

Chapitre 4 : Systèmes d'équations

1 Méthodes de résolution

- 1 Méthode de comparaison**
- 2 Méthode de substitution**
- 3 Méthode des combinaisons linéaires**

cf.script

$$13 \quad \begin{cases} \frac{5(x+y)}{3} = 15 \\ x - 2y = -3 \end{cases}$$

$$14 \quad \begin{cases} 2x + y + 7 = -7 - 3y \\ 4x + 4y + 4 = x - 7 \end{cases}$$

$$15 \quad \begin{cases} \frac{x+y}{2} = \frac{x-y}{3} \\ x + 4y = -\frac{1}{2} \end{cases}$$

$$16 \quad \begin{cases} \frac{1}{x} + \frac{1}{y} = \frac{7}{12} \\ \frac{1}{x} - \frac{1}{y} = -\frac{1}{12} \end{cases}$$

$$17 \quad \begin{cases} \frac{1}{x+1} + \frac{1}{y-2} = \frac{7}{12} \\ \frac{1}{x+1} - \frac{1}{y-2} = -\frac{1}{2} \end{cases}$$

$$18 \quad \begin{cases} x + \frac{8}{y-1} = -3 \\ -2x + \frac{12}{y-1} = -3 \end{cases}$$

$$19 \quad \begin{cases} \frac{7}{x} + \frac{4}{y} = \frac{1}{2} \\ \frac{3}{x} - \frac{5}{y} = \frac{3}{14} \end{cases}$$

$$20 \quad \begin{cases} \frac{x+y}{xy} = \frac{3}{4} \\ \frac{x-y}{xy} = \frac{1}{4} \end{cases}$$

$$21 \quad \begin{cases} 2(x+2y) = 0 \\ -3(-y+3x) = 0 \end{cases}$$

$$22 \quad \begin{cases} \frac{x}{3} = 2y - 1 \\ 3 = 2y - x \end{cases}$$

$$23 \quad \begin{cases} \frac{x}{3} - 5y + 8 = \frac{x}{2} - 3 \\ \frac{y}{2} - \frac{x}{3} + 4 = y + 1 \end{cases}$$

$$(17) \begin{cases} \frac{1}{x+1} + \frac{1}{y-2} = \frac{7}{12} \\ \frac{1}{x+1} - \frac{1}{y-2} = -\frac{1}{2} \end{cases} \quad \text{et } (x; y) \in \mathbb{R} - \{-1\} \times \mathbb{R} - \{2\}$$

$$\Leftrightarrow \begin{cases} t = \frac{1}{x+1} & \text{et } u = \frac{1}{y-2} \\ t + u = \frac{7}{12} \\ t - u = -\frac{1}{2} \end{cases} \quad \Leftrightarrow \begin{cases} t = \frac{1}{x+1} = \frac{1}{24} \\ u = \frac{1}{y-2} = -\frac{13}{24} \end{cases}$$

$$\Leftrightarrow \begin{cases} x = 23 \\ y = \frac{50}{13} \end{cases}$$

$$\Leftrightarrow (x; y) \in \left\{ \left(23 ; \frac{50}{13} \right) \right\}$$

$$\begin{aligned} & \frac{1}{y-2} = \frac{13}{24} \\ \Leftrightarrow & 24 = 13(y-2) \\ \Leftrightarrow & 24 = 13y - 26 \\ \Leftrightarrow & y = \frac{50}{13} \end{aligned}$$

✖ coin brico pour le 17

$$\begin{cases} t + u = \frac{7}{12} & | & 1 & | & 1 \\ t - u = -\frac{1}{2} & | & 1 & | & -1 \end{cases}$$

$$\Leftrightarrow \begin{cases} 2t + 0 \cdot u = \frac{1}{12} & \text{et } t = \frac{1}{24} \\ 0 \cdot t + 2u = \frac{13}{12} & \text{et } u = \frac{13}{24} \end{cases}$$

$$18 \quad \begin{cases} x + \frac{8}{y-1} = -3 \\ -2x + \frac{12}{y-1} = -3 \end{cases} \quad \text{et } (x; y) \in \mathbb{R} \times (\mathbb{R} - \{1\})$$

$$\Leftrightarrow \begin{cases} t = \frac{1}{y-1} \quad \text{et} \\ x + 8t = -3 & | 2 & | 3 \\ -2x + 12t = -3 & | 1 & | -2 \end{cases} \Leftrightarrow \begin{cases} t = \frac{1}{y-1} \quad \text{et} \\ 0 \cdot x + 28t = -9 \\ 7 \cdot x + 0 \cdot t = -3 \end{cases}$$

$$\Leftrightarrow \begin{cases} t = \frac{1}{y-1} = \frac{-9}{28} \\ x = \frac{-3}{7} \end{cases} \Leftrightarrow \begin{cases} y = \frac{-19}{9} \\ x = \frac{-3}{7} \end{cases} \quad \left| \begin{array}{l} \frac{1}{y-1} = \frac{-9}{28} \\ \Leftrightarrow 28 = -9y + 9 \\ \Leftrightarrow y = \frac{-19}{9} \end{array} \right.$$

$$\Leftrightarrow (x; y) \in \left\{ \left(\frac{-3}{7} ; \frac{-19}{9} \right) \right\}$$

$$20 \quad \begin{cases} \frac{x+y}{xy} = \frac{3}{4} \\ \frac{x-y}{xy} = \frac{1}{4} \end{cases} \quad \text{et } (x; y) \in \mathbb{R}^* \times \mathbb{R}^*$$

$$\Leftrightarrow \begin{cases} \frac{1}{x} + \frac{1}{y} = \frac{3}{4} \\ \frac{1}{y} - \frac{1}{x} = \frac{1}{4} \end{cases} \Leftrightarrow \begin{cases} t = \frac{1}{y} & \text{et } u = \frac{1}{x} \\ t + u = \frac{3}{4} \\ t - u = \frac{1}{4} \end{cases} \left| \begin{array}{l} 1 \\ 1 \end{array} \right| \begin{array}{l} 1 \\ -1 \end{array}$$

$$\Leftrightarrow \begin{cases} t = \frac{1}{y} & \text{et } u = \frac{1}{x} \\ 2t = 1 & \text{et } t = \frac{1}{2} \\ 2u = \frac{1}{2} & \text{et } u = \frac{1}{4} \end{cases} \Leftrightarrow \begin{cases} t = \frac{1}{y} = \frac{1}{2} & \text{et } y = 2 \\ u = \frac{1}{x} = \frac{1}{4} & \text{et } x = 4 \end{cases}$$

$$\Leftrightarrow (x; y) \in \{(4; 2)\}$$

$$(22) \begin{cases} \frac{x}{3} = 2y - 1 \\ 3 = 2y - x \end{cases} \quad \text{et } (x; y) \in \mathbb{R} \times \mathbb{R} \\ \mathbb{R}^2$$

$$\Leftrightarrow \begin{cases} x - 6y = -3 & | \quad 1 \\ x - 2y = -3 & | \quad -1 \end{cases}$$

$$\Leftrightarrow \begin{cases} 0 \cdot x - 4y = 0 & \text{et } y = 0 \\ x = -3 \end{cases} \Leftrightarrow (x; y) \in \{(-3; 0)\}$$