Souhrnné příklady

1) $\left(1-\frac{2}{x+1}\right)\cdot\left(1-\frac{3}{x-1}\right)=$

2) $\frac{xy}{x^2-y^2}\cdot\left(\frac{x}{y}-\frac{y}{x}\right)=$

3) $\left(\frac{1}{n}-\frac{1}{m}\right)\cdot\frac{m^2}{m-n}=$

4) $\left(1+\frac{x}{1-x}\right):\frac{1+x}{1-x}=$

5) $\frac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}}=$

6) $\left(2-\frac{2}{x+1}\right)\cdot\left(2-\frac{2}{x}\right)=$

7) $\left(1+\frac{2x}{1-2x}\right):\frac{1+x}{1-2x}=$

8) $\frac{1+\frac{3}{x}}{\frac{x^2}{3}-3}=$

9) $\left(2-\frac{2a}{a-2}\right):\frac{a}{2a-4}=$

10) $\frac{\frac{1}{a}-\frac{5}{a^2}}{3a-15}=$

11) $\left(\frac{1}{a}+\frac{1}{3}\right):\left(\frac{1}{a}-\frac{a}{9}\right)=$

12) $(2+a)\cdot\left(\frac{8}{4-a^2}-\frac{2}{2-a}\right)=$

13) $\left(2-\frac{1}{a+1}\right):(2a+1)=$

14) $\frac{2+\frac{1}{n}}{2-\frac{1}{2n^2}}=$

15) $(a-1):\left(2-\frac{2}{2a-1}\right)=$

16) $\frac{4a-\frac{1}{a}}{4a+2}=$

Řešení

1)

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

2)

$$\frac{xy}{x^2-y^2}\cdot\left(\frac{x}{y}-\frac{y}{x}\right)=\frac{xy}{x^2-y^2}\cdot\frac{x^2-y^2}{xy}=1$$

3)

$$\left(\frac{1}{n}-\frac{1}{m}\right)\cdot\frac{m^2}{m-n}=\frac{m-n}{mn}\cdot\frac{m^2}{m-n}=\frac{m}{n}$$

4)

$$\left(1+\frac{x}{1-x}\right):\frac{1+x}{1-x}=\frac{1-x+x}{1-x}:\frac{1+x}{1-x}=\frac{1}{1-x}\cdot\frac{1-x}{1+x}=\frac{1}{1+x}$$

5)

$$\frac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}}=\left(\frac{1}{x}+\frac{1}{y}\right):\left(\frac{1}{x}-\frac{1}{y}\right)=\frac{y+x}{xy}:\frac{y-x}{xy}=\frac{y+x}{xy}\cdot\frac{xy}{y-x}=\frac{y+x}{y-x}$$

6)

$$\left(2-\frac{2}{x+1}\right)\cdot\left(2-\frac{2}{x}\right)=\frac{2(x+1)-2}{x+1}\cdot\frac{2x-2}{x}=\frac{2x+2-2}{x+1}\cdot\frac{2x-2}{x}=\frac{2x}{x+1}\cdot\frac{2x-2}{x}=\frac{4x-4}{x+1}$$

7)

$$\left(1+\frac{2x}{1-2x}\right):\frac{1+x}{1-2x}=\frac{1-2x+2x}{1-2x}\cdot\frac{1-2x}{1+x}=\frac{1}{1-2x}\cdot\frac{1-2x}{1+x}=\frac{1}{1+x}$$

8)

$$\frac{1+\frac{3}{x}}{\frac{x^2}{3}-3}=\left(1+\frac{3}{x}\right):\left(\frac{x^2}{3}-3\right)=\frac{x+3}{x}:\frac{x^2-9}{3}=\frac{x+3}{x}\cdot\frac{3}{(x+3)(x-3)}=\frac{3}{x(x-3)}$$

9)

$$\left(2-\frac{2a}{a-2}\right):\frac{a}{2a-4}=\frac{2(a-2)-2a}{a-2}\cdot\frac{2(a-2)}{a}=\frac{2a-4-2a}{1}\cdot\frac{2}{a}=\frac{-4}{1}\cdot\frac{2}{a}=-\frac{8}{a}$$

10)

$$\frac{\frac{1}{a}-\frac{5}{a^2}}{3a-15}=\left(\frac{1}{a}-\frac{5}{a^2}\right):\frac{3a-15}{1}=\frac{a-5}{a^2}\cdot\frac{1}{3(a-5)}=\frac{1}{3a^2}$$

11)

$$\left(\frac{1}{a}+\frac{1}{3}\right):\left(\frac{1}{a}-\frac{a}{9}\right)=\frac{3+a}{3a}:\frac{9-a^2}{9a}=\frac{3+a}{3a}\cdot\frac{9a}{(3+a)(3-a)}=\frac{3}{3-a}$$

12)

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

$$=\frac{1}{1}\cdot\frac{8-4-2a}{2-a}=\frac{4-2a}{2-a}=\frac{2(2-a)}{2-a}=2$$

13)

$$\left(2-\frac{1}{a+1}\right):(2a+1)=\frac{2(a+1)-1}{a+1}:\frac{2a+1}{1}=\frac{2a+2-1}{a+1}\cdot\frac{1}{2a+1}=\frac{2a+1}{a+1}\cdot\frac{1}{2a+1}=\frac{1}{a+1}$$

14)

$$\frac{2+\frac{1}{n}}{2-\frac{1}{2n^2}}=\left(2+\frac{1}{n}\right):\left(2-\frac{1}{2n^2}\right)=\frac{2n+1}{n}:\frac{4n^2-1}{2n^2}=\frac{2n+1}{n}\cdot\frac{2n^2}{(2n+1)(2n-1)}=\frac{2n}{2n-1}$$

15)

$$(a-1):\left(2-\frac{2}{2a-1}\right)=\frac{a-1}{1}:\frac{2(2a-1)-2}{2a-1}=\frac{a-1}{1}\cdot\frac{2a-1}{4a-2-2}=\frac{a-1}{1}\cdot\frac{2a-1}{4a-4}=$$

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

16)

$$\frac{4a-\frac{1}{a}}{4a+2}=\left(4a-\frac{1}{a}\right):\frac{4a+2}{1}=\frac{4a^2-1}{a}\cdot\frac{1}{2(2a+1)}=\frac{(2a+1)(2a-1)}{a}\cdot\frac{1}{2(2a+1)}=\frac{2a-1}{2a}$$