

Multiplikation und Division von Bruchtermen

Lösungen

$$1. \quad a) \frac{6x^3}{(x+y)^2} \cdot \frac{x+y}{3x^2} = \frac{\cancel{6}x^{\cancel{3}} \cdot \cancel{(x+y)}}{(x+y)^{\cancel{2}} \cdot \cancel{3}x^{\cancel{2}}} = \frac{2x}{x+y}$$

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

$$c) \frac{(x^2-y^2)}{4x} \cdot \frac{6x^2}{x+y} = \frac{(x-y) \cdot \cancel{(x+y)} \cdot \cancel{6}^3 \cdot x^{\cancel{2}}}{\cancel{2} \cdot \cancel{4} \cdot \cancel{x} \cdot \cancel{(x+y)}} = \frac{3x(x-y)}{2} = \frac{3x^2-3xy}{2}$$

$$2. \quad a) \frac{5x^2}{3y^2} \cdot 2y = \frac{5x^2 \cdot \cancel{2}y}{3y^{\cancel{2}}} = \frac{10x^2}{3y}$$

$$b) \frac{2(x+1)^2}{3(x-1)^2} \cdot 4(x-1) = \frac{2 \cdot (x+1)^{\cancel{2}} \cdot 4 \cdot \cancel{(x-1)}}{3 \cdot \cancel{(x-1)} \cdot (x+1)} = \frac{8 \cdot (x+1)}{3} = \frac{8x+8}{3}$$

$$3. \quad a) \frac{a^2-b^2}{3a} : \frac{a+b}{a-b} = \frac{(a-b)(a+b)}{3a} \cdot \frac{(a-b)}{(a+b)} = \frac{(a-b) \cdot \cancel{(a+b)} \cdot (a-b)}{3 \cdot a \cdot \cancel{(a+b)}} = \frac{(a-b)^2}{3a}$$

$$b) \frac{4 \cdot (x-y)}{3 \cdot (x+y)^2} : \frac{6}{9 \cdot (x+y)} = \frac{4 \cdot (x-y)}{3 \cdot (x+y)^2} \cdot \frac{9 \cdot (x+y)}{6} = \frac{\cancel{4} \cdot (x-y) \cdot \cancel{9} \cdot \cancel{(x+y)}}{\cancel{3} \cdot (x+y)^{\cancel{2}} \cdot \cancel{6}^{\cancel{3}}} = \frac{2 \cdot (x-y)}{(x+y)}$$

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

$$4. \quad a) \frac{16ab^2}{3c} : (4a^2b^2) = \frac{16ab^2}{3c} \cdot \frac{1}{(4a^2b^2)} = \frac{\cancel{4} \cdot \cancel{16} \cdot a \cdot \cancel{b^2}}{3 \cdot c \cdot \cancel{4} \cdot a^{\cancel{2}} \cdot \cancel{b^2}} = \frac{4}{3ac}$$

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

$$c) \frac{m+n}{m-n} : (m+n)^2 = \frac{m+n}{m-n} \cdot \frac{1}{(m+n)^2} = \frac{\cancel{(m+n)}}{(m-n) \cdot (m+n) \cdot \cancel{(m+n)}} = \frac{1}{(m-n)(m+n)} = \frac{1}{m^2-n^2}$$