

18.09.25

4.1.2 Simplifier les expressions suivantes :

$$\text{g)} \quad 4^2 \cdot 2^5 \cdot 8^2 \quad \text{h)} \quad \left(\frac{3}{4}\right)^4 \div \left(\frac{9}{8}\right)^4 \quad \text{i)} \quad \frac{(3 \cdot 9 \cdot 27 \cdot 81)^5}{3^{50}}$$

$$\text{g)} \quad 2^4 \cdot 2^5 \cdot 2^6 = 2^{15}$$

$$8 = 2^3$$

$$\text{h)} \quad \frac{3^4}{4^4} \cdot \frac{8^4}{9^4} = \frac{3^4}{2^{\cancel{8}^4}} \cdot \frac{\cancel{2}^{12}^4}{3^8} = \frac{2^4}{3^4} = \left(\frac{2}{3}\right)^4$$

$$\text{i)} \quad \frac{(3 \cdot 3^2 \cdot 3^3 \cdot 3^4)^5}{3^{50}} = \frac{(3^{10})^5}{3^{50}} = \frac{3^{50}}{3^{50}} = 1$$

$$\begin{array}{l} a^x \cdot a^y = a^{x+y} \\ (a^x)^y = a^{xy} \\ a^x \cdot b^x = (ab)^x \end{array}$$

4.1.10 Simplifier les expressions suivantes :

a) $\sqrt[3]{\sqrt{7}}$ b) $\sqrt[3]{2^{18} \cdot 5^{12} \cdot 3^3}$ c) $\sqrt[4]{64} \cdot \sqrt[4]{4}$ d) $\sqrt[5]{3^{15}}$ e) $(\sqrt[8]{\sqrt[4]{\sqrt{2}}})^{128}$

f) $\sqrt{3\sqrt{3}}$ g) $\sqrt[3]{5\sqrt{5\sqrt{5}}}$ h) $\sqrt{2\sqrt{2}}$ i) $\sqrt[3]{3\sqrt[3]{3^4\sqrt[3]{3^6}}}$ j) $\sqrt[3]{2\sqrt[6]{\frac{2^{14}}{\sqrt[3]{2^6}}}}$

On utilise les puissances rationnelles.

a) $\left(\left(7^{\frac{1}{2}}\right)\right)^{\frac{1}{3}} = 7^{\frac{1}{6}} = \sqrt[6]{7}$

g) $\left(5 \left(5^1 \cdot 5^{\frac{1}{2}}\right)^{\frac{1}{2}}\right)^{\frac{1}{3}} = \left(5 \cdot \left(5^{\frac{3}{2}}\right)^{\frac{1}{2}}\right)^{\frac{1}{3}} = \left(5 \cdot 5^{\frac{3}{4}}\right)^{\frac{1}{3}} = \left(5^{\frac{7}{4}}\right)^{\frac{1}{3}} = 5^{\frac{7}{12}}$

$= \sqrt[12]{5^7}$

4, 1, 10

$$\text{i) } \sqrt[3]{3 \sqrt[3]{3^4 \sqrt[3]{3^6}}} = \sqrt[3]{3 \cdot \sqrt[3]{3^6}} = (3^3)^{\frac{1}{3}} \cdot 3$$

$3^{\frac{6}{3}} = 3^2$ 3^2

4.1,5

$$\text{i)} \quad \frac{1'280 \cdot 5^7 \cdot 125}{(0,2 \cdot 25)^3} = \frac{256 \cdot 5 \cdot 5^7 \cdot 5^3}{(5^{-1} \cdot 5^2)^3} = \frac{2^8 \cdot 5^{11}}{5^3} = 2^8 \cdot 5^8 = 10^8$$

$$5^{\frac{1}{4}} \cdot 5^{\frac{3}{4}}$$

$$\frac{\sqrt[4]{5^3}}{\sqrt[4]{5^3}}$$

$$4^{\frac{4}{7}} = (2^2)^{\frac{4}{7}} = 2^{\frac{8}{7}}$$

$$2^1 \cdot 2^{\frac{8}{7}} = 2^{\frac{15}{7}}$$

$$\text{d)} \quad \frac{1}{2 + \sqrt{3}} \cdot \frac{2 - \sqrt{3}}{2 - \sqrt{3}} = \frac{2 - \sqrt{3}}{4 - 3} = \frac{2 - \sqrt{3}}{1} = 2 - \sqrt{3}$$

$$(A+B)(A-B) = A^2 - B^2$$

4.1.6 Simplifier les expressions suivantes et écrivez-les sans fraction :

a) $x^2 y z^3 \cdot 3xy \cdot 27x^3 z^5$ b) $(2a^2 b^3 c)^4$ c) $\left(\frac{2r^3}{s}\right)^2 \cdot \left(\frac{s}{r}\right)^3$ d) $\frac{(4x^2 y^3)^5}{(2xy)^3} \div \frac{x^7}{(y^3)^4}$

e) $(u^{-2} v^3)^{-3}$ f) $\frac{8x^3 y^{-5}}{4x^{-1} y^2}$ g) $\left(\frac{x}{3}\right)^{-2} \div \left(\frac{x}{9}\right)^{-3}$ h) $\left(\frac{9y^3(3y^2)^{-2}}{(y^{-4})^{-3}}\right)^5$

a) $\underline{3^4} \underline{x^6} \underline{y^2} \underline{z^8}$

c) $\frac{4 \underline{r^6}}{\underline{s^2}} \cdot \frac{\underline{s^3}}{\underline{r^3}} = \frac{4 r^3 s}{1} = 4 r^3 s$

b) $2^4 a^8 b^{12} c^4$

d) $\frac{4^5 x^{10} y^{15}}{2^3 x^3 y^3} \cdot \frac{y^{12}}{x^7} = \frac{2^{10} x^{10} y^{27}}{2^3 x^{10} y^3} = 2^7 \cdot y^{24}$

e) $u^6 v^{-9}$ f) $\frac{2^3 x^3 y^{-5}}{2^2 x^{-1} y^2} = 2 x^4 y^{-7}$

g) $\frac{x^{-2}}{3^{-2}} \div \frac{x^{-3}}{3^{-6}} = \frac{x^{-2}}{3^{-2}} \cdot \frac{3^{-6}}{x^{-3}} = x \cdot 3^{-4} = 3^{-4} \cdot x$

h) $\left(\frac{9y^3(3y^2)^{-2}}{(y^{-4})^{-3}}\right)^5 = \left(\frac{3^2 y^3 \cdot 3^{-2} y^{-4}}{y^{12}}\right)^5 = \left(\frac{y^{-1}}{y^{12}}\right)^5 = \left(y^{-13}\right)^5 = y^{-65}$