

Exercice 1 :

Calculer :

$$1. A = (3 \times \sqrt{5})^2 = 9 \times 5 = \boxed{45}$$

$$2. B = (3 + \sqrt{5})^2 = 9 + 6\sqrt{5} + 5 = \boxed{14 + 6\sqrt{5}}$$

$$3. C = (3 - \sqrt{5})^2 = 9 - 6\sqrt{5} + 5 = \boxed{14 - 6\sqrt{5}}$$

$$4. D = \left(\frac{3}{\sqrt{5}}\right)^2 = \boxed{\frac{9}{5}}$$

$$5. E = 25 - (3(-2\sqrt{3}) + 4)^2 = 25 - (4 - 6\sqrt{3})^2 = 25 - (16 - 48\sqrt{3} + 108) = 25 - 124 + 48\sqrt{3} = \boxed{-99 + 48\sqrt{3}}$$

$$6. F = 25 - 5(-3\sqrt{2}) + 7(-3\sqrt{2})^2 = 25 + 15\sqrt{2} + 7 \times 18 = 25 + 15\sqrt{2} + 126 = \boxed{151 + 15\sqrt{2}}$$

Exercice 2 :

Exprimer les nombres sans racine carrée au dénominateur :

$$1. G = \frac{2 + \sqrt{5}}{\sqrt{2}} = \frac{(2 + \sqrt{5})\sqrt{2}}{2} = \boxed{\frac{2\sqrt{2} + \sqrt{10}}{2}}$$

$$2. H = \frac{1}{\sqrt{3}} = \frac{1 \times \sqrt{3}}{3} = \boxed{\frac{\sqrt{3}}{3}}$$

$$3. I = \frac{1 + \sqrt{5}}{1 - \sqrt{5}} = \frac{(1 + \sqrt{5})^2}{(1 - \sqrt{5})(1 + \sqrt{5})} = \frac{1 + 2\sqrt{5} + 5}{1 - 5} = -\frac{6 + 2\sqrt{5}}{4} = -\frac{2(3 + \sqrt{5})}{4} = \boxed{-\frac{3 + \sqrt{5}}{2}}$$

$$4. J = \frac{3 - 2\sqrt{7}}{3 + 2\sqrt{7}} = \frac{(3 - 2\sqrt{7})^2}{(3 + 2\sqrt{7})(3 - 2\sqrt{7})} = \frac{9 - 12\sqrt{7} + 28}{9 - 28} = \boxed{-\frac{37 - 12\sqrt{7}}{19}}$$

$$5. x^{-2} = \frac{1}{x^2}$$

$$x^2 = \left(\frac{1 - \sqrt{11}}{2}\right)^2 = \frac{1 - 2\sqrt{11} + 11}{4} = \frac{12 - 2\sqrt{11}}{4} = \frac{6 - \sqrt{11}}{2} \text{ Donc}$$

$$x^{-2} = \frac{1}{\left(\frac{1 - \sqrt{11}}{2}\right)^2} = \frac{1}{\frac{6 - \sqrt{11}}{2}} = \frac{2}{6 - \sqrt{11}}$$

Donc

$$x^{-2} = \frac{2(6 + \sqrt{11})}{(6 - \sqrt{11})(6 + \sqrt{11})} = \frac{12 + 2\sqrt{11}}{36 - 11} = \boxed{-\frac{12 + 2\sqrt{11}}{25}}$$