

Factorise les numérateurs et les dénominateurs puis simplifie le plus possible.

a) $\frac{b^2 - 4b + 4}{16b^2 - 64} =$

b) $\frac{-64x^6y}{-8x^4y^2z} =$

c) $\frac{3x^2 + 36x + 105}{3x + 21} =$

d) $\frac{x^2y^2 - x^2 - 4y^2 + 4}{(y + 1)(xy + 2y - x - 2)}m =$

e) $\frac{x^2 + 9x + 20}{x^2 - x - 20} =$

f) $\frac{j^3 + 3j^2 - 4j - 12}{(j + 2)(j^2 + j - 6)} =$

g) $\frac{u^3 + 6u^2 + 12u + 8}{u^2 + 4u + 4} =$

h) $\frac{6a^2 - 36a + 54}{3a^2 - 27} =$

i) $\frac{(a^2 + 1)(a^2 - 2a + 1)}{8a^4 - 8} =$

j) $\frac{-144 + 9w^2}{3w^2 + 3w - 36} =$

k) $\frac{x^2y^2 - 16x^2 - 9y^2 + 144}{(x^2 - 6x + 9)(y^2 - 16)} =$

l) $\frac{ts^2 + t^2 + us^2 + ut}{4t^2 - 4u^2} =$

$$\mathbf{m)} \quad \frac{x^2(u+y) - u - y}{3u + 3y} =$$

$$\mathbf{n)} \quad \frac{x^6 + 9x^4 + 27x^2 + 27}{x^4 + 6x^2 + 9} =$$

Corrigé

$$\text{a)} = \frac{(b-2)^2}{16(b^2-4)} = \frac{(b-2)^2}{16(b+2)(b-2)} = \frac{(b-2)}{16(b+2)}$$

$$\text{b)} = \frac{8x^2}{yz}$$

$$\text{c)} = \frac{3(x^2+12x+35)}{3(x+7)} = \frac{3(x+7)(x+5)}{3(x+7)} = x+5$$

$$\begin{aligned} \text{d)} &= \frac{x^2(y^2-1)-4(y^2-1)}{(y+1)[y(x+2)-1(x+2)]} = \frac{(y^2-1)(x^2-4)}{(y+1)(x+2)(y-1)} = \frac{(y+1)(y-1)(x+2)(x-2)}{(y+1)(x+2)(y-1)} \\ &= x-2 \end{aligned}$$

$$\text{e)} = \frac{(x+5)(x+4)}{(x-5)(x+4)} = \frac{x+5}{x-5}$$

$$\begin{aligned} \text{f)} &= \frac{j^2(j+3)-4(j+3)}{(j+2)(j+3)(j-2)} = \frac{(j+3)(j^2-4)}{(j+2)(j+3)(j-2)} = \frac{(j+3)(j+2)(j-2)}{(j+2)(j+3)(j-2)} \\ &= 1 \end{aligned}$$

$$\text{g)} = \frac{(u+2)^3}{(u+2)^2} = u+2$$

$$\text{h)} = \frac{6(a^2-6a+9)}{3(a^2-9)} = \frac{6(a-3)^2}{3(a+3)(a-3)} = \frac{2(a-3)}{a+3}$$

$$\begin{aligned} \text{i)} &= \frac{(a^2+1)(a-1)^2}{8(a^4-1)} = \frac{(a^2+1)(a-1)^2}{8(a^2+1)(a^2-1)} = \frac{(a^2+1)(a-1)^2}{8(a^2+1)(a+1)(a-1)} = \\ &\frac{a-1}{8(a+1)} \end{aligned}$$

$$\text{j)} = \frac{9w^2-144}{3(w^2+w-12)} = \frac{9(w^2-16)}{3(w+4)(w-3)} = \frac{9(w+4)(w-4)}{3(w+4)(w-3)} = \frac{3(w-4)}{w-3}$$

$$\mathbf{k)} \frac{x^2(y^2 - 16) - 9(y^2 - 16)}{(x - 3)^2(y + 4)(y - 4)} = \frac{(x^2 - 9)(y^2 - 16)}{(x - 3)^2(y + 4)(y - 4)} = \frac{(x + 3)(x - 3)(y + 4)(y - 4)}{(x - 3)^2(y + 4)(y - 4)} = \frac{x + 3}{x - 3}$$

$$\mathbf{l)} \frac{ts^2 + t^2 + us^2 + ut}{4t^2 - 4u^2} = \frac{t(s^2 + t) + u(s^2 + t)}{4(t^2 - u^2)} = \frac{(s^2 + t)(t + u)}{4(t + u)(t - u)} = \frac{s^2 + t}{4(t - u)}$$

$$\mathbf{m)} \frac{x^2(u + y) - u - y}{3u + 3y} = \frac{x^2(u + y) - 1(u + y)}{3(u + y)} = \frac{(x^2 - 1)(u + y)}{3(u + y)} = \frac{(x + 1)(x - 1)}{3}$$

$$\mathbf{n)} \frac{x^6 + 9x^4 + 27x^2 + 27}{x^4 + 6x^2 + 9} = \frac{(x^2 + 3)^3}{(x^2 + 3)^2} = x^2 + 3$$