Puissances à exposants rationnels (réelles)

fraction

$$\boxed{2^{\frac{m}{n}} = \sqrt[n]{2^m}}$$

Exemples :

$$2^{\frac{1}{2}} = \sqrt[2]{2^1}$$

$$4^{\frac{1}{2}} = \sqrt[2]{4^1} = \sqrt[2]{4} = 2$$

$$13^{\frac{4}{7}} = \sqrt[7]{13^4}$$

1.6 e) $(5x^2y^{-3})\cdot(4x^{-5}y^{-1})$

$$\boxed{a^m\cdot a^n = a^{m+n}}$$

$$a^{-n} = \frac{1}{a^n}$$

$$5\cdot x^2\cdot y^{-3}\cdot 4\cdot x^{-5}\cdot y^{-1} =$$

$$5\cdot 4(x^2\cdot x^{-5})(y^{-3}y^{-1}) =$$

$$20\ x^{2-5}y^{-3-1} = 20\ x^{-3}y^{-4} = 20\cdot\frac{1}{x^3}\cdot\frac{1}{y^4}$$

$$= \frac{20}{x^3y^4}$$

c) $\left(\frac{2}{3}x^3\right)^2\cdot\left(\frac{3}{2}x^2\right)^3 =$

$$(a\cdot b)^n = a^n\cdot b^n$$

$$(a^m)^n = a^{m\cdot n}$$

$$\left(\frac{2}{3}\right)^2\cdot(x^3)^2\cdot\left(\frac{3}{2}\right)^3\cdot(x^2)^3 =$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$\frac{2^2}{3^2}\cdot x^{3\cdot 2}\cdot\frac{3^3}{2^3}\cdot x^{2\cdot 3} =$$

$$\frac{\cancel{2}\cdot\cancel{2}\cdot\cancel{3}\cdot\cancel{3}\cdot 3}{\cancel{3}\cdot\cancel{3}\cdot\cancel{2}\cdot\cancel{2}\cdot 2}$$

$$\frac{\cancel{2^2}\cdot 3^3}{3^2\cdot\cancel{2^3}}\cdot\underbrace{x^6\cdot x^6} = 2^{-1}\cdot 3^1\cdot x^{6+6}$$

$$a^m\cdot a^n = a^{m+n}$$

$$\frac{2^2}{2^3}\cdot\frac{3^3}{3^2} = 2^{2-3}\cdot 3^{3-2}$$

$$= \frac{1}{2^1}\cdot 3\cdot x^{12}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$= \frac{3}{2}\cdot x^{12}$$

1 2 4 8 16

2^2 2^3

1 3 9 27

3^2

1.2 h)

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

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$= \frac{3^4}{4^4} \div \frac{(3^2)^4}{(2^3)^4}$$

$$(a^m)^n = a^{m\cdot n}$$

$$= \frac{3^4}{4^4} \div \frac{3^8}{2^{12}}$$

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b}\cdot\frac{d}{c}$$

$$= \frac{3^4}{4^4}\cdot\frac{2^{12}}{3^8} = \frac{3^4}{(2^2)^4}\cdot\frac{2^{12}}{3^8}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$= \frac{3^4}{3^8}\cdot\frac{2^{12}}{2^8}$$

$$a^{-n} = \frac{1}{a^n}$$

$$= 3^{4-8} \cdot 2^{12-8} = 3^{-4} \cdot 2^4$$

$$= \frac{2^4}{3^4}$$