

1. Doplně výraz a uveď podmínky, za kterých má součin smysl:

$$a) \frac{c}{d} \cdot \frac{?}{d+1} = \frac{5c}{d \cdot (d+1)}$$

$$b) \frac{c}{c+d} \cdot \frac{3d}{?} = \frac{3cd}{(c+d)^2}$$

$$c) \frac{2e^2}{c^2} \cdot \left(-\frac{ef}{d+1}\right) = -\frac{?}{c^2 \cdot (d+1)}$$

$$d) \left(-\frac{c}{?}\right) \cdot \frac{e^2}{f^3} = -\frac{ce^2}{7df^3}$$

$$e) \frac{2a}{7b^2} \cdot \frac{?}{a^3} = \frac{2 \cdot (b-1)}{7a^2b^2}$$

$$f) \frac{(c+1)^2}{?} \cdot \frac{5d}{2c+2} = \frac{5 \cdot (c+1)}{2}$$

$$g) \frac{cd-c}{20bc^3} \cdot \frac{8bcd}{?} = \frac{2d}{5c}$$

$$h) \frac{5a^2}{3b^3} \cdot \frac{?}{a+1} = \frac{5a^2}{3b^2 \cdot (a+1)}$$

Podpis rodičů:

2. Vynásob a zjednoduś:

a) $-\frac{ay}{6} \cdot \left(-\frac{y}{a}\right) =$

b) $-\frac{7m}{n-5} \cdot \frac{n-5}{14m^2} =$

c) $\frac{3a-3b}{k} \cdot \frac{m}{b-a} =$

d) $\frac{6}{y-7} \cdot \frac{7-y}{36} =$

e) $\frac{4a^2-b^2}{ab-a^2} \cdot \frac{a-b}{b^2+2ab} =$

f) $\frac{a^2b-4b^3}{3ab^2} \cdot \frac{a^2b}{a^2-2ab} =$

g) $\frac{x^2-xy}{x^2+xy} \cdot \frac{x^2y+xy^2}{xy} =$

h) $\frac{a^2-b^2}{a^2} \cdot \frac{a^3}{(a+b)^2} =$

Podpis rodičů:

$$\text{i)} \quad \frac{a^2-b^2}{(a+b)^2} \cdot \frac{3a+3b}{4a-4b} =$$

$$\text{j)} \quad -\frac{(a+b)^2}{(a-b)^2} \cdot \frac{3(a-b)^2}{4(a+b)^3} =$$

$$\text{k)} \quad \frac{ax+ay}{x^2-2xy+y^2} \cdot \frac{2x+2y}{ax^2+2axy+ay^2} =$$

$$\text{l)} \quad \frac{5x^2-10xy}{x^2+4y^2} \cdot \frac{x^4-16y^4}{15(x-2y)^2} =$$

$$\text{m)} \quad \frac{5m-5n}{4m+4n} \cdot \frac{8m+8n}{15m-15n} =$$

$$\text{n)} \quad \frac{a-4b}{15ab^2} \cdot \frac{5a^2b}{3a-12b} =$$

$$\text{o)} \quad \frac{3a+3b}{a^2-b^2} \cdot \frac{a-b}{a+b} =$$

$$\text{p)} \quad \frac{r-3}{r^2-9} \cdot \frac{2(r+3)}{r} =$$

Podpis rodičů:

3. Vynásob a uprav:

$$a) \frac{2a^3x^5}{3b^2y^4} \cdot \frac{6ay^4}{5bx^4} \cdot \frac{by}{a^3x^2} =$$

$$b) \frac{2as}{3d} \cdot \left(-\frac{3dm}{5c}\right) \cdot \left(-\frac{2c}{s}\right) =$$

$$c) \frac{9xy}{5ab} \cdot \frac{3ab}{4yz} \cdot \frac{4bz}{3axy} =$$

$$d) \frac{16y^2}{x^3+x^2} \cdot \frac{x+1}{(4-z)^2} \cdot \frac{4x-xz}{2y^3} =$$

$$e) \frac{x-y}{4xz^2} \cdot \frac{18z^3}{x+y} \cdot \frac{xy+y^2}{3zx} =$$

$$f) \frac{4y^3}{3u^2} \cdot \left(-\frac{5u^3}{x^2}\right) \cdot \frac{9xu}{y} =$$

$$g) \frac{3xy^2}{2u} \cdot \frac{2x^2}{z^2} \cdot \frac{5z^3}{4xy} =$$

$$h) \left(\frac{x^2}{y^2}\right)^2 \cdot \left(\frac{y^4}{z^3}\right)^3 \cdot \left(\frac{z^3}{z^4}\right)^3 \cdot \left(\frac{x^4}{y^3}\right)^2 =$$

Podpis rodičů:

Řešení:

Strana 1

1. Doplň výraz a uveď podmínky, za kterých má výraz smysl:

a) $\frac{c}{d} \cdot \frac{5}{d+1} = \frac{5c}{d \cdot (d+1)}$ $d \neq 0, d \neq -1$

b) $\frac{c}{c+d} \cdot \frac{3d}{c+d} = \frac{3cd}{(c+d)^2}$ $c \neq -d$

c) $\frac{2e^2}{c^2} \cdot \left(-\frac{ef}{d+1}\right) = -\frac{2e^3f}{c^2 \cdot (d+1)}$ $c \neq 0, d \neq -1$

d) $\left(-\frac{c}{7d}\right) \cdot \frac{e^2}{f^3} = -\frac{ce^2}{7df^3}$ $d \neq 0, f \neq 0$

e) $\frac{2a}{7b^2} \cdot \frac{b-1}{a^3} = \frac{2 \cdot (b-1)}{7a^2b^2}$ $a \neq 0, b \neq 0$

f) $\frac{(c+1)^2}{d} \cdot \frac{5d}{2c+2} = \frac{5 \cdot (c+1)}{2}$ $d \neq 0, c \neq -1$

g) $\frac{cd-c}{20bc^3} \cdot \frac{8bcd}{d-1} = \frac{2d}{5c}$ $b \neq 0, c \neq 0, d \neq 1$

h) $\frac{5a^2}{3b^3} \cdot \frac{b}{a+1} = \frac{5a^2}{3b^2 \cdot (a+1)}$ $b \neq 0, a \neq -1$

2. Vynásob a zjednoduš:

$$\text{a) } -\frac{ay}{6} \cdot \left(-\frac{y}{a}\right) = \left[\frac{y^2}{6}\right]$$

$$\text{b) } -\frac{7m}{n-5} \cdot \frac{n-5}{14m^2} = \left[-\frac{1}{2m}\right]$$

$$\text{c) } \frac{3a-3b}{k} \cdot \frac{m}{b-a} = \left[-\frac{3m}{k}\right]$$

$$\text{d) } \frac{6}{y-7} \cdot \frac{7-y}{36} = \left[-\frac{1}{6}\right]$$

$$\text{e) } \frac{4a^2-b^2}{ab-a^2} \cdot \frac{a-b}{b^2+2ab} = \left[-\frac{2a-b}{ab}\right]$$

$$\text{f) } \frac{a^2b-4b^3}{3ab^2} \cdot \frac{a^2b}{a^2-2ab} = \left[\frac{a+2b}{3}\right]$$

$$\text{g) } \frac{x^2-xy}{x^2+xy} \cdot \frac{x^2y+xy^2}{xy} = [x-y]$$

$$\text{h) } \frac{a^2-b^2}{a^2} \cdot \frac{a^3}{(a+b)^2} = \left[\frac{a(a-b)}{a+b}\right]$$

$$i) \frac{a^2 - b^2}{(a+b)^2} \cdot \frac{3a+3b}{4a-4b} = \left[\frac{3}{4} \right]$$

$$j) -\frac{(a+b)^2}{(a-b)^2} \cdot \frac{3(a-b)^2}{4(a+b)^3} = \left[\frac{3}{4(a+b)} \right]$$

$$k) \frac{ax+ay}{x^2-2xy+y^2} \cdot \frac{2x+2y}{ax^2+2axy+ay^2} = \left[\frac{3}{(x-y)^2} \right]$$

$$l) \frac{5x^2-10xy}{x^2+4y^2} \cdot \frac{x^4-16y^4}{15(x-2y)^2} = \left[\frac{x(x+2y)}{3} \right]$$

$$m) \frac{5m-5n}{4m+4n} \cdot \frac{8m+8n}{15m-15n} = \left[\frac{2}{3} \right]$$

$$n) \frac{a-4b}{15ab^2} \cdot \frac{5a^2b}{3a-12b} = \left[\frac{a}{9b} \right]$$

$$o) \frac{3a+3b}{a^2-b^2} \cdot \frac{a-b}{a+b} = \left[\frac{3}{a+b} \right]$$

$$p) \frac{r-3}{r^2-9} \cdot \frac{2(r+3)}{r} = \left[\frac{2}{r} \right]$$

3. Vynásob a uprav:

$$a) \frac{2a^3x^5}{3b^2y^4} \cdot \frac{6ay^4}{5bx^4} \cdot \frac{by}{a^3x^2} = \left[\frac{4ay}{5b^2x} \right]$$

$$b) \frac{2as}{3d} \cdot \left(-\frac{3dm}{5c} \right) \cdot \left(-\frac{2c}{s} \right) = \left[\frac{4am}{5} \right]$$

$$c) \frac{9xy}{5ab} \cdot \frac{3ab}{4yz} \cdot \frac{4bz}{3axy} = \left[\frac{9b}{5ay} \right]$$

$$d) \frac{16y^2}{x^3+x^2} \cdot \frac{x+1}{(4-z)^2} \cdot \frac{4x-xz}{2y^3} = \left[\frac{8}{xy(4-z)} \right]$$

$$e) \frac{x-y}{4xz^2} \cdot \frac{18z^3}{x+y} \cdot \frac{xy+y^2}{3zx} = \left[\frac{3y(x-y)}{2x^2} \right]$$

$$f) \frac{4y^3}{3u^2} \cdot \left(-\frac{5u^3}{x^2} \right) \cdot \frac{9xu}{y} = \left[-\frac{60y^2u^2}{x} \right]$$

$$g) \frac{3xy^2}{2u} \cdot \frac{2x^2}{z^2} \cdot \frac{5z^3}{4xy} = \left[\frac{15x^2yz}{4u} \right]$$

$$h) \left(\frac{x^2}{y^2} \right)^2 \cdot \left(\frac{y^4}{z^3} \right)^3 \cdot \left(\frac{z^3}{z^4} \right)^3 \cdot \left(\frac{x^4}{y^3} \right)^2 = [y^2]$$

Literatura: Mgr. František Janeček:

Sbírka úloh z matematiky pro střední
školy

*VÝRAZY, ROVNICE, NEROVNICE A JEJICH
SOUSTAVY*

Nakladatelství Prometheus