

EXPRESSIONS RATIONNELLES 1

Simplifie les expressions rationnelles suivantes et indique les restrictions.

a) $\frac{2x+2}{3x+3}$
 $\frac{2(x+1)}{3(x+1)} = \frac{2}{3}; x \neq -1$

b) $\frac{5y-10}{10y-20}$
 $\frac{5(y-2)}{10(y-2)} = \frac{1}{2}; y \neq 2$

c) $\frac{6k^2+3k}{8k+4}$
 $\frac{3k(2k+1)}{4(2k+1)} = \frac{3k}{4}; k \neq \frac{-1}{2}$

d) $\frac{3m^2-5m}{3m^3-5m^2}$
 $\frac{m(3m-5)}{m^2(3m-5)} = \frac{1}{m}; m \neq 0, \frac{5}{3}$

e) $\frac{8w^3+24w^2}{2w^2+6w}$
 $\frac{8w^2(w+3)}{2w(w+3)} = 4w; w \neq 0, -3$

f) $\frac{15x-30x^2}{3x^2-6x^3}$
 $\frac{15x(1-2x)}{3x^2(1-2x)} = \frac{5}{x}; x \neq 0, \frac{1}{2}$

g) $\frac{2r^2+2rs-6r}{4r+4s-12}$
 $\frac{2r(r+s-3)}{4(r+s-3)} = \frac{r}{2}; r \neq -s+3$

h) $\frac{3a+3b+3}{2a-2b-2}$
 $\frac{3(a+b+1)}{2(a-b-1)}; a \neq b+1$

i) $\frac{k^2+3k+2}{k^2+k-2}$
 $\frac{(k+2)(k+1)}{(k+2)(k-1)} = \frac{k+1}{k-1}; k \neq -2, 1$

j) $\frac{m^2+8m+15}{m^2+6m+5}$
 $\frac{(m+5)(m+3)}{(m+5)(m+1)} = \frac{(m+3)}{(m+1)}; m \neq -5, -1$

k) $\frac{y^2+7y+12}{y^2+5y+6}$
 $\frac{(y+4)(y+3)}{(y+2)(y+3)} = \frac{(y+4)}{(y+2)}; y \neq -2, -3$

l) $\frac{x^2-5x-14}{x^2-4x-21}$
 $\frac{(x-7)(x+2)}{(x-7)(x+3)} = \frac{(x+2)}{(x+3)}; x \neq 7, -3$

m) $\frac{a^2-7a+10}{a^2-a-20}$
 $\frac{(a-5)(a-2)}{(a-5)(a+4)} = \frac{(a-2)}{(a+4)}; a \neq 5, -4$

n) $\frac{n^2-5n-24}{n^2-9n+8}$
 $\frac{(n-8)(n+3)}{(n-8)(n-1)} = \frac{(n+3)}{(n-1)}; n \neq 8, 1$

o) $\frac{2y^2+3y+1}{2y^2+7y+3}$
 $\frac{(2y+2)(2y+1)/2}{(2y+6)(2y+1)/2} = \frac{2(y+1)(2y+1)/2}{2(y+3)(2y+1)/2} = \frac{y+1}{y+3}; y \neq -3, \frac{-1}{2}$

p) $\frac{a^2-2a-3}{a^2+6a+8}$
 $\frac{(a-3)(a+1)}{(a+4)(a+2)}; a \neq -4, -2$

q) $\frac{y^2-16}{y^2+4y-32}$
 $\frac{(y-4)(y+4)}{(y+8)(y-4)} = \frac{(y+4)}{(y+8)}; y \neq -8, 4$

r) $\frac{y^2-9}{y^2-6y+9}$
 $\frac{(y-3)(y+3)}{(y-3)(y-3)} = \frac{(y+3)}{(y-3)}; y \neq 3$

$$\begin{aligned} \text{s)} \quad & \frac{y^2 - 5y + 6}{y^2 - 4} \\ & \frac{(y-2)(y-3)}{(y-2)(y+2)} \\ & = \frac{(y-3)}{(y+2)}; y \neq 2, -2 \end{aligned}$$

$$\begin{aligned} \text{t)} \quad & \frac{10ab - 15a^2b}{12a^2 - 8a} \\ & \frac{5ab(2-3a)}{-4a(-3a+2)} \\ & = \frac{5ab}{4a}; a \neq 0, \frac{2}{3} \end{aligned}$$

$$\begin{aligned} \text{u)} \quad & \frac{2y-7}{2y^2 - y - 21} \\ & \frac{2y-7}{(2y-7)(2y+6) / 2} \\ & = \frac{2y-7}{(2y-7)2(y+3) / 2} \\ & = \frac{1}{y+3}; y \neq -3, \frac{7}{2} \end{aligned}$$

$$\begin{aligned} \text{v)} \quad & \frac{6x^2 - x - 1}{4x^2 - 1} \\ & \frac{(6x-3)(6x+2) / 6}{(2x+1)(2x-1)} \\ & = \frac{3(2x-1)2(3x+1) / 6}{(2x+1)(2x-1)} \\ & = \frac{(3x+1)}{(2x+1)}; x \neq \frac{1}{2}, \frac{-1}{2} \end{aligned}$$

$$\begin{aligned} \text{w)} \quad & \frac{x^2 + 10xy + 25y^2}{x + 5y} \\ & \frac{(x+5y)(x+5y)}{(x+5y)} \\ & = x + 5y; x \neq -5y \end{aligned}$$

$$\begin{aligned} \text{x)} \quad & \frac{6x^2 - 5xy + y^2}{6x^2 - xy - y^2} \\ & \frac{(6x-3y)(6x-2y) / 6}{(6x-3y)(6x+2y) / 6} \\ & = \frac{3(2x-y)2(3x-y) / 6}{3(2x-y)2(3x+y) / 6} \\ & = \frac{(3x-y)}{(3x+y)}; y \neq -3x, 2x \end{aligned}$$

$$\begin{aligned} \text{y)} \quad & \frac{2p^2 + 3pq + q^2}{3p^2 + 2pq - q^2} \\ & \frac{(2p+2q)(2p+q) / 2}{(3p+3q)(3p-q) / 3} \\ & = \frac{2(p+q)(2p+q) / 2}{3(p+q)(3p-q) / 3} \\ & = \frac{(2p+q)}{(3p-q)}; q \neq 3p; -p \end{aligned}$$

$$\begin{aligned} \text{z)} \quad & \frac{25x^2 - 9y^2}{5x^2 + 8xy + 3y^2} \\ & \frac{(5x-3y)(5x+3y)}{(5x+5y)(5x+3y) / 5} \\ & = \frac{(5x-3y)(5x+3y)}{5(x+y)(5x+3y) / 5} \\ & = \frac{(5x-3y)}{(x+y)}; x \neq -y, \frac{-3y}{5} \end{aligned}$$