | 4x = 20 | x - 18 = -10 | x - 4 = -4 | 11 |
| 12 | x - 4 = -4 | x + 2 = -4 | x + 3 = -1 | 12 |
| 13 | x - 7 = -1 | -2x = -20 | x + 1 = 6 | 13 |
| 14 | x + 3 = -1 | x - 18 = -26 | x + 17 = 14 | 14 |
| 15 | 4x = -24 | x + 14 = 15 | 4x = 20 | 15 |
| 16 | x + 1 = 6 | 4x = 20 | x + 16 = 13 | 16 |
| 17 | -5x = 0 | x - 7 = -1 | x - 1 = -6 | 17 |
| 18 | x + 17 = 14 | 4x = -24 | x + 17 = 17 | 18 |
| 19 | x - 17 = -13 | -5x = 0 | 4x = 24 | 19 |
| 20 | 4x = 20 | x - 17 = -13 | -5x = -10 | 20 |

# module III

$x + b = c$ ou $ax = b$


**niv.1 :** Résous les équations avec des entiers.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 21 | x + 10 = 3 | x - 12 = -13 | 4x = -24 | 21 |
| 22 | 4x = -12 | -5x = -15 | 4x = -8 | 22 |
| 23 | x + 3 = 11 | x + 3 = 10 | x - 7 = -7 | 23 |
| 24 | 3x = -24 | x + 2 = 1 | x + 8 = 11 | 24 |
| 25 | x - 11 = -1 | x + 6 = -3 | 2x = 18 | 25 |
| 26 | 2x = 6 | 4x = 0 | x + 3 = -2 | 26 |
| 27 | x - 18 = -23 | 2x = -10 | x + 12 = 6 | 27 |
| 28 | 2x = 18 | x + 12 = 14 | -4x = -28 | 28 |
| 29 | x + 8 = 12 | x + 5 = -3 | x - 19 = -16 | 29 |
| 30 | x + 13 = 21 | x + 17 = 17 | 4x = -16 | 30 |
| 31 | 3x = -18 | x + 3 = 3 | x + 18 = 19 | 31 |
| 32 | x + 7 = 15 | -4x = 32 | -2x = -16 | 32 |
| 33 | x + 11 = 4 | x - 18 = -13 | -3x = -18 | 33 |
| 34 | -3x = 18 | -3x = -6 | 3x = -30 | 34 |
| 35 | -3x = -24 | x + 4 = 7 | -2x = -4 | 35 |
| 36 | x - 3 = 5 | x - 18 = -12 | 2x = -14 | 36 |
| 37 | x + 11 = 7 | x + 1 = -5 | -4x = -24 | 37 |
| 38 | x - 17 = -9 | x + 8 = 16 | -3x = -24 | 38 |
| 39 | -5x = -30 | -5x = 15 | x - 6 = -4 | 39 |
| 40 | 4x = -36 | x - 4 = 3 | x -7 = -10 | 40 |

# module III

$x + b = c$ ou $ax = b$


**niv.1 :** Résous les équations avec des entiers.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 41 | x - 19 = -16 | x - 13 = -5 | 2x = -8 | 41 |
| 42 | 3x = 0 | -4x = 8 | 3x = -24 | 42 |
| 43 | 3x = -12 | -3x = -21 | 2x = -8 | 43 |
| 44 | -3x = -21 | x - 10 = -20 | 4x = -28 | 44 |
| 45 | x - 18 = -25 | x - 11 = -11 | x + 11 = 11 | 45 |
| 46 | x + 5 = 14 | -3x = 15 | -3x = 18 | 46 |
| 47 | 4x = 36 | x - 3 = -6 | 4x = 40 | 47 |
| 48 | -3x = 24 | x - 7 = -3 | 3x = 27 | 48 |
| 49 | 2x = -12 | -3x = 12 | x + 14 = 22 | 49 |
| 50 | -2x = 12 | 4x = 16 | x + 2 = -6 | 50 |
| 51 | 5x = 45 | x - 10 = -3 | x + 3 = 7 | 51 |
| 52 | -4x = 12 | -2x = -12 | -2x = -36 | 52 |
| 53 | 3x = 9 | -5x = -50 | x - 4 = 1 | 53 |
| 54 | x - 7 = -11 | x + 8 = -2 | x + 13 = 9 | 54 |
| 55 | x + 4 = 4 | -3x = 18 | x + 18 = 16 | 55 |
| 56 | x + 17 = 8 | x + 9 = 3 | x + 18 = 23 | 56 |
| 57 | x + 3 = 5 | 2x = -16 | x + 5 = 15 | 57 |
| 58 | x + 12 = 11 | x + 8 = 4 | x - 12 = -19 | 58 |
| 59 | x - 16 = -23 | -5x = 0 | x + 16 = 12 | 59 |
| 60 | x + 2 = 4 | x + 13 = 17 | x + 5 = 6 | 60 |

# module III

$x + b = c$ ou $ax = b$


niv.2 : Résous les équations avec des fractions.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | $-2 + x = \frac{1}{5}$ | $14 - x = \frac{-3}{2}$ | $X - \frac{1}{4} = 6$ | 1 |
| 2 | $3 - x = \frac{14}{4}$ | $x + \frac{8}{5} = 4$ | $-5 + x = \frac{3}{4}$ | 2 |
| 3 | $x + \frac{1}{2} = \frac{3}{4}$ | $x - 4 = \frac{8}{7}$ | $x - \frac{7}{9} = 9$ | 3 |
| 4 | $x + \frac{9}{2} = 4$ | $x - \frac{7}{3} = 9$ | $4 - x = \frac{3}{2}$ | 4 |
| 5 | $\frac{3}{2} + x = \frac{7}{4}$ | $-2 + x = \frac{1}{6}$ | $x - \frac{1}{4} = 5$ | 5 |
| 6 | $2 + x = \frac{8}{5}$ | $X - \frac{1}{4} = 4$ | $x - \frac{1}{2} = \frac{3}{4}$ | 6 |
| 7 | $X - 8 = \frac{59}{5}$ | $\frac{5}{6} = -3 + x$ | $\frac{2}{5} + x = 6$ | 7 |
| 8 | $\frac{31}{5} = \frac{11}{5} + x$ | $x - \frac{1}{11} = 2$ | $x - 5 = \frac{4}{7}$ | 8 |
| 9 | $\frac{5}{13} = X - \frac{6}{13}$ | $\frac{-3}{2} = x + 3$ | $x - 5 = \frac{11}{14}$ | 9 |
| 10 | $x - \frac{7}{2} = 9$ | $\frac{1}{15} = -2 + x$ | $3 = \frac{4}{9} - x$ | 10 |
| 11 | $x - \frac{1}{4} = 2$ | $6 - x = \frac{7}{2}$ | $\frac{3}{5} + x = \frac{7}{4}$ | 11 |
| 12 | $\frac{1}{2} = x - \frac{2}{5}$ | $\frac{5}{2} + x = \frac{7}{4}$ | $\frac{5}{3} = -5 + x$ | 12 |
| 13 | $\frac{1}{6} = -2 + x$ | $\frac{1}{7} = x + \frac{1}{8}$ | $\frac{1}{17} = x - 3$ | 13 |
| 14 | $x - \frac{3}{2} = \frac{1}{4}$ | $x - \frac{1}{23} = \frac{1}{2}$ | $9 - x = \frac{-1}{8}$ | 14 |
| 15 | $\frac{2}{3} + x = 6$ | $\frac{3}{5} - x = 3$ | $\frac{1}{8} = x + \frac{1}{9}$ | 15 |
| 16 | $x = \frac{3}{4} - 5$ | $x - 1 = \frac{2}{3}$ | $\frac{5}{3} + x = \frac{5}{2}$ | 16 |

# module IV

$ax + b = c$


**niv.1 :** Résous les équations, avec entiers et sans ( ).

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | 8x - 3 = 13 | 2x + 7 = 15 | -2x + 2 = -14 | 1 |
| 2 | 14x + 28 = 42 | 2x - 1 = -17 | 21 - x = 17 | 2 |
| 3 | -4x + 2 = 14 | 3x + 7 = 13 | 12 + x = 10 | 3 |
| 4 | -x - 1 = 6 | 14 + 2x = 20 | 16x - 2 = 14 | 4 |
| 5 | -2x - 3 = -1 | 2x - 3 = -5 | 15x - 4 = 41 | 5 |
| 6 | 12 - x = 15 | 4x + 4 = 40 | 2x + 5 = 9 | 6 |
| 7 | 12 - x = 7 | -x + 8 = 7 | -x - 8 = -3 | 7 |
| 8 | 3x - 6 = 3 | -3x + 7 = 34 | 4x + 3 = -13 | 8 |
| 9 | 4x + 10 = -6 | 8 + x = 5 | -5x - 6 = 44 | 9 |
| 10 | 4x + 8 = 32 | 3x + 3 = 24 | 3x + 2 = -25 | 10 |
| 11 | 2x + 1 = -15 | 12x + 8 = -4 | 3x - 8 = -8 | 11 |
| 12 | 13x + 6 = 45 | 25x - 10 = 90 | 12x + 12 = 36 | 12 |
| 13 | 77 - 11x = 66 | 2x + 10 = 12 | -3x + 2 = 32 | 13 |
| 14 | -3x - 4 = -1 | 90 - 10x = 0 | -3x + 5 = -7 | 14 |
| 15 | 9x + 3 = 30 | 45 + 5x = 55 | 7x - 4 = 45 | 15 |
| 16 | -60 - 4x = -76 | 4x - 7 = -43 | -2x + 2 = -8 | 16 |
| 17 | 13x + 3 = 29 | 25x - 20 = 230 | 2x + 6 = 22 | 17 |
| 18 | -4x + 6 = 22 | 12x + 3 = 75 | 14x - 7 = 7 | 18 |
| 19 | -3x + 1 = -14 | 15 + 3x = 30 | -2x - 9 = -1 | 19 |
| 20 | -5x + 2 = 12 | 3x + 7 = -2 | -4x - 2 = -14 | 20 |

# module IV

$ax + b = c$


niv.2 : Résous les équations, avec entiers et ( ).

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | 4(x - 4) = -28 | 2(2x - 1) = 6 | 3(x + 2) = -18 | 1 |
| 2 | 4(x - 2) = -8 | 4(6 + x) = 12 | 4(x + 3) = 82 | 2 |
| 3 | 2(2x + 4) = 12 | 2(x + 3) = 18 | -3(x - 3) = -18 | 3 |
| 4 | 3(x - 2) = -12 | -(x + 4) =- 9 | 5(3x - 9) = -30 | 4 |
| 5 | 5(x - 4) = -50 | 5(2x - 2) = -30 | -3(x + 10) = -3 | 5 |
| 6 | 7(x + 3) = 49 | 3(x + 4) = 39 | 6(4 - x) = 54 | 6 |
| 7 | -6(x - 3) = -18 | 2(x + 6) = 30 | 4(-x + 3) = 40 | 7 |
| 8 | 8(x + 4) = -8 | 6(x + 5) = 6 | 2(x + 1) = -12 | 8 |
| 9 | 5(4x + 10) = 30 | -(3x + 4) = -5 | -4(x - 5) = -16 | 9 |
| 10 | 10(x - 4) = 40 | 2(x + 7) = 10 | 11(x - 3) = -88 | 10 |
| 11 | 3(x + 4) = 39 | 3(12 + x) = 24 | -2(2x + 4) = -10 | 11 |
| 12 | 1(x + 2) = 10 | 4(- x+ 3) = -12 | -4(x + 11) = -20 | 12 |
| 13 | -3(x + 1) = 6 | 2(2x + 4) = 14 | 5(x - 4) = 10 | 13 |
| 14 | 5(x + 8) = 45 | 3(x + 5) = -7 | 2(x + 3) = 16 | 14 |
| 15 | -(x + 5) = -9 | 12 (x - 4) = 60 | 4(x + 6) = 48 | 15 |
| 16 | 4(x - 9) = -68 | 6(x + 2) = -30 | 3(x - 4) = 3 | 16 |
| 17 | 6(2x + 6) = 0 | 4(x - 6) = -64 | 3(x + 5) = 24 | 17 |
| 18 | 8(x - 4) = -24 | 3(x - 5) = 12 | 4(7x - 5) = 8 | 18 |
| 19 | 4(x + 4) = 56 | -3(x - 1) = -12 | 8(x - 3) = -96 | 19 |
| 20 | -3(x + 2) = -33 | 4(x - 4) = -24 | 5 (x+ 2) = 5 | 20 |

# module IV

$ax + b = c$


**niv.3 :** Résous les équations, avec fractions.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | $2x - 5 = \frac{2}{3}$ | $\frac{11x}{2} + 4 = 26$ | $4(x - 5) = \frac{2}{3}$ | 1 |
| 2 | $14x - 9 = \frac{11}{4}$ | $\frac{x}{3} + 5 = 12$ | $\frac{4x}{9} - 5 = 49$ | 2 |
| 3 | $x + 4 = \frac{3}{4}$ | $\frac{3x}{4} + 5 = 36$ | $\frac{x}{2} + 8 = 3$ | 3 |
| 4 | $\frac{1}{5} = 3x - 2$ | $\frac{x}{5} + 2 = 3$ | $\frac{3x}{2} + 8 = 69$ | 4 |
| 5 | $x - 7 = \frac{1}{3}$ | $\frac{3x}{2} - 8 = 22$ | $\frac{5x}{7} - 4 = 14$ | 5 |
| 6 | $7 - 2x = \frac{3}{5}$ | $\frac{x}{2} - 4 = 13$ | $\frac{21x}{6} + 5 = 9$ | 6 |
| 7 | $3 = -2 + \frac{x}{5}$ | $\frac{11x}{5} + 4 = 18$ | $\frac{-x}{4} - 3 = 7$ | 7 |
| 8 | $\frac{11x}{3} + 4 = 15$ | $\frac{x}{5} + 2 = 12$ | $\frac{x}{3} + 5 = 2x$ | 8 |
| 9 | $\frac{x}{4} + 8 = 3$ | $\frac{8x}{4} + 9 = 13$ | $\frac{5x}{7} - 1 = 4$ | 9 |
| 10 | $16 - \frac{4x}{2} = 14$ | $4 + \frac{14x}{10} = 18$ | $\frac{-6x}{8} - 6 = 7$ | 10 |
| 11 | $\frac{11x}{2} + 8 = 6$ | $7 = -2 + \frac{x}{5}$ | $\frac{2x}{7} + 4 = 8$ | 11 |
| 12 | $x - 5 = \frac{11}{3}$ | $\frac{11x}{2} + 4 = 26$ | $\frac{-9x}{6} - 8 = 3$ | 12 |
| 13 | $\frac{15x}{6} + 4 = 12$ | $\frac{x}{3} + 5 = 12$ | $\frac{-4x}{7} + 5 = 8$ | 13 |
| 14 | $14x - 9 = \frac{11}{4}$ | $\frac{3x}{4} + 5 = 36$ | $\frac{-3x}{5} + 2 = 6$ | 14 |
| 15 | $\frac{8x}{4} + 9 = 13$ | $\frac{x}{5} + 2 = 3$ | $\frac{6x}{3} + 2 = 5$ | 15 |
| 16 | $\frac{14x}{10} + 4 = 18$ | $\frac{3x}{2} - 8 = 22$ | $\frac{-4x}{9} + 4 = -4$ | 16 |
| 17 | $x + 4 = \frac{11}{3}$ | $\frac{25x}{4} = 25$ | $\frac{6x}{7} + 2 = -4$ | 17 |
| 18 | $7 = -2 + \frac{x}{5}$ | $\frac{x}{2} - 4 = 13$ | $\frac{6x}{4} - 2 = 6$ | 18 |
| 19 | $\frac{x}{3} + 8 = 9$ | $\frac{11x}{5} + 4 = 18$ | $\frac{-2x}{5} + 3 = 2$ | 19 |
| 20 | $\frac{6x}{7} + 2 = 10$ | $\frac{x}{5} + 2 = 12$ | $\frac{-9x}{5} - 4 = -7$ | 20 |

# module V

$ax + b = cx + d$


**niv.1 :** Résous les équations avec entiers et sans ( ).

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | 5x - 8 = 3x - 22 | x + 7 = 4x + 22 | -x - 1 = 3x - 21 | 1 |
| 2 | 3x + 9 = -4x + 72 | 2x - 10 = -4x - 28 | -3x + 9 = 4x + 79 | 2 |
| 3 | 5x + 2 = 2x - 10 | 3x - 9 = 2x - 19 | 5x + 9 = -2x - 33 | 3 |
| 4 | 3x - 7 = 2x - 9 | 3x - 8 = -x - 28 | 3x + 5 = -5x - 11 | 4 |
| 5 | x - 7 = -4x - 2 | -x - 1 = 4x - 16 | -2x + 8 = 2x + 40 | 5 |
| 6 | 4x + 4 = -x + 49 | -2x - 2 = 3x - 12 | 3x - 8 = 4x - 3 | 6 |
| 7 | -5x - 8 = -2x - 20 | 2x + 9 = 3x | -4x + 7 = -5x + 16 | 7 |
| 8 | 4x - 3 = -4x - 75 | -3x - 4 = -2x - 6 | -4x - 6 = -2x + 12 | 8 |
| 9 | x - 3 = -2x - 21 | -x + 4 = 3x + 16 | 2x + 2 = -5x + 72 | 9 |
| 10 | 2x + 3 = 3x + 4 | 3x - 9 = 4x - 18 | -x - 7 = x + 1 | 10 |
| 11 | -3x + 7 = 3x + 7 | 3x + 7 = x - 1 | -3x + 3 = -2x - 1 | 11 |
| 12 | -x + 7 = x + 23 | 2x - 7 = 3x - 16 | -3x - 7 = x + 9 | 12 |
| 13 | -4x + 9 = -x | 2x - 4 = x - 7 | -x + 9 = 5x - 51 | 13 |
| 14 | -3x + 4 = 2x - 26 | 5x + 7 = 3x - 11 | 3x - 1 = -2x + 14 | 14 |
| 15 | 2x - 3 = 4x - 23 | 3x - 7 = -4x + 42 | 2x - 6 = 3x - 13 | 15 |
| 16 | 3x - 3 = 4x | 3x + 7 = -2x + 17 | 2x + 18 = -4x - 72 | 16 |
| 17 | -2x - 6 = 3x - 36 | 2x + 7 = 3x - 3 | -3x - 18 = x + 54 | 17 |
| 18 | 3x - 4 = -x + 24 | -5x - 4 = 2x + 31 | 2x + 9 = -x - 15 | 18 |
| 19 | 3x - 1 = -2x - 21 | 5x + 7 = -x + 37 | 3x - 5 = 5x - 7 | 19 |
| 20 | 4x + 4 = -2x + 22 | -5x + 4 = x - 2 | -2x + 5 = 3x | 20 |

# module V

$ax + b = cx + d$


niv.2 : Résous les équations avec entiers et ( ).

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | 3(x + 4) = 4x + 3 | 2(x - 6) = x - 13 | -3(x + 4) = -4x - 11 | 1 |
| 2 | 2(x + 3) = x - 3 | 5(x - 6) = -3x - 94 | -3(x + 8) = 2x + 21 | 2 |
| 3 | -2(x - 1) = 5x + 23 | -2(x + 6) = 2x - 4 | -5(x + 8) = 5x - 70 | 3 |
| 4 | 3(x + 10) = -2x - 5 | 3(x - 3) = 2x - 7 | -3(x - 6) = 2x + 18 | 4 |
| 5 | 4(x - 4) = 5x - 14 | 3(x - 1) = -4x - 52 | 3(x + 5) = 4x + 8 | 5 |
| 6 | -4(x + 1) = -3x - 13 | 4(x + 7) = -2x + 28 | -3(x - 3) = 2x + 59 | 6 |
| 7 | -(x + 1) = x - 17 | 3(x - 7) = -x - 53 | -2(x - 3) = 2x + 10 | 7 |
| 8 | 4(x + 2) = 2x + 2 | -4(x + 8) = -2x - 42 | -(x + 4) = x - 6 | 8 |
| 9 | 3(x - 4) = 2x - 3 | 3(x - 9) = -2x - 42 | 3(x + 5) = 8x | 9 |
| 10 | 3(x + 3) = -4x + 72 | -2(x + 7) = -4x - 6 | 15(x - 3) = 15 - 15x | 10 |
| 11 | 7( x+ 2 )=10x + 2 | 24x = 8( x -4) | -(x + 7) = x + 3 | 11 |
| 12 | -6(x + 3)= -12x | 16 (x+ 8) = -10x - 2 | 13(x+3 )= 25x - 9 | 12 |
| 13 | 4(x + 5) = -2x + 56 | 2(x - 4) = 3x - 13 | 12(x + 4) = 16x + 20 | 13 |
| 14 | -4(x + 6) = 2x - 30 | 2(x - 9) = 4x - 10 | 15(x + 4) = 40x + 10 | 14 |
| 15 | 3(x - 3) = 5x - 25 | 3(x - 4) = 5x - 18 | - (x + 5) =- 4x - 8 | 15 |
| 16 | 2(x + 3) = x + 6 | -4(x - 3) = -5x + 2 | 3(x + 8) = 14 - 7x | 16 |
| 17 | 4(x - 9) = 12x + 4 | 3(x + 4) = x + 26 | 5(x - 6) = 2x - 6 | 17 |
| 18 | 5x + 5 = 2(x +1) | 4(x - 2) = 2x | 3(x - 1) = 2x - 11 | 18 |
| 19 | 3(x - 1) = 4x - 1 | 5(x + 6) = -x + 36 | 2(x - 5) = 6x +2 | 19 |
| 20 | 3(x + 9) = 5x + 17 | 3(x + 7) = 4x + 30 | - 4(x - 7) = x + 68 | 20 |

# module V

$ax + b = cx + d$


**niv.3 :** Résous les équations avec fractions.

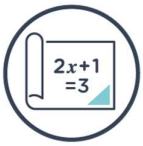
| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | $2 - 5x = 3x + \frac{5}{8}$ | $\frac{x}{4} + 2 = 3x + \frac{5}{8}$ | $2(x - \frac{1}{4}) = x - 3$ | 1 |
| 2 | $\frac{11x}{5} - 5 = x + 7$ | $\frac{3x}{2} + 4 = 3x + 1$ | $x + \frac{3}{2} = 2(x + 5)$ | 2 |
| 3 | $23x + 4 = \frac{12x}{5}$ | $\frac{11x}{3} + 4 = 25 - x$ | $2(x - \frac{5}{4}) = -4x - 28$ | 3 |
| 4 | $\frac{15x}{4} = 2x - 5$ | $\frac{x}{2} + 4 = 5x + \frac{2}{7}$ | $3(x - 3) = 2x - \frac{7}{2}$ | 4 |
| 5 | $\frac{13x}{2} = 9x - 4$ | $\frac{5x}{2} - 8 = 3x - 22$ | $3x - \frac{4}{3} = -(x + 28)$ | 5 |
| 6 | $\frac{x}{4} + 3 = 3x + \frac{1}{4}$ | $\frac{3x}{4} + 9 = -4x + 2$ | $\frac{4x}{3} - 1 = 4(x - 4)$ | 6 |
| 7 | $5x + \frac{4}{3} = -2x - 3$ | $\frac{-5x}{3} + 2 = 2x - 10$ | $-2x - \frac{7}{6} = 3(x - 4)$ | 7 |
| 8 | $3x + \frac{5}{3} = -5x - 11$ | $3x - 7 = \frac{4x}{5} - 9$ | $2x + \frac{2}{3} = 3(x + 4)$ | 8 |
| 9 | $-2x + \frac{3}{2} = 2x + 4$ | $\frac{x}{6} - 7 = -4x - 2$ | $-3x - \frac{4}{5} = -2(x + 3)$ | 9 |
| 10 | $3x - \frac{7}{4} = 4x - 3$ | $4x + 4 = \frac{-x}{9} + 9$ | $-x + \frac{6}{4} = 3(x + 5)$ | 10 |
| 11 | $-4x + \frac{5}{3} = -5x + 1$ | $-5x - 8 = \frac{-2x}{5} - 20$ | $3(x - 3) = 4x - \frac{2}{2}$ | 11 |
| 12 | $-4x - \frac{7}{3} = -2x + 1$ | $\frac{4x}{5} - 3 = -4x - 75$ | $3x + \frac{5}{3} = -3(x - 1)$ | 12 |
| 13 | $2x + \frac{3}{5} = -5x + 7$ | $\frac{-x}{7} - 3 = -2x - 2$ | $2x - \frac{7}{9} = 1(x - 5)$ | 13 |
| 14 | $-x - 7 = x + \frac{5}{2}$ | $2x + 3 = \frac{3x}{4} + 4$ | $2x - \frac{7}{4} = -(x - 7)$ | 14 |
| 15 | $-3x + 3 = -2x - \frac{3}{8}$ | $-3x + 7 = \frac{x}{3} + 7$ | $5x + \frac{4}{7} = -2(3x1)$ | 15 |
| 16 | $-3x - 7 = x + \frac{7}{9}$ | $\frac{2x}{5} + 7 = x + 3$ | $3x - \frac{5}{4} = -4(x + 13)$ | 16 |
| 17 | $-x + \frac{4}{6} = 5x - 5$ | $-4x + 9 = \frac{x}{4}$ | $3x + \frac{6}{2} = -2(x + 10)$ | 17 |
| 18 | $13x + 2 = \frac{2x}{5}$ | $\frac{x}{7} + 1 = -4x$ | $(x - \frac{1}{2}) = -2x - 8$ | 18 |
| 19 | $\frac{13x}{5} = 2x - 15$ | $\frac{x}{3} + 1 = +\frac{4}{7}$ | $5(x - 2) = 4x - \frac{6}{4}$ | 19 |

# module VI

Équations complexes et à deux inconnues

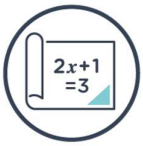

**niv.1 :** Résous les équations complexes fractionnaires.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | $\frac{15x-5}{10} = 3x + 2$ | $\frac{6x-3}{4} - 1 = \frac{2x-1}{2}$ | $\frac{6x+5}{2} = \frac{5x}{4}$ | 1 |
| 2 | $\frac{5x-3}{6} = 4 - x$ | $\frac{x-1}{2} = \frac{2x+3}{5}$ | $\frac{8x-6}{3} = \frac{7x-3}{4}$ | 2 |
| 3 | $\frac{x+2}{7} = 5x + 1$ | $\frac{x-3}{2} = \frac{3+5x}{5}$ | $\frac{9x}{10} - 2 = \frac{-9}{3}$ | 3 |
| 4 | $\frac{x+3}{9} = 6x - 7$ | $\frac{x-1}{3} = \frac{2x+1}{5}$ | $\frac{x-1}{2} = \frac{2x+3}{5}$ | 4 |
| 5 | $\frac{x-5}{2} = 4x - 4$ | $\frac{7x+5}{4} = 9x - 6$ | $\frac{2x+3}{4} = \frac{2-x}{3}$ | 5 |
| 6 | $\frac{4x-9}{8} = 3x - 5$ | $\frac{7x-7}{24} = x + 3$ | $\frac{x-3}{2} = \frac{3+5x}{5}$ | 6 |
| 7 | $\frac{7x-7}{24} = x + 3$ | $\frac{4x-3}{6} = \frac{5x+1}{5}$ | $\frac{-1}{7} = \frac{3x+3}{2}$ | 7 |
| 8 | $\frac{5x-9}{2} = 7x - 8$ | $\frac{13x-5}{2} = \frac{15x}{5}$ | $\frac{x}{4} + 2 = 3x + \frac{5}{8}$ | 8 |
| 9 | $\frac{15x}{4} = 2x - 5$ | $\frac{4x-9}{3} = \frac{9x+3}{4}$ | $\frac{2x+2}{4} - \frac{2x+3}{2} = \frac{1}{2}$ | 9 |
| 10 | $\frac{x}{3} + \frac{x-1}{2} = \frac{1}{3}$ | $\frac{3x}{14} = \frac{8x+1}{3}$ | $\frac{11}{22} + 3x = \frac{6x}{4}$ | 10 |
| 11 | $\frac{x}{4} + 3 = 3x + \frac{1}{4}$ | $\frac{8x+6}{3} = \frac{11x}{2}$ | $\frac{4x-3}{6} = \frac{5x+1}{5}$ | 11 |
| 12 | $\frac{x}{5} - \frac{1-2x}{3} = x - \frac{x+3}{2}$ | $\frac{3x-5}{4} = \frac{7x}{9}$ | $\frac{13x}{4} = \frac{x+2}{5} + 1$ | 12 |
| 13 | $\frac{3+x}{2} - \frac{3+x}{3} = 2x - \frac{1}{6}$ | $\frac{5x-7}{2} = \frac{4x}{5}$ | $\frac{13x-5}{2} = \frac{15x}{5}$ | 13 |
| 14 | $\frac{2x-1}{3} = 5 - \frac{x-1}{2}$ | $\frac{3x+5}{12} = \frac{x}{7}$ | $\frac{8x-6}{3} = \frac{7x-3}{4}$ | 14 |
| 15 | $\frac{4x-6}{3} = \frac{4x-3}{4}$ | $\frac{3x}{4} + 2 = \frac{-5}{3}$ | $\frac{3x+5}{12} = \frac{x}{7}$ | 15 |
| 16 | $\frac{21x-9}{3} = \frac{8x+4}{16}$ | $\frac{2x}{5} + 2 = \frac{4}{8}$ | $\frac{8x+6}{3} = \frac{11x}{2}$ | 16 |
| 17 | $\frac{6x+6}{6} = 4x + 2$ | $\frac{21x-9}{3} = \frac{8x+4}{16}$ | $\frac{x-1}{3} = \frac{2x+1}{5}$ | 17 |



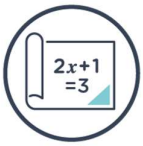

niv.2 : Résous les équations à 2 inconnues par substitution simple.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | $\begin{cases} 2x = -18 \\ -7x + 4y = 67 \end{cases}$ | $\begin{cases} -5x = 5 \\ 6x - 2y = 10 \end{cases}$ | $\begin{cases} -8x - 10y = -124 \\ -5y = -30 \end{cases}$ | 1 |
| 2 | $\begin{cases} 4x - y = 44 \\ -3y = 24 \end{cases}$ | $\begin{cases} -x + 8y = 15 \\ -5x = 35 \end{cases}$ | $\begin{cases} 7x - 5y = -31 \\ -8y = 40 \end{cases}$ | 2 |
| 3 | $\begin{cases} 5y = 40 \\ -4x + 4y = 48 \end{cases}$ | $\begin{cases} -3x - 9y = 48 \\ 5y = -35 \end{cases}$ | $\begin{cases} 6x = -48 \\ 9x + 9y = -36 \end{cases}$ | 3 |
| 4 | $\begin{cases} 3x - 5y = 15 \\ 6y = 0 \end{cases}$ | $\begin{cases} -8y = -48 \\ 7x - 9y = -75 \end{cases}$ | $\begin{cases} 3x = -15 \\ -3x - 5y = 60 \end{cases}$ | 4 |
| 5 | $\begin{cases} -x = 1 \\ 4x + 9y = 41 \end{cases}$ | $\begin{cases} 7x + 4y = -48 \\ -2x = 8 \end{cases}$ | $\begin{cases} -4x = 0 \\ -10x + 9y = 27 \end{cases}$ | 5 |
| 6 | $\begin{cases} 2x - 9y = -56 \\ -6y = -36 \end{cases}$ | $\begin{cases} -4x = 24 \\ -3x - 2y = 30 \end{cases}$ | $\begin{cases} 4x + 3y = 14 \\ 2x = 16 \end{cases}$ | 6 |
| 7 | $\begin{cases} 9x + 2y = 9 \\ -3y = 0 \end{cases}$ | $\begin{cases} 4x + 2y = -12 \\ -8y = 64 \end{cases}$ | $\begin{cases} 7x + 5y = -80 \\ -8y = 72 \end{cases}$ | 7 |
| 8 | $\begin{cases} -7x + 4y = -8 \\ 5y = -45 \end{cases}$ | $\begin{cases} -3y = 12 \\ 2x - 9y = 48 \end{cases}$ | $\begin{cases} 5x - 9y = 74 \\ 9x = 36 \end{cases}$ | 8 |
| 9 | $\begin{cases} 10x - 10y = 80 \\ -4y = 4 \end{cases}$ | $\begin{cases} 10x = -90 \\ 6x - 8y = -86 \end{cases}$ | $\begin{cases} -10x + 5y = 30 \\ -2y = 0 \end{cases}$ | 9 |
| 10 | $\begin{cases} 7x - 6y = 38 \\ -8y = -24 \end{cases}$ | $\begin{cases} 3x + 8y = 81 \\ 9x = 27 \end{cases}$ | $\begin{cases} -x - 3y = 15 \\ 3y = -9 \end{cases}$ | 10 |




niv.2 : Résous les équations à 2 inconnues par substitution simple.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 11 | $\begin{cases} 2x = 4 \\ -2x + 8y = -76 \end{cases}$ | $\begin{cases} -3x - 5y = -38 \\ -10y = -40 \end{cases}$ | $\begin{cases} 3x = 0 \\ 9x - 2y = 12 \end{cases}$ | 11 |
| 12 | $\begin{cases} -6x - 5y = 57 \\ 2y = -18 \end{cases}$ | $\begin{cases} 8x = 40 \\ 6x + 4y = 30 \end{cases}$ | $\begin{cases} -9x = -9 \\ -4x - 2y = 10 \end{cases}$ | 12 |
| 13 | $\begin{cases} -7y = -14 \\ -4x + 2y = -28 \end{cases}$ | $\begin{cases} 9x = -54 \\ -10x - 4y = 20 \end{cases}$ | $\begin{cases} 7x = -56 \\ 5x - y = -39 \end{cases}$ | 13 |
| 14 | $\begin{cases} 4x - 9y = 59 \\ 9y = -63 \end{cases}$ | $\begin{cases} -y = -3 \\ -4x + 6y = 18 \end{cases}$ | $\begin{cases} 8y = 24 \\ -10x + 6y = -52 \end{cases}$ | 14 |
| 15 | $\begin{cases} 8x = 16 \\ -3x + 7y = -6 \end{cases}$ | $\begin{cases} -8x - 4y = 80 \\ -3x = 21 \end{cases}$ | $\begin{cases} -3x = 3 \\ -5x - 10y = -5 \end{cases}$ | 15 |
| 16 | $\begin{cases} 10x - y = 87 \\ 6x = 48 \end{cases}$ | $\begin{cases} -5x + 5y = 15 \\ -2x = -6 \end{cases}$ | $\begin{cases} -3x + 6y = -48 \\ 8y = -48 \end{cases}$ | 16 |
| 17 | $\begin{cases} -8x + 8y = 40 \\ 5y = 35 \end{cases}$ | $\begin{cases} -y = 10 \\ 2x - 8y = 72 \end{cases}$ | $\begin{cases} 6y = -42 \\ 9x - 2y = -13 \end{cases}$ | 17 |
| 18 | $\begin{cases} 2x = 4 \\ 5x - 6y = 40 \end{cases}$ | $\begin{cases} 4x = -12 \\ 7x + 8y = 43 \end{cases}$ | $\begin{cases} -7x - 3y = -76 \\ -8y = -72 \end{cases}$ | 18 |
| 19 | $\begin{cases} -2y = 14 \\ -10x + 7y = -109 \end{cases}$ | $\begin{cases} -9x + 3y = -3 \\ 2x = 4 \end{cases}$ | $\begin{cases} -x - 3y = 18 \\ 2y = -8 \end{cases}$ | 19 |
| 20 | $\begin{cases} 6x = 48 \\ 6x + 3y = 75 \end{cases}$ | $\begin{cases} -9x = 36 \\ -10x - 9y = 22 \end{cases}$ | $\begin{cases} 8y = -40 \\ 8x - 6y = -18 \end{cases}$ | 20 |




niv.2 : Résous les équations à 2 inconnues par substitution simple.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 21 | $\begin{cases} 3x + 6y = 27 \\ 2y = 8 \end{cases}$ | $\begin{cases} 10x = -60 \\ -6x - 5y = 16 \end{cases}$ | $\begin{cases} 7x - 4y = -4 \\ 5x = 0 \end{cases}$ | 21 |
| 22 | $\begin{cases} 2y = 2 \\ 3x + 8y = -4 \end{cases}$ | $\begin{cases} -x + 9y = 53 \\ 8x = 8 \end{cases}$ | $\begin{cases} -2x - 4y = -48 \\ -9y = -72 \end{cases}$ | 22 |
| 23 | $\begin{cases} -9x - 6y = -69 \\ 3x = 27 \end{cases}$ | $\begin{cases} -10x - 9y = -107 \\ -7x = -56 \end{cases}$ | $\begin{cases} -5y = -30 \\ -6x + 4y = 18 \end{cases}$ | 23 |
| 24 | $\begin{cases} -5x - 10y = 135 \\ 9x = -63 \end{cases}$ | $\begin{cases} -x - 7y = -19 \\ -5y = -15 \end{cases}$ | $\begin{cases} 9y = -36 \\ 9x + 2y = -44 \end{cases}$ | 24 |
| 25 | $\begin{cases} 4x - 4y = 0 \\ 2y = -6 \end{cases}$ | $\begin{cases} -3x - 2y = -21 \\ 3x = 9 \end{cases}$ | $\begin{cases} -5x = -20 \\ -9x - 9y = -36 \end{cases}$ | 25 |
| 26 | $\begin{cases} -2y = -6 \\ 6x - 5y = -39 \end{cases}$ | $\begin{cases} 2x + 8y = -14 \\ -7x =- 35 \end{cases}$ | $\begin{cases} -6x + 6y = 12 \\ -7y = -7 \end{cases}$ | 26 |
| 27 | $\begin{cases} -2x = -12 \\ 2x - 9y = 30 \end{cases}$ | $\begin{cases} -9y = 54 \\ -9x - 9y = 108 \end{cases}$ | $\begin{cases} 2x + 5y = -10 \\ 2y = -12 \end{cases}$ | 27 |
| 28 | $\begin{cases} -4y = -28 \\ 7x + 2y = 0 \end{cases}$ | $\begin{cases} -9y = 54 \\ -4x - 10y = 76 \end{cases}$ | $\begin{cases} -7x = 56 \\ -9x + 4y = 44 \end{cases}$ | 28 |
| 29 | $\begin{cases} -5x = 5 \\ -4x + 7y = 67 \end{cases}$ | $\begin{cases} -x - 8y = 57 \\ -10x = 90 \end{cases}$ | $\begin{cases} 4x + 4y = 56 \\ 2y = 20 \end{cases}$ | 29 |
| 30 | $\begin{cases} 7y = -21 \\ 8x + 6y = 14 \end{cases}$ | $\begin{cases} 7x = 28 \\ 3x - y = 9 \end{cases}$ | $\begin{cases} -7x = 28 \\ 4x + 7y = -44 \end{cases}$ | 30 |


niv.3 : Résous les équations à 2 inconnues par substitution simple ou combinaison.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 1 | $\begin{cases} -8x - 7y = -86 \\ -6x + 8y = -38 \end{cases}$ | $\begin{cases} -3x - 3y = -36 \\ x - 2y = 3 \end{cases}$ | $\begin{cases} -3x - 5y = -33 \\ -x - 5y = -31 \end{cases}$ | 1 |
| 2 | $\begin{cases} 7x + 3y = -15 \\ 4x - 9y = -30 \end{cases}$ | $\begin{cases} -4x - 2y = -36 \\ -x + y = 0 \end{cases}$ | $\begin{cases} 3x + y = 32 \\ -x - 4y = -40 \end{cases}$ | 2 |
| 3 | $\begin{cases} -x + 4y = 20 \\ -2x - 8y = -40 \end{cases}$ | $\begin{cases} -4x - 5y = -85 \\ x -2y = -8 \end{cases}$ | $\begin{cases} -x + 3y = -26 \\ -x + 2y = -19 \end{cases}$ | 3 |
| 4 | $\begin{cases} 9x + 4y = -15 \\ 3x - y = -12 \end{cases}$ | $\begin{cases} x + 4y = -34 \\ -4x + 3y = -19 \end{cases}$ | $\begin{cases} 4x + y = -25 \\ 2x - y = -17 \end{cases}$ | 4 |
| 5 | $\begin{cases} 6x - 9y = -87 \\ -5x - 9y = -10 \end{cases}$ | $\begin{cases} -x - 5y = -54 \\ -4x + 4y = 24 \end{cases}$ | $\begin{cases} x + 4y = -9 \\ 4x - y = -19 \end{cases}$ | 5 |
| 6 | $\begin{cases} 9x + 2y = 72 \\ -x + 4y = -46 \end{cases}$ | $\begin{cases} -4x + y = -29 \\ -x - 3y = -30 \end{cases}$ | $\begin{cases} -4x - 2y = -2 \\ 3x + y = 0 \end{cases}$ | 6 |
| 7 | $\begin{cases} -2x + 7y = -39 \\ -9x - 4y = 2 \end{cases}$ | $\begin{cases} 2x - 4y = 0 \\ x - 2y = 0 \end{cases}$ | $\begin{cases} -3x - 4y = 51 \\ -x - y = 15 \end{cases}$ | 7 |
| 8 | $\begin{cases} -x - 8y = -26 \\ 7x - 5y = -62 \end{cases}$ | $\begin{cases} 2x - 4y = 34 \\ -x - 4y = 37 \end{cases}$ | $\begin{cases} 2x - y = -2 \\ 3x + 2y = -3 \end{cases}$ | 8 |
| 9 | $\begin{cases} -9x - 7y = -65 \\ 9x + 10y = 89 \end{cases}$ | $\begin{cases} 3x - y = 28 \\ 4x + 4y = -16 \end{cases}$ | $\begin{cases} -x + 3y = -22 \\ -2x + 2y = -12 \end{cases}$ | 9 |
| 10 | $\begin{cases} 5x - 9y = 108 \\ -3x - 10y = 43 \end{cases}$ | $\begin{cases} 2x - 4y = -10 \\ -5x + y = -29 \end{cases}$ | $\begin{cases} 5x + 2y =- 19 \\ 5x - y = 2 \end{cases}$ | 10 |


niv.3 : Résous les équations à 2 inconnues par substitution simple ou combinaison.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 11 | $\begin{cases} 10x = -60 \\ -6x - 5y = 16 \end{cases}$ | $\begin{cases} -x - 4y = 24 \\ x - 4y = 24 \end{cases}$ | $\begin{cases} -5x - 2y = -50 \\ -x - 2y = -26 \end{cases}$ | 11 |
| 12 | $\begin{cases} -x + 9y = 53 \\ 8x = 8 \end{cases}$ | $\begin{cases} -x - y = -11 \\ -4x + 2y = -2 \end{cases}$ | $\begin{cases} -5x + 4y = 29 \\ -x + 4y = 9 \end{cases}$ | 12 |
| 13 | $\begin{cases} -10x - 9y = -107 \\ -7x = -56 \end{cases}$ | $\begin{cases} -x - y = 0 \\ 2x + 5y = 27 \end{cases}$ | $\begin{cases} -4x - y = 24 \\ -3x - 2y = 8 \end{cases}$ | 13 |
| 14 | $\begin{cases} -x - 7y = -19 \\ -5y = -15 \end{cases}$ | $\begin{cases} -x + y = 4 \\ 2x - 2y = -8 \end{cases}$ | $\begin{cases} -2x - y = -14 \\ x + 2y = 1 \end{cases}$ | 14 |
| 15 | $\begin{cases} -3x - 2y = -21 \\ 3x = 9 \end{cases}$ | $\begin{cases} 2x + 4y = 10 \\ x + 4y = 19 \end{cases}$ | $\begin{cases} -3x - 3y = 3 \\ 3x - y = -23 \end{cases}$ | 15 |
| 16 | $\begin{cases} 2x + 8y = -14 \\ -7x = -35 \end{cases}$ | $\begin{cases} 3x - 3y = 27 \\ -x - 3y = -1 \end{cases}$ | $\begin{cases} -x - 5y = 24 \\ -3x - 5y = 12 \end{cases}$ | 16 |
| 17 | $\begin{cases} -9y = 54 \\ -9x - 9y = 108 \end{cases}$ | $\begin{cases} -x - 2y = -13 \\ -5x - 4y = -23 \end{cases}$ | $\begin{cases} -3x + 2y = -22 \\ x - 4y = 4 \end{cases}$ | 17 |
| 18 | $\begin{cases} -9y = 54 \\ -4x - 10y = 76 \end{cases}$ | $\begin{cases} -x - 4y = -17 \\ 3x + 3y = 33 \end{cases}$ | $\begin{cases} -x - 5y = -54 \\ 5x - 3y = -10 \end{cases}$ | 18 |
| 19 | $\begin{cases} -x - 8y = 57 \\ -10x = 90 \end{cases}$ | $\begin{cases} 5x + y = -33 \\ -5x - y = 33 \end{cases}$ | $\begin{cases} 2x - 3y = -6 \\ -5x + y = -11 \end{cases}$ | 19 |
| 20 | $\begin{cases} 7x = 28 \\ 3x - y = 9 \end{cases}$ | $\begin{cases} -4x + 4y = 60 \\ -x + 3y = 29 \end{cases}$ | $\begin{cases} -5x + 2y = -37 \\ x - 5y = 12 \end{cases}$ | 20 |


niv.3 : Résous les équations à 2 inconnues par substitution simple ou combinaison.

| | colonne 1 | colonne 2 | colonne 3 | |
|---|---|---|---|---|
| 21 | $\begin{cases} 6x - 7y = -88 \\ -10x + 7y = 128 \end{cases}$ | $\begin{cases} -8x + 4y = 12 \\ 7x - 7y = 7 \end{cases}$ | $\begin{cases} -3x + 5y = -7 \\ -7x + 5y = -3 \end{cases}$ | 21 |
| 22 | $\begin{cases} -9x + 10y = -58 \\ -3x - 4y = 10 \end{cases}$ | $\begin{cases} 7x - y = 47 \\ 3x + 4y = 29 \end{cases}$ | $\begin{cases} 3x - 3y = 9 \\ -6x + 6y = -18 \end{cases}$ | 22 |
| 23 | $\begin{cases} -10x - 6y = -58 \\ -4x - 8y = -68 \end{cases}$ | $\begin{cases} -x + 2y = 24 \\ -9x + 3y = 96 \end{cases}$ | $\begin{cases} -9x - 8y = 37 \\ 5x - 3y = 39 \end{cases}$ | 23 |
| 24 | $\begin{cases} 4x + 9y = -40 \\ -8x - 5y = 28 \end{cases}$ | $\begin{cases} -9x - 5y = -61 \\ 7x + 4y = 47 \end{cases}$ | $\begin{cases} 5x + 8y = 46 \\ -8x - 4y = -56 \end{cases}$ | 24 |
| 25 | $\begin{cases} -4x - 9y = 90 \\ 2x + 2y = -30 \end{cases}$ | $\begin{cases} 5x + 4y = -40 \\ -4x + 5y = -50 \end{cases}$ | $\begin{cases} 9x + 3y = 48 \\ 6x + 2y = 32 \end{cases}$ | 25 |
| 26 | $\begin{cases} -8x - 7y = 46 \\ -x - 2y = 8 \end{cases}$ | $\begin{cases} -8x + 6y = 80 \\ -7x + 2y = 57 \end{cases}$ | $\begin{cases} -5x + 5y = 50 \\ -8x - 9y = 29 \end{cases}$ | 26 |
| 27 | $\begin{cases} -x + 4y = 7 \\ 9x + 7y = 23 \end{cases}$ | $\begin{cases} 8x + 7y = -4 \\ -x + 9y = -39 \end{cases}$ | $\begin{cases} -x + 5y = 4 \\ 5x + 2y = -20 \end{cases}$ | 27 |
| 28 | $\begin{cases} -10x + 2y = -48 \\ -10x + 6y = -44 \end{cases}$ | $\begin{cases} -9x + 3y = -54 \\ 2x + 3y = 23 \end{cases}$ | $\begin{cases} -x - 2y = -22 \\ -7x + 5y = -2 \end{cases}$ | 28 |
| 29 | $\begin{cases} -3x - y = -21 \\ -x - 5y = -21 \end{cases}$ | $\begin{cases} -5x - 6y = 51 \\ 3x - 8y = -19 \end{cases}$ | $\begin{cases} 10x - 9y = 108 \\ 7x + 9y = 45 \end{cases}$ | 29 |
| 30 | $\begin{cases} -x - 6y = -35 \\ -4x - y = 21 \end{cases}$ | $\begin{cases} -3x - 3y = 27 \\ -6x - 5y = 48 \end{cases}$ | $\begin{cases} -4x - 6y = 0 \\ 5x + 9y = -9 \end{cases}$ | 30 |