

Fractions

$(a; b)$

$$\frac{a}{b}$$

$$\frac{a}{b} \pm \frac{c}{d} = \frac{ad \pm bc}{bd}$$

$a, b, c, d \in \mathbb{Z}$

Sont des entiers relatifs

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$$

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

$$\frac{ab}{ac} = \frac{b}{c}$$

$$\frac{a}{b} = a \cdot \frac{1}{b} = \frac{1}{b} \cdot a$$

$$\frac{ab}{c} = a \cdot \frac{b}{c} = \frac{a}{c} \cdot b$$

# Fractions rationnelles

Polynômes:

$$\begin{array}{|c|} \hline +/- \\ \hline \cdot \\ \hline \end{array}$$

opérations

$$a = x+1$$

$$\frac{a}{b} = \frac{x+1}{4-x^2}$$

$$b = 4-x^2$$

$$c = 1$$

$$\frac{c}{d} = \frac{1}{x-2}$$

$$d = x-2$$

$$\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

$$\frac{1}{2} + \frac{1}{4} = \frac{4+2}{8} = \frac{6}{8} = \frac{3}{4}$$

$$\frac{a}{b} + \frac{c}{d} = \frac{x+1}{4-x^2} + \frac{1}{x-2}$$

$$\begin{array}{|l} 2-b = -(b-2) \\ = -b+2 = 2-b \end{array}$$

$$= \frac{x+1}{(2+x)(2-x)} + \frac{1}{x-2}$$

$$= \frac{x+1}{(2+x)(2-x)} - \frac{1}{2-x} = \frac{x+1}{(2+x)(2-x)} - \frac{2+x}{(2+x)(2-x)}$$

$$= \frac{x+1 - (2+x)}{(2+x)(2-x)}$$

$$= \frac{-1}{(2+x)(2-x)} = \frac{-1}{4-x^2}$$

Réduire

$$\frac{A \cdot \cancel{B} \cdot \cancel{C} \cdot \cancel{D}}{\cancel{B} \cdot \cancel{C} \cdot \cancel{D} \cdot E} = \frac{A}{E}$$

$$\frac{4x}{x^2} = \frac{\begin{array}{|c|} \hline 4 \cdot \cancel{x} \\ \hline \cancel{x} \cdot \cancel{x} \\ \hline \end{array}}{x} = \frac{2 \cdot 2}{x} = \frac{4}{x}$$

$$A \cdot 1 = A$$

$$\frac{a^2 b c}{b c^3} = \frac{a^2}{c^2}$$

$$\frac{64 x y z}{12 x w} = \frac{16}{3} \cdot \frac{xy}{w}$$
$$= \frac{16xy}{3w}$$

$$\frac{x^2 + 2x + 1}{x^2 - 1} = \frac{(x+1)^2}{(x+1)(x-1)} = \frac{\cancel{(x+1)} \cdot (x+1)}{\cancel{(x+1)} \cdot (x-1)} = \frac{x+1}{x-1}$$

$$\frac{1 \cdot \cancel{(x-1)}}{2 \cdot \cancel{(x-1)}} = \frac{1}{2}$$

factoriser en haut  
et en bas

$$2x - 2 = 2 \cdot x - 2 \cdot 1 = 2(x - 1)$$

$$\frac{3x + 6}{x + 2} = \frac{3 \cdot (x + 2)}{1 \cdot (x + 2)} = 3$$

$$\frac{8}{16} = \frac{8}{2 \cdot 8} = \frac{1}{2}$$

$$\frac{1 \cdot \cancel{(x-1)}}{2 \cdot \cancel{(x-1)}} = \frac{1}{2}$$

$$\frac{-16}{-4} = \frac{-2 \cdot 2 \cdot \cancel{2} \cdot \cancel{2}}{-\cancel{2} \cdot \cancel{2}} = \frac{\cancel{(-1)} \cdot 2 \cdot 2}{\cancel{(-1)} \cdot 1}$$

FACTORISER

$$\frac{x^2 - 16}{x^2 - 5x + 4}$$

$$= \frac{(x+4) \cdot \cancel{(x-4)}}{(x-2) \cdot \cancel{(x-4)}}$$

$$= \frac{x+4}{x-2}$$

FACTORISER

$$x^2 - 5x + 4 = (x-1)(x-4)$$

$$x - x^3 \stackrel{\text{O}}{=} x(1 - x^2)$$

$$\stackrel{\text{O}}{=} x(1+x)(1-x)$$

$$\frac{x^3 - 15x^2 + 75x - 125}{x^2 - 25} = \frac{(x - 5)^{\textcircled{3}}}{(x - 5)^2(x + 5)}$$

$$= \frac{(x - 5) \cdot \cancel{(x - 5)} \cdot (x - 5)}{\cancel{(x - 5)} \cdot (x + 5)}$$

$$= \frac{(x - 5)^2}{x + 5}$$



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

$$\frac{x - x^3}{x^4 + 2x^3 + x^2} = \frac{x(1-x^2)}{x^2(x^2+2x+1)} = \frac{x(\cancel{1+x})(1-x)}{x^2 \cdot (\cancel{x+1})(x+1)} = \frac{1-x}{x(x+1)}$$

$$(x^2 + x)^2$$

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

$$(x(x+1))^2 = x^2(x+1)^2$$


$$A - B = -(B - A)$$

$$B - A = -(A - B)$$

Regle

$$\frac{2x - 2y}{3y - 3x} = \frac{2(x - y)}{3(y - x)} = \frac{2(x - y)}{3 \cdot (-1)(x - y)}$$

$$\frac{(a+b)(a-b)^{\textcircled{1}}}{(a-b)^{\textcircled{2}}} = \frac{(a+b) \cdot \cancel{(a-b)}}{(a-b) \cdot \cancel{(a-b)}} = \frac{a+b}{a-b}$$

$$\frac{x-1}{2x-2} = \frac{x-1}{2(x-1)}$$


$$\frac{3}{6} = \frac{1 \cdot \cancel{3}}{2 \cdot \cancel{3}} = \frac{1}{2}$$

$$F \rightarrow \frac{2x - 2y}{\quad} = \frac{2(x - y)}{\quad}$$

$$F \rightarrow \frac{3y - 3x}{\quad} = \frac{3(y - x)}{\quad}$$

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

$$\frac{a^2 - b^2}{(a-b)^2} = \frac{(a+b) \cdot \cancel{(a-b)}}{(a-b) \cdot \cancel{(a-b)}}$$