

Exercice 1 : Utiliser les identités remarquables

Résoudre les équations suivantes :

1. $(x - 5)^2 - 4x^2 = 0$

2. $\frac{1}{4}x^2 - 4x + 16 = 0$

$$\begin{aligned} 1. (x - 5)^2 - 4x^2 = 0 &\iff (x - 5)^2 - (2x)^2 = 0 \\ &\iff (x - 5 + 2x)(x - 5 - 2x) = 0 \\ &\iff (3x - 5)(-x - 5) = 0 \\ &\iff 3x - 5 = 0 \quad \text{ou} \quad -x - 5 = 0 \\ &\iff 3x = 5 \quad \text{ou} \quad -x = 5 \\ &\iff x = \frac{5}{3} \quad \text{ou} \quad x = -5 \end{aligned}$$

$$\text{Donc } \mathcal{S} = \left\{ -5 ; \frac{5}{3} \right\}.$$

$$\begin{aligned} 2. \frac{1}{4}x^2 - 4x + 16 = 0 &\iff \left(\frac{1}{2}x\right)^2 - 2 \times \frac{1}{2}x \times 4 + 4^2 = 0 \\ &\iff \left(\frac{1}{2}x - 4\right)^2 = 0 \\ &\iff \frac{1}{2}x - 4 = 0 \\ &\iff \frac{1}{2}x = 4 \\ &\iff 2 \times \frac{1}{2}x = 2 \times 4 \\ &\iff x = 8 \end{aligned}$$

$$\text{Donc } \mathcal{S} = \{8\}.$$