

Exercice 1

$$A = (\sqrt{7})^2 = 7$$

$$B = -(\sqrt{11})^3 = -(\sqrt{11})^2 \sqrt{11} = -11\sqrt{11}$$

$$C = (2\sqrt{5})^2 = 2^2 \times \sqrt{5}^2 = 4 \times 5 = 20$$

$$D = \left(\frac{\sqrt{36}}{\sqrt{9}}\right)^3 = \left(\sqrt{\frac{36}{9}}\right)^3 = (\sqrt{4})^3 = 2^3 = 8$$

$$E = -5\sqrt{3} \times 2\sqrt{3} = -10(\sqrt{3})^2 = -10 \times 3 = -30$$

$$F = -7\sqrt{3} + 8\sqrt{75} = -7\sqrt{3} + 8\sqrt{25 \times 3} = -7\sqrt{3} + 8 \times 5\sqrt{3} = -7\sqrt{3} + 40\sqrt{3} = 33\sqrt{3}$$

$$G = \left(\frac{\sqrt{2}}{\sqrt{3}}\right)^2 = \left(\sqrt{\frac{2}{3}}\right)^2 = \frac{2}{3}$$

$$H = (-2\sqrt{3})^2 + (5\sqrt{6})^2 = (-2)^2 \times (\sqrt{3})^2 + 5^2 \times (\sqrt{6})^2 = 4 \times 3 + 25 \times 6 = 12 + 150 = 162$$

Exercice 2

$$A = \sqrt{12} \times \sqrt{27} = \sqrt{4 \times 3} \times \sqrt{9 \times 3} = 2\sqrt{3} \times 3\sqrt{3} = 6 \times (\sqrt{3})^2 = 6 \times 3 = 18$$

$$B = \sqrt{5} \times \sqrt{45} \times \sqrt{125} = \sqrt{5} \times \sqrt{9 \times 5} \times \sqrt{25 \times 5} = \sqrt{5} \times 3\sqrt{5} \times 5\sqrt{5} = 15 \times (\sqrt{5})^2 \times \sqrt{5} = 75\sqrt{5}$$

$$C = 7\sqrt{48} \times \sqrt{3} = 7 \times \sqrt{16 \times 3} \times \sqrt{3} = 7 \times 4\sqrt{3} \times \sqrt{3} = 28 \times 3 = 84$$

$$D = \frac{\sqrt{120}}{\sqrt{3} \times \sqrt{20}} = \frac{\sqrt{120}}{\sqrt{60}} = \sqrt{\frac{120}{60}} = \sqrt{2}$$

Exercice 3

$$A = 4\sqrt{12} - 7\sqrt{27} - 11\sqrt{3} = 4\sqrt{4 \times 3} - 7\sqrt{9 \times 3} - 11\sqrt{3} = 8\sqrt{3} - 21\sqrt{3} - 11\sqrt{3} = -24\sqrt{3}$$

$$\begin{aligned} B &= 6\sqrt{20} - 11\sqrt{125} + 3\sqrt{80} \\ B &= 6\sqrt{4 \times 5} - 11\sqrt{25 \times 5} + 3\sqrt{16 \times 5} \\ B &= 6 \times 2\sqrt{5} - 11 \times 5\sqrt{5} + 3 \times 4\sqrt{5} \\ B &= 12\sqrt{5} - 55\sqrt{5} + 12\sqrt{5} \\ B &= -31\sqrt{5} \end{aligned}$$

Exercice 4

$$A = \frac{3\sqrt{36}}{\sqrt{2}} = 3\sqrt{\frac{36}{2}} = 3\sqrt{18} = 3\sqrt{9 \times 2} = 3 \times 3\sqrt{2} = 9\sqrt{2}$$

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$$A = \frac{3\sqrt{36}}{\sqrt{2}} = \frac{3 \times 6}{\sqrt{2}} = \frac{18}{\sqrt{2}} = \frac{18 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{18\sqrt{2}}{2} = 9\sqrt{2}$$

$$B = \frac{\sqrt{14}}{2\sqrt{28}} = \frac{1}{2} \times \sqrt{\frac{14}{28}} = \frac{1}{2} \times \sqrt{\frac{1}{2}} = \frac{1}{2} \times \frac{1}{\sqrt{2}} = \frac{1}{2} \times \frac{1 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{\sqrt{2}}{2 \times 2} = \frac{\sqrt{2}}{4}$$

$$C = 7\sqrt{48} \times \frac{1}{\sqrt{3}} = 7 \times \sqrt{16 \times 3} \times \frac{1}{\sqrt{3}} = 7 \times \sqrt{16} \times \sqrt{3} \times \frac{1}{\sqrt{3}} = 7 \times \sqrt{16} = 7 \times 4 = 28$$

$$D = \frac{\sqrt{80}}{\sqrt{5} \times \sqrt{20}} = \frac{\sqrt{20} \times \sqrt{4}}{\sqrt{5} \sqrt{20}} = \frac{2}{\sqrt{5}} = \frac{2 \times \sqrt{5}}{\sqrt{5} \times \sqrt{5}} = \frac{2\sqrt{5}}{5}$$

Exercice 5

$$A = \sqrt{\frac{25}{75}} = \frac{\sqrt{25}}{\sqrt{25 \times 3}} = \frac{\sqrt{25}}{\sqrt{25} \times \sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{1 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$B = \frac{100}{2\sqrt{50}} = \frac{100 \times \sqrt{50}}{2 \times (\sqrt{50})^2} = \frac{100 \times \sqrt{50}}{100} = \sqrt{50} = \sqrt{25 \times 2} = \sqrt{25} \times \sqrt{2} = 5\sqrt{2}$$

$$C = \sqrt{\frac{121}{169}} = \frac{\sqrt{121}}{\sqrt{169}} = \frac{11}{13}$$

$$D = \frac{3}{2\sqrt{6}} = \frac{3 \times \sqrt{6}}{2 \times (\sqrt{6})^2} = \frac{3\sqrt{6}}{12} = \frac{\sqrt{6}}{4}$$

$$E = \frac{1}{\sqrt{7}} = \frac{1 \times \sqrt{7}}{\sqrt{7} \times \sqrt{7}} = \frac{\sqrt{7}}{7}$$

$$F = \frac{\sqrt{2}}{\sqrt{8}} = \sqrt{\frac{2}{8}} = \sqrt{\frac{1}{4}} = \frac{1}{2}$$

Exercice 6

$$1. \quad R = \frac{\sqrt{(-9)^2}}{\sqrt{9}} = \frac{\sqrt{81}}{\sqrt{9}} = \sqrt{\frac{81}{9}} = \sqrt{9} = 3$$

$$2. \quad T = \sqrt{18} \times \sqrt{50} = \sqrt{9 \times 2} \times \sqrt{25 \times 2} = 3\sqrt{2} \times 5\sqrt{2} = 15(\sqrt{2})^2 = 15 \times 2 = 30 \in \mathbb{N}$$

$$3. \quad U = 3\sqrt{75} + 2\sqrt{48} = 3\sqrt{25 \times 3} + 2\sqrt{16 \times 3} = 3 \times 5\sqrt{3} + 2 \times 4\sqrt{3} = 15\sqrt{3} + 8\sqrt{3} = 23\sqrt{3}$$

$$4. \quad V = \frac{\sqrt{5}}{\sqrt{3}} = \frac{\sqrt{5}\sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{\sqrt{15}}{3}$$