

Tous les résultats doivent être donnés simplifiés

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1. Simplifier : $\sqrt{45} = \sqrt{9 \times 5} = \sqrt{9} \times \sqrt{5} = \boxed{3\sqrt{5}}$

2. Ecrire sous la forme \sqrt{a} : $4\sqrt{2} = \sqrt{16} \times \sqrt{2} = \boxed{\sqrt{32}}$

3. Calculer et donner le résultat sous la forme la plus simple.

$$3\sqrt{2} \times 2\sqrt{5} = \boxed{6\sqrt{10}}$$

$$4\sqrt{5} + \sqrt{5} = \boxed{5\sqrt{5}}$$

$$(5\sqrt{3})^2 = 5^2 \times (\sqrt{3})^2 = 25 \times 3 = \boxed{75}$$

$$(2\sqrt{3})^3 = 2^3 \times (\sqrt{3})^3 = 8 \times (\sqrt{3})^2 \times \sqrt{3} = 8 \times 3\sqrt{3} = \boxed{24\sqrt{3}}$$

$$\frac{\sqrt{7^8}}{49} = \frac{7^4}{7^2} = 7^2 = \boxed{49}$$

$$\sqrt{3^7} = \sqrt{3^6 \times 3} = \sqrt{3^6} \times \sqrt{3} = 3^3 \times \sqrt{3} = \boxed{27\sqrt{3}}$$

$$2\sqrt{5}(\sqrt{5} - 3\sqrt{2}) = 2(\sqrt{5})^2 - 6\sqrt{10} = \boxed{10 - 6\sqrt{10}}$$

$$\frac{\sqrt{\frac{2}{7}}}{\sqrt{7}} = \frac{\sqrt{2}}{\sqrt{7}} = \frac{\sqrt{2}}{\sqrt{7}} \times \frac{1}{\sqrt{7}} = \frac{\sqrt{2}}{(\sqrt{7})^2} = \boxed{\frac{\sqrt{2}}{7}}$$

$$\begin{aligned} \sqrt{27} + \sqrt{75} &= \sqrt{9 \times 3} + \sqrt{25 \times 3} = \sqrt{9} \times \sqrt{3} + \sqrt{25} \times \sqrt{3} \\ &= 3\sqrt{3} + 5\sqrt{3} \\ &= \boxed{8\sqrt{3}} \end{aligned}$$

$$\sqrt{2\sqrt{16} + \sqrt{100}} = \sqrt{2 \times 4 + 10} = \sqrt{18} = \sqrt{9 \times 2} = \sqrt{9} \times \sqrt{2} = \boxed{3\sqrt{2}}$$

$$\begin{aligned} (\sqrt{7} - \sqrt{3})^2 &= (\sqrt{7})^2 - 2 \times \sqrt{7} \times \sqrt{3} + (\sqrt{3})^2 \\ &= 7 - 2\sqrt{21} + 3 \\ &= \boxed{10 - 2\sqrt{21}} \end{aligned}$$

$$\begin{aligned} 3 - (2\sqrt{2} + \sqrt{5})^2 &= 3 - \left((2\sqrt{2})^2 + 2 \times 2\sqrt{2} \times \sqrt{5} + (\sqrt{5})^2 \right) \\ &= 3 - (8 + 4\sqrt{10} + 5) \\ &= 3 - (13 + 4\sqrt{10}) \\ &= 3 - 13 - 4\sqrt{10} = \boxed{-10 - 4\sqrt{10}} \end{aligned}$$

4. Supprimer la racine carrée au dénominateur :

$$\frac{3}{\sqrt{11}} = \frac{3\sqrt{11}}{\sqrt{11} \times \sqrt{11}} = \boxed{\frac{3\sqrt{11}}{11}}$$

$$\begin{aligned} \frac{2}{4 - \sqrt{2}} &= \frac{2(4 + \sqrt{2})}{(4 - \sqrt{2})(4 + \sqrt{2})} = \frac{8 + 2\sqrt{2}}{4^2 - (\sqrt{2})^2} = \frac{8 + 2\sqrt{2}}{16 - 2} = \frac{8 + 2\sqrt{2}}{14} = \frac{2(4 + \sqrt{2})}{2 \times 7} \\ &= \boxed{\frac{4 + \sqrt{2}}{7}} \end{aligned}$$

5. Soit $f(x) = (x-1)(x^2+2)$ pour $x \in \mathbb{R}$.

a. Calculer $f(-\sqrt{2})$.

$$\begin{aligned} f(-\sqrt{2}) &= (-\sqrt{2} - 1)((-\sqrt{2})^2 + 2) \\ &= (-\sqrt{2} - 1)(4) \\ &= \boxed{-4\sqrt{2} - 4} \end{aligned}$$

b. Calculer $f(1 + \sqrt{3})$.

$$\begin{aligned} f(1 + \sqrt{3}) &= (1 + \sqrt{3} - 1)((1 + \sqrt{3})^2 + 2) \\ &= \sqrt{3}(1 + 2\sqrt{3} + 3 + 2) \\ &= \sqrt{3}(6 + 2\sqrt{3}) \\ &= 6\sqrt{3} + 2 \times 3 = \boxed{6\sqrt{3} + 6} \end{aligned}$$