NÁSOBENIE A DELENIE LOMENÝCH VÝRAZOV

(Riešené úlohy 2)

1. Vynásob lomené výrazy tak, aby výsledok bol v základnom tvare:

a) $\frac{a^3}{b}\cdot\frac{c^4}{a^2}=\frac{a}{b}\cdot\frac{c^4}{1}=\frac{a.c^4}{b}$ P1: b≠0 P2: a≠0

Pomôcka: $\frac{8}{12}\cdot\frac{16}{4}=\frac{128:4}{48:4}=\frac{32:4}{12:4}=\frac{8}{3}$ (základný tvar)

$\frac{8}{12}\cdot\frac{16}{4}=\frac{2}{3}.\frac{4}{1}=\frac{8}{3}$ **(najprv krátiť až potom násobiť!!!)**

b) $\frac{p}{6q^2}\cdot\left(-4q^3\right)=\frac{p}{6q^2:q^2}\cdot\frac{\left(-4q^3\right):q^2}{1}=\frac{p}{6}.\frac{(-4q)}{1}=\frac{-2pq}{3}=-\frac{2pq}{3}$ P: <u>q≠0</u>

c) $\left(-\frac{4u^2}{21v^3}\right)\cdot\left(-\frac{7v}{8u^2}\right)=\left(-\frac{1.1}{3.v^2}\right)\cdot\left(-\frac{1.1}{2.1}\right)=+\frac{1}{6.v^2}$ P1: v<u>≠0</u> P2: u<u>≠0</u>

d) $\frac{m}{3}\cdot\frac{n^2}{2m}\cdot\frac{10}{n}=\frac{1}{3}\cdot\frac{n}{1.1}\cdot\frac{5}{1}=\frac{5n}{3}$ P1: <u>m≠0</u> P2: <u>n≠0</u>

e) $\frac{x}{y^2}\cdot\frac{y}{3x^2}\cdot(-x)=-\frac{1}{y}\cdot\frac{1}{3.1}\cdot 1=-\frac{1}{3.y}$ P1: <u>x≠0</u> P2: <u>y≠0</u>

f) $\frac{3ab}{4xy}\cdot\frac{10x^2y}{21ab^2}=$

g) $\frac{3x}{5ab}\cdot\frac{3ay}{4bz}\cdot\frac{4z}{9xy}=$

2. Vynásob lomené výrazy tak, aby výsledok bol v základnom tvare:

a) $\frac{x^2y}{3(x+1)}\cdot\frac{2(x+1)}{xy^2}=\frac{x.1}{3}.\frac{2}{1.y}=\frac{2x}{3y}$ **P1: x≠-1 P2: x≠0 P3: y≠0**

b) $\frac{2m}{5m+5}\cdot\frac{5}{7m}=\frac{2m}{5(m+1)}\cdot\frac{5}{7m}=\frac{2.1}{1.(m+1)}\cdot\frac{1}{7.1}=\frac{2}{7.(m+1)}$ **P1: <u>m≠0</u> P2: m<u>≠–1</u>**

c) $\frac{q-2}{p+q}\cdot\frac{2p+2q}{3q-6}=\frac{q-2}{p+q}\cdot\frac{2(p+q)}{3(q-2)}=\frac{2}{3}$ **P1: p+q≠0 => <u>p≠-q</u>**

P2: 3(q-2) ≠0 => q-2≠0 => <u>q≠2</u>

d) $\frac{r}{r+s}\cdot\frac{r^2+rs}{r-s}=\frac{r}{r+s}\cdot\frac{r(r+s)}{r-s}=\frac{r}{1}\cdot\frac{r.1}{r-s}=\frac{r^2}{r-s}$ P1: <u>r ≠ s</u> P2: <u>r ≠ – s</u>

e) $\frac{a^2+ab}{a}\cdot\frac{b}{ab+b^2}=\frac{a(a+b)}{a}\cdot\frac{b}{b(a+b)}=\frac{1.1}{1}\cdot\frac{1}{1.1}=1$ P1: <u>r ≠ s</u> P2: <u>r ≠ – s</u>

f) $\frac{2x+8}{x^2}\cdot\frac{x^2-xy}{x+4}=$

g) $\frac{15+15n}{n^2-1}\cdot\frac{n^2-n}{3n-3}=$

3. **Vydeľ lomené výrazy tak, aby výsledok bol v základnom tvare:**

a) $\frac{x(a+b)}{12a}:\frac{x^2}{a}=\frac{x(a+b)}{12a}.\frac{a}{x^2}=\frac{(a+b)}{12}.\frac{1}{x}=\frac{(a+b)}{12x}$ P1: <u>a≠0</u> P2: <u>x≠0</u>

b) $\frac{2c-2}{d^2}:\frac{c-1}{d}=\frac{2(c-1)}{d^2}.\frac{d}{c-1}=\frac{2.1}{d}.\frac{1}{1}=\frac{2}{d}$ P1: <u>d≠0</u> P2: <u>c≠1</u>

c) $\frac{t^2-2t}{3}:\frac{t}{6}=\frac{t(t-2)}{3}.\frac{6}{t}=\frac{1(t-2)}{1}.\frac{2}{1}=2(t-2)$ P: <u>t≠0</u>

d) $\frac{3r}{s+5}:\frac{r}{s-2}=\frac{3r}{s+5}.\frac{s-2}{r}=\frac{3.1}{s+5}.\frac{s-2}{1}=\frac{3(s-2)}{s+5}$ P1: <u>r≠0</u> P2: <u>s≠2</u> P3: <u>s≠–5</u>

e) $\frac{x^2-xy}{y}:\frac{x-y}{xy}=\frac{x(x-y)}{y}.\frac{x.y}{(x-y)}=\frac{x}{1}.\frac{x}{1}=x^2$ P1: <u>y≠0</u> P2: <u>x≠0</u> P3: <u>x≠y</u>

f) $\frac{a+b}{a-b}:\frac{b+a}{b-a}=\frac{a+b}{a-b}.\frac{b-a}{b+a}=\frac{a+b}{a-b}.\frac{-(-b+a)}{a+b}=-1$ P1: <u>$a\neq b$</u> P2: <u>$a\neq -b$</u>

g) $\frac{b-2}{a+b}:\frac{3b-6}{2a+2b}=\frac{b-2}{a+b}.\frac{2(a+b)}{3(b-2)}=\frac{2}{3}$ P1: <u>$a\neq -b$</u> P2: <u>$b\neq 2$</u>

4. **Vynásob lomené výrazy tak, aby výsledok bol v základnom tvare:**

a) $\frac{a^2-b^2}{a+b}\cdot\frac{ab}{a-b}=\frac{(a-b)(a+b)}{a+b}\cdot\frac{ab}{a-b}=ab$ P1: <u>a≠-b</u> P2: <u>a≠b</u>

b) $\frac{x+y}{x-y}\cdot\frac{(x-y)^2}{x^2-y^2}=\frac{x+y}{x-y}\cdot\frac{(x-y)^2}{(x-y)(x+y)}=\frac{1}{1}.\frac{x-y}{x-y}=1$ P1: <u>x≠-y</u> P2: <u>x≠y</u>

c) $\frac{(r+1)^2}{r-1}\cdot\frac{(r-1)^2}{r+1}=(r-1)(r+1)=r^2-1$ P1: <u>r≠1</u> P2: <u>r≠-1</u>

d) $\frac{2a^2-2b^2}{3x^2-3y^2}\cdot\frac{9(x+y)}{4a-4b}=\frac{2(a^2-b^2)}{3(x^2-y^2)}\cdot\frac{9(x+y)}{4(a-b)}=\frac{2(a-b)(a+b)}{3(x-y)(x+y)}\cdot\frac{9(x+y)}{4(a-b)}=\frac{3(a+b)}{2(x-y)}$
P1: <u>x≠y</u> P2: <u>x≠-y</u> P3: <u>a≠b</u>

e) $\frac{a^2-ab}{ab+b^2}\cdot\frac{a^2+ab}{ab-b^2}=$ **(D.ú.)**

f) $\frac{2a^2}{a^2b+ab^2}\cdot\frac{ab+b^2}{2a-4}=$ **(D.ú.)**

g) $\frac{r^2-9}{r+1}\cdot\frac{r^2-1}{r-3}=$ **(D.ú.)**

h) $\dfrac{m^2-mn}{m^2+mn}\cdot\dfrac{m^2n+mn^2}{mn}=$

i) $\dfrac{4u-4v}{2uv}\cdot\dfrac{u^2}{u^2-uv}=$

j) $\dfrac{p^2+pq}{5p^2-5q^2}\cdot\dfrac{p^2q-q^2}{2p^2-2p}=$

k) $\dfrac{a^2-n^2}{(a+n)^2}\cdot\dfrac{4a+4n}{5(a-n)}=$

l) $\dfrac{a^2-4}{1-a}\cdot\dfrac{2b}{a-2}\cdot\dfrac{1-a^2}{ab+2b}=$

m) $\dfrac{ax^2-ay^2}{(a+b)^2}\cdot\dfrac{3a+3b}{ax^2-2axy+ay^2}=$

n) $\dfrac{2x^2+8x+8}{x-2}\cdot\dfrac{x^2-4}{4(x+2)}=$

o) $\dfrac{z^2-1}{z^2+2z+1}\cdot\dfrac{3z+3}{4z-4}=$

p) $\dfrac{a^2-4b^2}{a^3-a^2b}\cdot\dfrac{a-b}{a^2+2ab}=$