

Racines et puissances

Exercice 1

$$\text{a) } c = \sqrt{200a^3b^2} = \sqrt{2 \cdot 100 \cdot a^2 \cdot a \cdot b^2} = 10ab\sqrt{2a}$$

$$\text{b) } a = \sqrt[3]{250a^9b^8} = \sqrt[3]{2 \cdot 125 \cdot a^9 \cdot b^6 \cdot b^2} = 5a^3b^2\sqrt[3]{2b^2}$$

Exercice 2

$$\text{a) } \|\vec{a}\| = \sqrt{100 + 25} = \sqrt{125} = 5\sqrt{5}$$

$$\begin{aligned} \text{b) } \vec{b} \cdot \vec{c} &= 2\sqrt{10} \cdot 3\sqrt{30} - \sqrt{33} \cdot \sqrt{11} = 6 \underbrace{\sqrt{10}\sqrt{10}}_{10} \sqrt{3} - \sqrt{3} \underbrace{\sqrt{11}\sqrt{11}}_{11} \\ &= 60\sqrt{3} - 11\sqrt{3} = 49\sqrt{3} \end{aligned}$$

Exercice 3

$$\text{a) } \sqrt{a^3} = \sqrt{a^2 \cdot a} = a\sqrt{a}$$

$$\text{b) } (3^3)^{\frac{2}{3}} = 3^2 = 9$$

$$\text{c) } b^{0,5} = \sqrt{b}$$

$$\text{d) } a^{\frac{7}{4}-\frac{1}{2}} = a^{\frac{5}{4}} = \sqrt[4]{a^5} = \sqrt[4]{a^4 \cdot a} = a\sqrt[4]{a}$$

$$\text{e) } (2^5)^{-\frac{3}{5}} = 2^{-3} = \frac{1}{2^3} = \frac{1}{8}$$

$$\text{f) } \left(x^{\frac{3}{10}}\right)^{\frac{4}{3}} = x^{\frac{2}{5}} = \sqrt[5]{x^2}$$

Exercice 4

$$\text{a) } \sqrt[11]{x^3} = x^{\frac{3}{11}}$$

$$\text{b) } \frac{y^{-5} \cdot \sqrt{y}}{y^{-2} \cdot \sqrt[5]{y^3}} = \frac{y^{-5} \cdot y^{\frac{1}{2}}}{y^{-2} \cdot y^{\frac{3}{5}}} = \frac{y^{-\frac{9}{2}}}{y^{-\frac{7}{5}}} = y^{-\frac{9}{2} + \frac{7}{5}} = y^{-\frac{31}{10}} = \frac{1}{y^{\frac{31}{10}}}$$

$$\text{c) } \sqrt{\frac{\sqrt{z} \cdot z^{-5}}{z^{-\frac{5}{7}}}} = \sqrt{\frac{z^{\frac{1}{2}} \cdot z^{-5}}{z^{-\frac{5}{7}}}} \sqrt{\frac{z^{-\frac{9}{2}}}{z^{-\frac{5}{7}}}} = \sqrt{z^{-\frac{9}{2} + \frac{5}{7}}} = \sqrt{z^{-\frac{53}{14}}} = \left(z^{-\frac{53}{14}}\right)^{\frac{1}{2}} = z^{-\frac{53}{28}} = \frac{1}{z^{\frac{53}{28}}}$$

Exercice 5

$$\text{a) } t = \frac{150 \cdot 10^6}{3 \cdot 10^5} = 50 \cdot 10^1 = 500 \text{ s} = 8 \text{ min } 20 \text{ s}$$

$$\text{b) } v = \frac{150 \cdot 10^6}{240 \cdot 24} = 26'041, \bar{6} \text{ km/h}$$