

Zlomky a celá čísla

7. ročník

jméno:

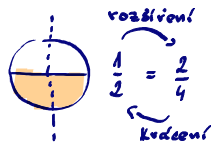
třída:

Řešení : sedovamatika.cz

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Zlomky a celá čísla 1

Rozšiřování a krácení



Rozšiř zlomek dvěma

$$\frac{1}{2} = \frac{1 \cdot 2}{2 \cdot 2} = \frac{2}{4}$$

$$\frac{3}{5} = \frac{3 \cdot 2}{5 \cdot 2} = \frac{6}{10}$$

$$\frac{4}{3} = \frac{4 \cdot 2}{3 \cdot 2} = \frac{8}{6}$$

$$\frac{11}{7} = \frac{22}{14}$$

Rozšiř zlomek třemi

$$\frac{3}{2} = \frac{3 \cdot 3}{2 \cdot 3} = \frac{9}{6}$$

$$\frac{2}{7} = \frac{2 \cdot 3}{7 \cdot 3} = \frac{6}{21}$$

$$\frac{4}{5} = \frac{4 \cdot 3}{5 \cdot 3} = \frac{12}{15}$$

$$\frac{8}{3} = \frac{24}{9}$$

Rozšiř zlomek pěti

$$\frac{2}{5} = \frac{2 \cdot 5}{5 \cdot 5} = \frac{10}{25}$$

$$\frac{3}{4} = \frac{3 \cdot 5}{4 \cdot 5} = \frac{15}{20}$$

$$\frac{5}{9} = \frac{5 \cdot 5}{9 \cdot 5} = \frac{25}{45}$$

$$\frac{10}{12} = \frac{50}{60}$$

Zkrat zlomek dvěma

$$\frac{10}{8} = \frac{10 \div 2}{8 \div 2} = \frac{5}{4}$$

$$\frac{12}{6} = \frac{12 \div 2}{6 \div 2} = \frac{6}{3}$$

$$\frac{20}{4} = \frac{20 \div 2}{4 \div 2} = \frac{10}{2}$$

$$\frac{30}{12} = \frac{15}{6}$$

Zkrat zlomek čtyřmi

$$\frac{20}{32} = \frac{20 \div 4}{32 \div 4} = \frac{5}{8}$$

$$\frac{100}{60} = \frac{100 \div 4}{60 \div 4} = \frac{25}{15}$$

$$\frac{36}{12} = \frac{36 \div 4}{12 \div 4} = \frac{9}{3}$$

$$\frac{44}{80} = \frac{11}{20}$$

Zkrat zlomek pěti

$$\frac{15}{30} = \frac{15 \div 5}{30 \div 5} = \frac{3}{6}$$

$$\frac{10}{25} = \frac{10 \div 5}{25 \div 5} = \frac{2}{5}$$

$$\frac{35}{40} = \frac{35 \div 5}{40 \div 5} = \frac{7}{8}$$

$$\frac{45}{80} = \frac{9}{16}$$

Zkrat zlomek do základního tvaru

$$\frac{24}{32} = \frac{12}{16} = \frac{6}{8} = \frac{3}{4}$$

$\frac{24 \div 8}{32 \div 8} = \frac{3}{4}$ (nášete rovnou)

$$\frac{18}{36} = \frac{2}{4} = \frac{1}{2}$$

$$\frac{50}{100} = \frac{5}{10} = \frac{1}{2}$$

$$\frac{42}{63} = \frac{14}{21} = \frac{2}{3}$$

$$\frac{28}{70} = \frac{4}{10} = \frac{2}{5}$$

$$\frac{144}{60} = \frac{72}{30} = \frac{36}{15} = \frac{12}{5}$$

$$\frac{300}{450} = \frac{30}{45} = \frac{6}{9} = \frac{2}{3}$$

$$\frac{196}{49} = \frac{28}{7} = \frac{4}{1} = 4$$

$196 \div 7 = 28$

$$\frac{175}{125} = \frac{35}{25} = \frac{7}{5}$$

$$\frac{260}{156} = \frac{130}{78} = \frac{65}{39} = \frac{5}{3}$$

$65 \div 13 = 5$
 $39 \div 13 = 3$

$$\frac{175}{25} = 35$$

$$\frac{105}{25} = 21$$

$$\frac{156}{16} = 7.8$$

Zlomky a celá čísla 2 – sčítání se stejným nebo podobným jmenovatelem



Zmenovateľ se nesčítá! → Pořád to jsou poloviny.



$$\frac{1}{2} + \frac{1}{2} = \frac{1+1}{2} = \frac{2}{2} = 1$$

$$\frac{1}{3} + \frac{2}{3} = \frac{1+2}{3} = \frac{3}{3} = 1$$

$$\frac{1}{4} + \frac{2}{4} = \frac{1+2}{4} = \frac{3}{4}$$

$$\frac{1}{7} + \frac{3}{7} = \frac{1+3}{7} = \frac{4}{7}$$

$$\frac{5}{16} + \frac{3}{16} = \frac{5+3}{16} = \frac{8}{16} = \frac{1}{2}$$

$$\frac{1}{25} + \frac{4}{25} = \frac{1+4}{25} = \frac{5}{25} = \frac{1}{5}$$

$$\frac{5}{23} + \frac{11}{23} = \frac{5+11}{23} = \frac{16}{23}$$

$$\frac{3}{10} + \frac{5}{10} = \frac{3+5}{10} = \frac{8}{10} = \frac{4}{5}$$

$$\frac{1}{9} + \frac{2}{9} = \frac{1+2}{9} = \frac{3}{9} = \frac{1}{3}$$

$$\frac{1}{7} + \frac{3}{7} + \frac{3}{7} = \frac{1+3+3}{7} = \frac{7}{7} = 1$$

$$\frac{1}{2} - \frac{1}{2} = \frac{1-1}{2} = \frac{0}{2} = 0$$

$$\frac{2}{2} - \frac{1}{2} = \frac{2-1}{2} = \frac{1}{2}$$

$$\frac{1}{4} + \frac{2}{4} - \frac{3}{4} = \frac{1+2-3}{4} = \frac{0}{4} = 0$$

$$\frac{1}{7} + \frac{6}{7} - \frac{1}{7} = \frac{1+6-1}{7} = \frac{6}{7}$$

$$\frac{1}{8} + \frac{3}{8} - \frac{2}{8} = \frac{1+3-2}{8} = \frac{2}{8} = \frac{1}{4}$$

$$\frac{6}{3} - \frac{3}{3} = \frac{3}{3} = 1$$

$$\frac{5}{2} - \frac{3}{2} = \frac{2}{2} = 1$$

$$\frac{7}{3} - \frac{2}{3} = \frac{5}{3}$$

$$1 - \frac{1}{2} = \frac{2}{2} - \frac{1}{2} = \frac{1}{2}$$

$1 = \frac{1}{1} = \frac{2}{2} = \frac{3}{3} = \frac{4}{4} = \frac{5}{5} = \dots$

$$1 - \frac{1}{3} = \frac{3}{3} - \frac{1}{3} = \frac{2}{3}$$

$$1 - \frac{1}{5} = \frac{5}{5} - \frac{1}{5} = \frac{4}{5}$$

$$1 - \frac{1}{100} = \frac{100}{100} - \frac{1}{100} = \frac{99}{100}$$

$$1 - \frac{1}{2} = \frac{2}{2} - \frac{1}{2} = \frac{1}{2}$$

$$\frac{3}{2} - 1 = \frac{3}{2} - \frac{2}{2} = \frac{1}{2}$$

$$\frac{2}{2} \cdot \frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

$\frac{1}{2} = \frac{2}{4}$

$$\frac{2}{2} \cdot \frac{1}{3} + \frac{1}{6} = \frac{2}{6} + \frac{1}{6} = \frac{3}{6} = \frac{1}{2}$$

$$\frac{2}{2} \cdot \frac{1}{5} + \frac{1}{10} = \frac{2}{10} + \frac{1}{10} = \frac{3}{10}$$

$$\frac{2}{2} \cdot \frac{1}{7} + \frac{3}{14} = \frac{2}{14} + \frac{3}{14} = \frac{5}{14}$$

$$\frac{6}{6} \cdot \frac{1}{36} + \frac{1}{36} = \frac{6}{36} + \frac{1}{36} = \frac{7}{36}$$

$$\frac{1}{25} + \frac{4}{25} = \frac{1+4}{25} = \frac{5}{25} = \frac{1}{5}$$

$$\frac{2}{2} \cdot \frac{1}{2} - \frac{1}{4} = \frac{2}{4} - \frac{1}{4} = \frac{1}{4}$$

$$\frac{1}{7} + \frac{3}{7} - \frac{1}{14} = \frac{2}{7} - \frac{1}{14} = \frac{4}{14} - \frac{1}{14} = \frac{3}{14}$$

$$1 + \frac{1}{2} + \frac{1}{4} = \frac{4}{4} + \frac{2}{4} + \frac{1}{4} = \frac{7}{4}$$

$$\frac{3}{2} + \frac{4}{4} = \frac{6}{4} + \frac{4}{4} = \frac{10}{4} = \frac{5}{2}$$

$\frac{3}{2} = \frac{6}{4}$

$$\frac{1}{50} + \frac{3}{100} = \frac{2}{100} + \frac{3}{100} = \frac{5}{100} = \frac{1}{20}$$

$$\frac{1}{7} + \frac{3}{21} = \frac{1}{7} + \frac{1}{7} = \frac{2}{7}$$

$$\frac{4}{4} \cdot \frac{1}{42} + \frac{1}{8} = \frac{4}{84} + \frac{1}{8} = \frac{4+10.5}{84} = \frac{14.5}{84}$$

$$\frac{1}{5} + \frac{3}{10} - \frac{2}{20} = \frac{4}{20} + \frac{6}{20} - \frac{2}{20} = \frac{8}{20} = \frac{2}{5}$$

$\frac{1}{5} = \frac{4}{20}$

$$\frac{1}{100} - \frac{10}{1000} = \frac{10}{1000} - \frac{10}{1000} = \frac{0}{1000} = 0$$

$$\frac{1}{200} + \frac{3}{100} + \frac{1}{2} = \frac{1}{200} + \frac{6}{200} + \frac{100}{200} = \frac{107}{200}$$

Zlomky a celá čísla 3 – sčítání a smíšená čísla

$$\frac{1}{6} + \frac{1 \cdot 2}{3 \cdot 2} + \frac{1 \cdot 3}{2 \cdot 3} = \frac{1}{6} + \frac{2}{6} + \frac{3}{6} = \frac{6}{6} = 1$$

$$n(6; 3; 2) = 6$$

$$\frac{3 \cdot 1}{3 \cdot 2} + \frac{1 \cdot 2}{3 \cdot 2} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

$$n(2; 3) = 6$$

$$\frac{3 \cdot 1}{2 \cdot 5} + \frac{1}{10} + \frac{1 \cdot 5}{2 \cdot 5} = \frac{3}{10} + \frac{1}{10} + \frac{5}{10} = \frac{8}{10} = \frac{4}{5}$$

$$n(5; 2) = 10$$

$$\frac{2 \cdot 1}{2 \cdot 5} + \frac{1 \cdot 5}{2 \cdot 5} = \frac{2}{10} + \frac{5}{10} = \frac{7}{10}$$

$$n(4; 6) = 12$$

$$\frac{3 \cdot 3}{3 \cdot 4} + \frac{1 \cdot 2}{6 \cdot 2} = \frac{9}{12} + \frac{2}{12} = \frac{11}{12}$$

$$n(3; 4) = 28$$

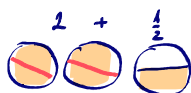
$$\frac{4 \cdot 3}{4 \cdot 7} + \frac{1 \cdot 7}{4 \cdot 7} = \frac{12}{28} + \frac{7}{28} = \frac{19}{28}$$

$$n(5; 9) = 45$$

$$\frac{3 \cdot 3}{3 \cdot 5} - \frac{1 \cdot 5}{9 \cdot 5} = \frac{27}{45} - \frac{5}{45} = \frac{22}{45}$$

$$\frac{3 \cdot 3}{3 \cdot 10} + \frac{2 \cdot 2}{15 \cdot 2} = \frac{9}{30} + \frac{4}{30} = \frac{13}{30}$$

Převod' na zlomek v základním tvaru



$$1 \frac{1}{2} = \frac{1 \cdot 2 + 1}{2} = \frac{3}{2}$$

$$2 \frac{1}{2} = 2 + \frac{1}{2} = \frac{4}{2} + \frac{1}{2} = \frac{5}{2}$$

$$1 \frac{1}{5} = \frac{6}{5}$$

$$1 \frac{2}{5} = \frac{7}{5}$$

$$2 \frac{2}{5} = \frac{2 \cdot 5 + 2}{5} = \frac{12}{5}$$

$$3 \frac{3}{5} = \frac{18}{5}$$

$$10 \frac{2}{7} = \frac{10 \cdot 7 + 2}{7} = \frac{72}{7}$$

$$2 \frac{2}{11} = \frac{24}{11}$$

$$7 \frac{5}{6} = \frac{7 \cdot 6 + 5}{6} = \frac{47}{6}$$

$$2 \frac{3}{13} = \frac{29}{13}$$

$$23 \frac{3}{10} = \frac{233}{10}$$

$$2 \frac{62}{100} = \frac{262 \cdot 2}{100 \cdot 2} = \frac{524}{200}$$

Převod' na smíšené číslo



$$\frac{4}{3} = 1 \frac{1}{3}$$

$$\frac{15}{2} = 7 \frac{1}{2}$$

$$\frac{24}{3} = 8$$

$$\frac{81}{4} = 20 \frac{1}{4}$$

$$4 : 3 = 1 \text{ (z.b. 1)}$$

$$15 : 2 = 7 \text{ (z.b. 1)}$$

$$24 : 3 = 8$$

$$81 : 4 = 20 \text{ (z.b. 1)}$$

$$\frac{125}{10} = 12 \frac{5}{10} = 12 \frac{1}{2}$$

$$\frac{14}{3} = 4 \frac{2}{3}$$

$$\frac{94}{7} = 13 \frac{3}{7}$$

$$\frac{27}{6} = \frac{9}{2} = 4 \frac{1}{2}$$

$$25 : 2 = 12 \text{ z.b. 1}$$

$$14 : 3 = 4 \text{ (z.b. 2)}$$

$$34 : 7 = 4 \text{ (z.b. 3)}$$



$$\frac{115}{8} = 14 \frac{3}{8}$$

$$\frac{114}{20} = \frac{57}{10} = 5 \frac{7}{10}$$

$$\frac{620}{30} = \frac{62}{3} = 20 \frac{2}{3}$$

$$\frac{840}{15} = 56$$

$$115 : 8 = 14 \frac{3}{8}$$

$$840 : 15 = 56 \text{ (z.b. 0)}$$

Zlomky a celá čísla 4 - Procvičování

Pokud lze (čitatel je větší než jmenovatel), tak výsledek zapiš ve **smíšeném čísle**.

$$\frac{4 \cdot 5}{4 \cdot 3} + \frac{3 \cdot 3}{4 \cdot 3} = \frac{20}{12} + \frac{9}{12} = \frac{29}{12} = 2 \frac{5}{12}$$

$$n(3; 4) = 12 \quad 23 : 12 = 2 \text{ (zby. 5)}$$

$$\frac{2 \cdot 5}{2 \cdot 6} + \frac{3 \cdot 3}{4 \cdot 3} = \frac{10}{12} + \frac{9}{12} = \frac{19}{12} = 1 \frac{7}{12}$$

$$n(6; 4) = 12$$

$$\frac{9 \cdot 3}{9 \cdot 5} + \frac{8 \cdot 5}{9 \cdot 5} = \frac{27}{45} + \frac{40}{45} = \frac{67}{45} = 1 \frac{22}{45}$$

$$n(5; 3) = 45$$

$$\frac{4 \cdot 2}{4 \cdot 3} + \frac{7}{12} = \frac{8}{12} + \frac{7}{12} = \frac{15}{12} = \frac{5}{4} = 1 \frac{1}{4}$$

$$n(3; 12) = 12$$

$$\frac{4}{11} + \frac{1}{2} = \frac{8}{22} + \frac{11}{22} = \frac{19}{22}$$

$$n(11; 2) = 22$$

$$\frac{3}{7} + \frac{2}{3} = \frac{9}{21} + \frac{14}{21} = \frac{23}{21} = 1 \frac{2}{21}$$

$$\frac{7}{9} + \frac{1}{4} = \frac{28}{36} + \frac{9}{36} = \frac{37}{36} = 1 \frac{1}{36}$$

$$n(9; 4) = 36$$

$$\frac{11}{18} + \frac{5 \cdot 3}{6 \cdot 3} = \frac{11}{18} + \frac{15}{18} = \frac{26}{18} = \frac{13}{9} = 1 \frac{4}{9}$$

$$n(18; 6) = 18$$

$$\frac{4}{5} - \frac{2}{3} = \frac{12}{15} - \frac{10}{15} = \frac{2}{15}$$

$$\frac{8 \cdot 7}{8 \cdot 9} - \frac{5 \cdot 3}{8 \cdot 3} = \frac{56}{72} - \frac{15}{72} = \frac{41}{72}$$

$$n(9; 8) = 72$$

$$\frac{1}{2} - \frac{1}{4} = \frac{2}{4} - \frac{1}{4} = \frac{1}{4}$$

$$\frac{11}{15} - \frac{1}{3} = \frac{11}{15} - \frac{5}{15} = \frac{6}{15} = \frac{2}{5}$$

$$\frac{7}{8} - \frac{3 \cdot 2}{4 \cdot 2} = \frac{7}{8} - \frac{6}{8} = \frac{1}{8}$$

$$\frac{5}{7} - \frac{3}{28} = \frac{20}{28} - \frac{3}{28} = \frac{17}{28}$$

$$n(7; 28) = 28$$

$$\frac{3 \cdot 7}{3 \cdot 10} + \frac{3 \cdot 6}{5 \cdot 6} + \frac{4 \cdot 2}{15 \cdot 2} = \frac{21}{30} + \frac{18}{30} + \frac{8}{30} = \frac{47}{30} = 1 \frac{17}{30}$$

$$n(10; 5; 15) = 30$$

$$\frac{1}{4} + \frac{2}{3} + \frac{5}{6} = \frac{3}{12} + \frac{8}{12} + \frac{10}{12} = \frac{21}{12} = \frac{7}{4} = 1 \frac{3}{4}$$

$$n(4; 3; 6) = 12$$

$$\frac{3 \cdot 7}{3 \cdot 12} + \frac{5}{36} + \frac{3 \cdot 3}{4 \cdot 3} = \frac{21}{36} + \frac{5}{36} + \frac{27}{36} = \frac{53}{36} = 1 \frac{17}{36}$$

$$n(12; 36; 4) = 36$$

$$\frac{7 \cdot 7}{7 \cdot 8} + \frac{3 \cdot 3}{7 \cdot 8} + \frac{15 \cdot 2}{28 \cdot 2} = \frac{49}{56} + \frac{24}{56} + \frac{30}{56} = \frac{103}{56} = 1 \frac{47}{56}$$

$$n(8; 7; 28) = 56$$

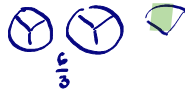
$$\frac{3}{4} + \frac{2}{5} + \frac{11}{20} = \frac{15}{20} + \frac{8}{20} + \frac{11}{20} = \frac{34}{20} = \frac{17}{10} = 1 \frac{7}{10}$$

$$\frac{1}{30} + \frac{9}{15} + \frac{7}{60} = \frac{2}{60} + \frac{36}{60} + \frac{7}{60} = \frac{45}{60} = \frac{15}{20} = \frac{3}{4}$$

Zlomky a celá čísla 5 – Procvičování

Výsledek zapiš ve smíšeném čísle.

$$2\frac{1}{3} = \frac{2 \cdot 3 + 1}{3} = \frac{7}{3} \quad 3\frac{2}{5} = \frac{15+2}{5} = \frac{17}{5}$$



$$2\frac{1}{3} + 3\frac{2}{5} = \frac{67}{15} + \frac{173}{15} = \frac{35}{15} + \frac{51}{15} = \frac{86}{15} = 5\frac{11}{15}$$

11. 2p. (1. sešitování)

$$= 2 + 3 + \frac{1}{3} + \frac{2}{5} = 5 + \frac{5}{15} + \frac{6}{15} = 5 + \frac{11}{15} = 5\frac{11}{15}$$

$$\frac{86:15=5}{-75} \\ \frac{11}{15}$$

$$5\frac{1}{12} + 1\frac{1}{3} = \frac{61}{12} + \frac{44}{12} = \frac{61+16}{12} = \frac{77}{12} = 6\frac{5}{12}$$

$$= 6 + \frac{1}{12} + \frac{1}{3} = 6 + \frac{1}{12} + \frac{4}{12} = 6\frac{5}{12}$$

$$\frac{77:12=6}{-72} \\ \frac{5}{12}$$

$$4\frac{1}{6} + 1\frac{3}{4} = \frac{225}{24} + \frac{73}{24} = \frac{50}{12} + \frac{21}{12} = \frac{71}{12} = 5\frac{11}{12}$$

$$= 5 + \frac{1}{6} + \frac{3}{4} = 5 + \frac{2}{12} + \frac{9}{12} = 5\frac{11}{12}$$

$$\frac{71:12=5}{-60} \\ \frac{11}{12}$$

$$1\frac{3}{10} + 2\frac{1}{15} = \frac{313}{30} + \frac{312}{30} = \frac{33}{30} + \frac{62}{30} = \frac{101}{30} = 3\frac{11}{30}$$

$$3\frac{2}{3} + 4\frac{7}{9} = \frac{344}{9} + \frac{43}{9} = \frac{33}{9} + \frac{43}{9} = \frac{76}{9} = 8\frac{4}{9}$$

11. 2p.

$$1\frac{1}{4} + 3\frac{4}{5} = \frac{55}{20} + \frac{134}{20} = \frac{25}{20} + \frac{76}{20} = \frac{101}{20} = 5\frac{1}{20}$$

$$1 + 3 + \frac{1}{4} + \frac{4}{5} = 4 + \frac{5}{20} + \frac{16}{20} = 4 + \frac{21}{20} = 4 + 1\frac{1}{20} = 5\frac{1}{20}$$

$$\rightarrow 2 = \frac{24}{12} = \frac{8}{4}$$

$$2 + \frac{12}{2} + 3\frac{1}{4} = \frac{8}{4} + \frac{2}{4} + \frac{13}{4} = \frac{23}{4} = 5\frac{3}{4}$$

$$\rightarrow \frac{13}{4}$$

$$\frac{221:40=5}{-200} \\ \frac{21}{40}$$

$$5\frac{1}{8} + 1 + 4\frac{2}{5} = \frac{5}{40} + \frac{40}{40} + \frac{126}{40} = \frac{221}{40} = 5\frac{21}{40}$$

$$\rightarrow \frac{21}{40}$$

$$5 + 1\frac{3}{7} + \frac{2}{5} = \frac{355}{35} + \frac{105}{35} + \frac{27}{35} = \frac{125}{35} + \frac{50}{35} + \frac{14}{35} = \frac{239}{35} = 6\frac{29}{35}$$

$$\rightarrow \frac{10}{7}$$

$$\frac{239:35=6}{-210} \\ \frac{29}{35}$$

$$\frac{3}{14} + 3 + 1\frac{3}{7} = \frac{3}{14} + 3 + \frac{102}{14} = \frac{3}{14} + \frac{42}{14} + \frac{20}{14} = \frac{65}{14} = 4\frac{9}{14}$$

$$\rightarrow \frac{10}{7}$$

$$\frac{65:14=4}{-56} \\ \frac{9}{14}$$

$$\frac{112:15=7}{-105} \\ \frac{7}{15}$$

$$5\frac{1}{3} + \frac{2}{15} + 2 = \frac{516}{15} + \frac{2}{15} + 2 = \frac{80}{15} + \frac{2}{15} + \frac{30}{15} = \frac{112}{15} = 7\frac{7}{15}$$

Zlomky a celá čísla 6 – Násobení

$$2 \cdot \frac{2}{5} = \frac{4}{5} \quad 2 = \frac{2}{1}$$

$$2 \cdot \frac{1}{2} = \frac{2}{2} = 1$$

$$3 \cdot \frac{1}{3} = \frac{3}{3} = 1$$

$$\frac{5}{4} \cdot \frac{1}{2} = \frac{5 \cdot 1}{4 \cdot 2} = \frac{5}{8}$$

$$2 \cdot \frac{1}{3} = \frac{2}{3}$$

$$2 \cdot \frac{5}{7} = \frac{10}{7}$$

$$\frac{1}{2} \cdot \frac{1}{2} = \frac{1 \cdot 1}{2 \cdot 2} = \frac{1}{4}$$

$$\frac{2}{3} \cdot \frac{4}{5} = \frac{2 \cdot 4}{3 \cdot 5} = \frac{8}{15}$$

$$\frac{1}{2} \cdot \frac{2}{1} = \frac{1 \cdot 2}{2 \cdot 1} = \frac{2}{2} = 1$$

$$\frac{8}{2} \cdot \frac{2}{8} = 1$$

$$\frac{8}{4} \cdot \frac{6}{8} = \frac{1 \cdot 3}{2 \cdot 1} = \frac{3}{2}$$

Nemohu krátit raději sebe → pod sebou a křížem

$$\frac{16}{5} \cdot \frac{5}{8} = \frac{2 \cdot 1}{1 \cdot 1} = \frac{2}{1} = 2$$

$$\frac{8}{3} \cdot \frac{9}{12} = \frac{1}{1} \cdot \frac{3}{2} = \frac{3}{2}$$

$$\frac{25}{8} \cdot \frac{8}{5} = \frac{10}{1} = 10$$

$$\frac{81}{7} \cdot \frac{14}{9} = \frac{9 \cdot 1}{1} = \frac{18}{1} = 18$$

$$\frac{7}{14} \cdot \frac{9}{2} = \frac{3}{2}$$

→ $\frac{3}{1} \cdot \frac{3}{14}$

$$\frac{21}{11} \cdot \frac{22}{14} = \frac{21}{1} \cdot \frac{2}{7} = \frac{2 \cdot 1}{1} = \frac{3}{1} = 3$$

$$\frac{5}{18} \cdot \frac{5}{3} = \frac{5}{3}$$

$$\frac{26}{8} \cdot \frac{6}{13} = \frac{4}{1} = 4$$

$$\frac{5}{12} \cdot \frac{8}{35} = \frac{1}{14}$$

$$\frac{24}{7} \cdot \frac{7}{8} = \frac{3}{1} = 3$$

$$\frac{20}{10} \cdot \frac{8}{8} = \frac{2}{1} \cdot \frac{1}{2} = \frac{1}{1} = 1$$

$$\frac{36}{49} \cdot \frac{7}{8} = \frac{6}{7} \cdot \frac{1}{1} = \frac{6}{7}$$

$$\frac{66}{54} \cdot \frac{9}{33} = \frac{11}{9} \cdot \frac{1}{3} = \frac{11}{1} \cdot \frac{1}{33} = \frac{1}{3}$$

$$\frac{16}{100} \cdot \frac{25}{8} = \frac{2}{4} = \frac{1}{2}$$

$$\frac{9}{14} \cdot \frac{9}{2} = \frac{9}{2}$$

$$\frac{5}{17} \cdot \frac{5}{1} = 4 \cdot 5 = 20$$

$$\frac{144}{12} \cdot \frac{5}{6} = \frac{12}{1} \cdot \frac{5}{3} = \frac{36}{3} \cdot \frac{5}{3} = \frac{6}{1} \cdot \frac{5}{1} = \frac{10}{1} = 10$$

$$\frac{1}{2} \cdot \frac{4}{8} \cdot \frac{5}{2} = \left(\frac{1}{1} \right) \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{1} = 1$$

→ nadbytečné

$$\frac{1}{2} \cdot \frac{4}{5} \cdot \frac{5}{2} = 1$$

$$\frac{3}{5} \cdot \frac{4}{9} \cdot \frac{5}{2} = \frac{2}{3}$$

$$\frac{6}{7} \cdot \frac{14}{15} \cdot \frac{5}{8} = \frac{3 \cdot 2}{3 \cdot 4} = \frac{1}{2}$$

$$25 \cdot 5 = 125$$

$$\frac{27}{14} \cdot \frac{2}{3} \cdot \frac{38}{9} = \frac{3 \cdot 2 \cdot 38}{14 \cdot 3 \cdot 9} = 6$$

$$\frac{15}{12} \cdot \frac{12}{225} \cdot \frac{5}{7} = \frac{15}{15 \cdot 7} = \frac{1}{7}$$

$$\left(\frac{1}{2}\right) \xrightarrow{\text{Převracený zlomek}} \frac{2}{1}$$

$$\frac{1}{2} : \frac{1}{2} = \frac{1}{2} \cdot \frac{2}{1} = \frac{1}{1} = 1$$

$$\frac{3}{7} : \frac{1}{7} = \frac{3}{7} \cdot \frac{7}{1} = \frac{3}{1} = 3$$

$$\frac{1}{4} : \frac{1}{4} = \frac{1}{4} \cdot \frac{4}{1} = \frac{1}{1} = 1$$

$$\frac{1}{3} : \frac{2}{3} = \frac{1}{3} \cdot \frac{3}{2} = \frac{1}{2}$$

$$\frac{5}{16} : \frac{15}{16} = \frac{5}{16} \cdot \frac{16}{15} = \frac{1}{3}$$

$$\frac{1}{3} : \frac{2}{7} = \frac{1}{3} \cdot \frac{7}{2} = \frac{7}{6}$$

! Nemohu krátit kráčíem u dělení!

$$\frac{2}{25} : \frac{4}{5} = \frac{2}{25} \cdot \frac{5}{4} = \frac{1}{10}$$

$$\frac{30}{9} : \frac{10}{3} = \frac{30}{9} \cdot \frac{3}{10} = \frac{3}{3} = 1$$

$$\frac{12}{24} : \frac{4}{8} = \frac{12}{24} \cdot \frac{8}{4} = \frac{2}{2} = 1$$

$$\frac{5}{21} : \frac{10}{7} = \frac{5}{21} \cdot \frac{7}{10} = \frac{1}{6}$$

Pod sebou můžu krátit vždy

$$\frac{12}{7} : \frac{16}{14} = \frac{12}{7} \cdot \frac{14}{16} = \frac{3}{2}$$

$$\frac{64}{15} : \frac{8}{30} = \frac{64}{15} \cdot \frac{30}{8} = 16$$

$$\frac{49}{2} : \frac{14}{8} = \frac{49}{2} \cdot \frac{8}{14} = 14$$

$$\frac{50}{25} : \frac{6}{18} = \frac{50}{25} \cdot \frac{18}{6} = \frac{2}{1} \cdot \frac{3}{1} = 6$$

$$\frac{12}{42} : \frac{4}{21} = \frac{12}{42} \cdot \frac{21}{4} = \frac{3}{2}$$

$$\frac{75}{21} : \frac{10}{7} = \frac{75}{21} \cdot \frac{7}{10} = \frac{5}{2}$$

$$1 : \frac{1}{2} = 1 \cdot \frac{2}{1} = \frac{2}{1} = 2$$

$$2 : \frac{1}{7} = 2 \cdot \frac{7}{1} = 14$$

$$\frac{6}{3} : 2 = \frac{6}{3} \cdot \frac{1}{2} = \frac{2}{2} = 1$$

$$\frac{12}{4} : 4 = \frac{12}{4} \cdot \frac{1}{4} = \frac{3}{4}$$

$$\frac{5}{16} : 10 = \frac{5}{16} \cdot \frac{1}{10} = \frac{1}{32}$$

$$\frac{1}{3} : 2 = \frac{1}{3} \cdot \frac{1}{2} = \frac{1}{6}$$

$$20 : \frac{4}{5} = 20 \cdot \frac{5}{4} = 25$$

$$30 : \frac{10}{3} = 30 \cdot \frac{3}{10} = 9$$

Zlomky a celá čísla 8 – Procvičování

Výsledek zapiš ve smíšeném čísle

$$\frac{64}{8} \cdot \frac{8}{16} \cdot \frac{2}{32} = \frac{2 \cdot 3}{8 \cdot 4} = \frac{3}{4}$$

$$\frac{100}{200} \cdot \frac{400}{500} \cdot \frac{5000}{200} = \frac{1 \cdot 50}{2 \cdot 5 \cdot 2} = 10$$

$$\frac{8}{14} \cdot \frac{21}{8} \cdot \frac{16}{5} = \frac{3 \cdot 16}{2 \cdot 2 \cdot 5} = \frac{3 \cdot 8}{2 \cdot 5} = \frac{12}{5} = 2 \frac{2}{5}$$

$$\frac{48}{48} \cdot \frac{21}{15} \cdot \frac{35}{24} = \frac{2 \cdot 3 \cdot 7}{7 \cdot 3 \cdot 1} = 2$$

$$2 \frac{7}{9} + 3 + \frac{1}{4} = \begin{cases} 5 + \frac{7}{9} + \frac{1}{4} = 5 + \frac{28}{36} + \frac{9}{36} = 5 + \frac{37}{36} = 5 + 1 \frac{1}{36} = 6 \frac{1}{36} \\ \frac{25}{9} + 3 + \frac{1}{4} = \frac{100}{36} + \frac{108}{36} + \frac{9}{36} = \frac{217}{36} = 6 \frac{1}{36} \end{cases}$$

$$0,5 + \frac{1}{3} + 2 \frac{1}{6} = \frac{1}{2} + \frac{1}{3} + \frac{13}{6} = \frac{3}{6} + \frac{2}{6} + \frac{13}{6} = \frac{18}{6} = 3$$

$$\frac{25}{100} = \frac{1}{4}$$

$$0,25 + \frac{3}{10} + 1 \frac{1}{2} = \frac{1 \cdot 5}{4 \cdot 5} + \frac{3 \cdot 2}{10 \cdot 2} + \frac{3 \cdot 10}{2 \cdot 10} = \frac{5}{20} + \frac{6}{20} + \frac{30}{20} = \frac{41}{20} = 2 \frac{1}{20}$$

$$3 \frac{2}{7} + 0,1 + \frac{3}{10} = \frac{23}{7} + \frac{1}{10} + \frac{3}{10} = \frac{23}{7} + \frac{4}{10} = \frac{5 \cdot 23}{5 \cdot 7} + \frac{2 \cdot 2}{5 \cdot 7} = \frac{115}{35} + \frac{4}{35} = \frac{119}{35} = 3 \frac{24}{35}$$

$$\frac{119}{35} : 35 = 3$$

$$0,8 + 3 \frac{1}{5} + \frac{7}{30} = \frac{8 \cdot 3}{10 \cdot 3} + \frac{16 \cdot 6}{5 \cdot 6} + \frac{7}{30} = \frac{24}{30} + \frac{36}{30} + \frac{7}{30} = \frac{67}{30} = 2 \frac{7}{30}$$

$$\frac{11}{3} : 4 = \frac{11}{3} \cdot \frac{1}{4} = \frac{11}{12}$$

$$\frac{28}{7} : \frac{81}{9} = \frac{4}{1} \cdot \frac{1}{9} = \frac{4}{9}$$

$$\frac{55}{22} : \frac{25}{16} = \frac{5 \cdot 16}{2 \cdot 25} = \frac{8}{5} = 1 \frac{3}{5}$$

$$\frac{28}{7} : \frac{81}{9} = \frac{28}{7} \cdot \frac{9}{81} = \frac{4}{3}$$

$$\frac{5}{16} : \frac{15}{16} = \frac{5}{16} \cdot \frac{16}{15} = \frac{1}{3}$$

$$\frac{2}{25} : \frac{4}{5} = \frac{2}{25} \cdot \frac{5}{4} = \frac{1}{10}$$

$$\frac{12}{24} : \frac{4}{8} = \frac{1}{2} \cdot \frac{2}{1} = 1$$

$$\frac{5}{21} : \frac{10}{7} = \frac{5}{21} \cdot \frac{7}{10} = \frac{1}{6}$$

$$\frac{14}{3} : 7 = \frac{2}{3}$$

$$\frac{14}{3} : 7 = \frac{2 \cdot 14}{3 \cdot 7} = \frac{2}{3}$$

$$\frac{144}{196} : \frac{12}{14} = \frac{144}{196} \cdot \frac{14}{12} = \frac{12}{14} = \frac{6}{7}$$

Zlomky a celá čísla 9 – Složené zlomky

$$\frac{\frac{1}{2}}{\frac{1}{2}} = \frac{1}{2} : \frac{1}{2} = \frac{1}{2} \cdot \frac{2}{1} = 1$$

Hlavní zlomková čára

$$\frac{\frac{2}{7}}{\frac{2}{7}} = \frac{2}{7} : \frac{2}{7} = \frac{2}{7} \cdot \frac{7}{2} = 1$$

Nad hl. zl. čára

$$\frac{\frac{4}{2}}{\frac{2}{2}} = \frac{4}{2} : \frac{2}{2} = 1$$

$$\frac{\frac{12}{6}}{\frac{2}{7}} = \frac{12}{6} : \frac{2}{7} = \frac{12}{6} \cdot \frac{7}{2} = 7$$

$$\frac{\frac{7}{12}}{\frac{21}{24}} = \frac{7}{12} : \frac{21}{24} = \frac{7}{12} \cdot \frac{24}{21} = \frac{2}{3}$$

$$\frac{\frac{3}{12}}{\frac{4}{4}} = 3 : \frac{12}{4} = 1$$

$$\frac{\frac{5}{14}}{\frac{10}{21}} = \frac{5}{14} : \frac{10}{21} = \frac{5}{14} \cdot \frac{21}{10} = \frac{3}{4}$$

$$\frac{\frac{16}{7}}{\frac{18}{21}} = \frac{16}{7} : \frac{18}{21} = \frac{16}{7} \cdot \frac{21}{18} = \frac{8}{3}$$

$$\frac{\frac{49}{25}}{\frac{7}{10}} = \frac{49}{25} : \frac{7}{10} = \frac{49}{25} \cdot \frac{10}{7} = \frac{14}{5}$$

$$\frac{\frac{6}{2}}{\frac{3}{3}} = 6 : \frac{2}{3} = 6 \cdot \frac{3}{2} = 9$$

$$\frac{\frac{9}{8}}{\frac{16}{16}} = 9 : \frac{8}{16} = 9 \cdot \frac{16}{8} = 18$$

$$\frac{\frac{9}{8}}{\frac{16}{16}} = \frac{9}{8} : 16 = \frac{9}{8} \cdot \frac{1}{16} = \frac{9}{128}$$

$$\frac{\frac{24}{6}}{\frac{5}{5}} = 24 : \frac{6}{5} = 24 \cdot \frac{5}{6} = 20$$

$$\frac{\frac{10}{100}}{\frac{1000}{10000}} = \frac{1}{10} : \frac{1}{10} = 1$$

$$\frac{\frac{1}{1}}{\frac{1}{6}} = 1 : \frac{1}{6} = 1 \cdot \frac{6}{1} = 6$$

$$\frac{\frac{1}{1}}{\frac{1}{8}} = 1 : \frac{1}{8} = 1 \cdot \frac{8}{1} = 8$$

Pozor! na rovnal se

$$\frac{\frac{3}{1}}{\frac{3}{3}} = \frac{3}{1} : 3 = 1$$

Mohl vyhodit $\frac{3}{1} = 3$

$$\frac{3}{3} = 1$$

$$\frac{\frac{3}{1}}{\frac{1}{3}} = 3 : \frac{1}{3} = 3 \cdot \frac{3}{1} = 9$$

Zlomky a celá čísla 10 –složené operace

$$1) \quad \frac{1}{6} + \frac{2}{3} \cdot \frac{9}{8} = \frac{1}{6} + \frac{3}{4} = \frac{2}{12} + \frac{9}{12} = \frac{11}{12}$$

$$2) \quad \frac{2}{3} - \frac{2}{3} : \frac{5}{2} = \frac{2}{3} - \frac{2}{3} \cdot \frac{2}{5} = \frac{5 \cdot 2}{5 \cdot 3} - \frac{4}{15} = \frac{10}{15} - \frac{4}{15} = \frac{6}{15} = \frac{2}{5}$$

$$3) \quad 1 - \frac{2}{3} = \frac{3}{3} - \frac{2}{3} = \frac{1}{3}$$

$\hookrightarrow \frac{1}{1} \cdot \frac{2}{3}$

$$4) \quad \frac{5}{8} \cdot 1,6 - \frac{7}{12} = \frac{5}{8} \cdot \frac{16}{10} - \frac{7}{12} = \frac{2}{2} - \frac{7}{12} = \frac{12}{12} - \frac{7}{12} = \frac{5}{12}$$

$$5) \quad \frac{3}{10} - \frac{1}{5} + \frac{1}{4} = \frac{3}{10} - \frac{2}{10} + \frac{5}{10} = \frac{6}{10} = \frac{3}{5}$$

$$6) \quad 3 \cdot \frac{2}{15} + \frac{1}{3} \cdot \frac{2}{15} = \frac{6}{15} + \frac{2}{15} = \frac{18}{45} + \frac{2}{45} = \frac{20}{45} = \frac{4}{9}$$

$$7) \quad \frac{3}{5} \cdot \frac{6}{15} - \frac{3}{5} : \frac{2}{2} = \frac{3}{5} \cdot \frac{2}{5} - \frac{3}{2} = \frac{3}{2} - \frac{3}{2} = 0$$

$$\frac{5}{10} = \frac{1}{2}$$

$$8) \quad \left(0,5 + \frac{2}{5}\right) : 9 = \left(\frac{5}{10} + \frac{2}{5}\right) : \frac{9}{1} = \left(\frac{5}{10} + \frac{4}{10}\right) : \frac{9}{1} = \frac{9}{10} : \frac{9}{1} = \frac{1}{10}$$

$\nearrow$
stejně budu
uít desetiny

$$9) \quad \left(3 - \frac{9}{4}\right) \cdot \frac{8}{3} = \left(\frac{12}{4} - \frac{9}{4}\right) \cdot \frac{8}{3} = \frac{3}{4} \cdot \frac{8}{3} = 2$$

$\hookrightarrow \frac{3}{1} = \frac{12}{4}$

Zlomky a celá čísla 11 – Složené zlomky

1)
$$\frac{\frac{15}{35}}{\frac{12}{28}} = \frac{15}{35} : \frac{12}{28} = \frac{15}{35} \cdot \frac{28}{12} = \frac{3}{7} \cdot \frac{4}{3} = 1$$

LZE POKRÁTIT

2)
$$\frac{\frac{7}{10}}{\frac{14}{5}} = \frac{7}{10} : \frac{14}{5} = \frac{7}{10} \cdot \frac{5}{14} = \frac{1}{4}$$

! 10 a 14 krátit nemohu!

3)
$$\frac{2 - \frac{1}{2}}{\frac{1}{2}} = \frac{\frac{4}{2} - \frac{1}{2}}{\frac{1}{2}} = \frac{\frac{3}{2}}{\frac{1}{2}} = \frac{3}{2} : \frac{1}{2} = \frac{3}{2} \cdot \frac{2}{1} = 3$$

4)
$$\frac{\frac{3}{2} - \frac{1}{4}}{2} = \frac{\frac{6}{4} - \frac{1}{4}}{2} = \frac{\frac{5}{4}}{2} = \frac{5}{4} : \frac{2}{1} = \frac{5}{4} \cdot \frac{1}{2} = \frac{5}{8}$$

5)
$$1 - \frac{\frac{7}{12}}{\frac{21}{24}} = 1 - \frac{7}{12} : \frac{21}{24} = 1 - \frac{7}{12} \cdot \frac{24}{21} = 1 - \frac{2}{3} = \frac{3}{3} - \frac{2}{3} = \frac{1}{3}$$

6)
$$\frac{\frac{2 \cdot \frac{5}{14}}{\frac{28}{35}}}{\frac{4}{7}} = \frac{\frac{5}{7}}{\frac{4}{7}} = \frac{5}{7} : \frac{4}{7} = \frac{5}{7} \cdot \frac{7}{4} = \frac{5}{4}$$

7)
$$\frac{\frac{\frac{3}{8}}{\frac{7}{10} : \frac{14}{5}}}{\frac{1}{4}} = \frac{\frac{3}{8}}{\frac{1}{4}} = \frac{3}{8} : \frac{1}{4} = \frac{3}{8} \cdot \frac{4}{1} = \frac{3}{2}$$

8)
$$\frac{\frac{9-3}{1 - \frac{8}{16}}}{\frac{2}{2} - \frac{1}{2}} = \frac{6}{\frac{1}{2}} = 6 : \frac{1}{2} = 6 \cdot \frac{2}{1} = 12$$

9)
$$4 \cdot \frac{12}{\frac{24}{5}} = \begin{cases} \frac{48}{\frac{24}{5}} = 48 : \frac{24}{5} = 48 \cdot \frac{5}{24} = 10 \\ 4 \cdot 12 : \frac{24}{5} = 4 \cdot 12 \cdot \frac{5}{24} = 4 \cdot \frac{5}{2} = 10 \end{cases}$$

10)
$$\frac{6 - \frac{2}{3}}{6} = \frac{\frac{18}{3} - \frac{2}{3}}{6} = \frac{\frac{16}{3}}{6} = \frac{16}{3} : 6 = \frac{16}{3} \cdot \frac{1}{6} = \frac{8}{9}$$

11)
$$\frac{\frac{4}{1+2} - 1}{1+2} = \frac{\frac{4}{3} - 1}{3} = \frac{\frac{4}{3} - \frac{3}{3}}{3} = \frac{\frac{1}{3}}{3} = \frac{1}{3} : 3 = \frac{1}{3} \cdot \frac{1}{3} = \frac{1}{9}$$

$$1) \quad \frac{\frac{3 \cdot 1}{3 \cdot 7} + \frac{4 \cdot 7}{9 \cdot 7}}{\frac{5 \cdot 2}{5 \cdot 9} + \frac{3 \cdot 3}{5 \cdot 5}} = \frac{\frac{3}{63} + \frac{28}{63}}{\frac{10}{45} + \frac{27}{45}} = \frac{\frac{31}{63}}{\frac{37}{45}} = \frac{31}{63} : \frac{37}{45} = \frac{31}{63} \cdot \frac{45}{37} = \frac{5}{7}$$

$$2) \quad \left(\frac{\frac{10}{8} + \frac{15}{9}}{\frac{3}{3}} \right) \cdot 0,1 = \frac{10}{3} \cdot \frac{1}{10} = \frac{1}{3}$$

$$3) \quad \frac{2 + \frac{14}{3}}{2 \cdot \frac{14}{3}} = \frac{\frac{6}{3} + \frac{14}{3}}{\frac{28}{3}} = \frac{\frac{20}{3}}{\frac{28}{3}} = \frac{20}{3} : \frac{28}{3} = \frac{20}{3} \cdot \frac{3}{28} = \frac{5}{7}$$

$$4) \quad \frac{\frac{5}{7} + \frac{5}{6}}{\frac{2}{3} - \frac{3}{7}} = \frac{\frac{30}{42} + \frac{35}{42}}{\frac{14}{21} - \frac{9}{21}} = \frac{\frac{65}{42}}{\frac{5}{21}} = \frac{65}{42} : \frac{5}{21} = \frac{65}{42} \cdot \frac{21}{5} = \frac{13}{2}$$

$$5) \quad 2 \cdot \left(\frac{1}{3} + \frac{5}{6} \right) - 3 \cdot \frac{1}{2} = 2 \cdot \frac{7}{6} - \frac{3 \cdot 3}{2 \cdot 3} = \frac{14}{6} - \frac{9}{6} = \frac{5}{6}$$

$$6) \quad 4 \cdot \frac{2}{5} - \frac{2 \cdot 3}{5 \cdot 2} - \frac{1 \cdot 2}{2 \cdot 5} = \frac{8}{5} - \frac{3}{5} - \frac{1}{5} = \frac{4}{5}$$

$$7) \quad 2 - \frac{6}{5} \cdot \left(\frac{11}{6} - \frac{4}{9} \right) = 2 - \frac{6}{5} \cdot \left(\frac{33}{18} - \frac{8}{18} \right) = 2 - \frac{6}{5} \cdot \frac{25}{18} = 2 - \frac{5}{3} = \frac{6}{3} - \frac{5}{3} = \frac{1}{3}$$

$$8) \quad \frac{\frac{1 \cdot 3}{4 \cdot 2} + \frac{5}{2}}{\frac{1}{4} + \frac{3 \cdot 5}{2 \cdot 2}} = \frac{\frac{3}{8} + \frac{5}{2}}{\frac{1}{4} + \frac{15}{4}} = \frac{\frac{3}{8} + \frac{20}{8}}{\frac{16}{4}} = \frac{\frac{23}{8}}{4} = \frac{23}{8} : 4 = \frac{23}{8} \cdot \frac{1}{4} = \frac{23}{32}$$

Zlomky a celá čísla 13 – Opakování

$$1) \left(\frac{2}{7} - \frac{3}{21} \right) \cdot \frac{7}{6} + \frac{7}{12} = \frac{1}{7} \cdot \frac{7}{6} + \frac{7}{12} = \frac{1}{6} + \frac{7}{12} = \frac{2}{12} + \frac{7}{12} = \frac{9}{12} = \frac{3}{4}$$

$$2) \frac{12}{27} : \left(\frac{4}{3} - \frac{1}{6} \cdot \frac{8}{3} \right) = \frac{12}{27} : \left(\frac{4}{3} - \frac{4}{3} \right) = \frac{12}{27} : \left(\frac{12}{3} - \frac{4}{3} \right) = \frac{12}{27} : \frac{8}{3} = \frac{12}{27} \cdot \frac{3}{8} = \frac{12}{24} \cdot \frac{1}{2} = \frac{1}{2}$$

$$3) \frac{0,5 + \frac{2}{7}}{1 \frac{2}{9} \cdot 2 \frac{4}{7}} = \frac{\frac{1}{2} + \frac{2}{7}}{\frac{11}{9} \cdot \frac{18}{7}} = \frac{\frac{7}{14} + \frac{4}{14}}{\frac{22}{7}} = \frac{\frac{11}{14}}{\frac{22}{7}} = \frac{11}{14} : \frac{22}{7} = \frac{11}{14} \cdot \frac{7}{22} = \frac{1}{4}$$

$$4) \frac{\frac{5}{8} - \frac{4}{35}}{1 + \frac{1}{3} - \frac{2}{7}} = \frac{\frac{2}{21}}{\frac{21}{21} + \frac{1}{21} - \frac{6}{21}} = \frac{\frac{2}{21}}{\frac{16}{21}} = \frac{2}{16} : \frac{22}{21} = \frac{2}{21} \cdot \frac{21}{22} = \frac{1}{11}$$

$\hookrightarrow 1 = \frac{1}{1} = \frac{21}{21}$

$$5) \frac{\frac{1}{4} + \frac{2}{3}}{\left(3 - \frac{9}{4} \right) \cdot \frac{8}{3}} = \frac{\frac{5}{12} + \frac{8}{12}}{\left(\frac{12}{4} - \frac{9}{4} \right) \cdot \frac{8}{3}} = \frac{\frac{11}{12}}{\frac{3}{4} \cdot \frac{8}{3}} = \frac{\frac{11}{12}}{\frac{2}{1}} = \frac{11}{12} : \frac{2}{1} = \frac{11}{12} \cdot \frac{1}{2} = \frac{11}{24}$$

$\hookrightarrow \frac{3}{4} = \frac{12}{12}$

$$6) \frac{\frac{9}{4} : \frac{15}{2}}{\frac{3}{8} \cdot \frac{2}{15} + \frac{2}{5}} = \frac{\frac{3}{2} \cdot \frac{2}{15}}{\frac{1}{5} + \frac{2}{5}} = \frac{\frac{3}{10}}{\frac{3}{5}} = \frac{3}{10} : \frac{3}{5} = \frac{3}{10} \cdot \frac{5}{3} = \frac{1}{2}$$

$$7) \frac{2 \cdot \frac{5}{6} - \frac{1}{3}}{10} = \frac{\frac{5}{3} - \frac{1}{3}}{10} = \frac{\frac{4}{3}}{10} = \frac{4}{3} : 10 = \frac{4}{3} \cdot \frac{1}{10} = \frac{2}{15}$$

$$8) \frac{2 \frac{3}{4} - \frac{2}{3}}{\frac{3}{5} \cdot \frac{2}{15} + \frac{2}{5}} = \frac{\frac{33}{12} - \frac{8}{12}}{\frac{1}{5} - \frac{1}{5} + \frac{2}{5}} = \frac{\frac{25}{12}}{\frac{2}{5}} = \frac{25}{12} : \frac{2}{5} = \frac{25}{12} \cdot \frac{5}{2} = \frac{25}{12} \cdot \frac{5}{2} = \frac{25}{6}$$

Zlomky a celá čísla 14

Vypočítej

1) Kolik je $\frac{1}{2}$ z 500 Kč? ↗ krát

$$\frac{1}{2} \cdot 500 = 250 \text{ Kč}$$

2) Kolik jsou $\frac{3}{4}$ z 400 Kč?

$$\frac{3}{4} \cdot 400 = 300 \text{ Kč}$$

3) Kolik je $\frac{1}{4}$ z 600 Kč?

$$\frac{1}{4} \cdot 600 = \frac{1}{2} \cdot 300 = 150 \text{ Kč}$$

4) Kolik je $\frac{1}{5}$ z 800 Kč?

$$\frac{1}{5} \cdot 800 = 160 \text{ Kč}$$

$$800 : 5 = 160$$

5) Kolik jsou $\frac{2}{3}$ z 900 Kč?

$$\frac{2}{3} \cdot 900 = 2 \cdot 300 = 600 \text{ Kč}$$

6) Kolik je $\frac{5}{7}$ z 1400 Kč?

$$\frac{5}{7} \cdot 1400 = 1000 \text{ Kč}$$

7) Z celé pizzy sním $\frac{5}{6}$.

Kolik mi zbyde?



$$1 - \frac{5}{6} = \frac{6}{6} - \frac{5}{6} = \frac{1}{6} \text{ pizzy}$$

↑
celá

8) Víkend tvoří $\frac{2}{7}$ týdne.

Kolik tvoří pracovní dny?

$$1 - \frac{2}{7} = \frac{7}{7} - \frac{2}{7} = \frac{5}{7} \text{ týdne}$$

9) Z baterie spotřebuji $\frac{3}{10}$ energie.

Kolik mi zbyde?

$$1 - \frac{3}{10} = \frac{10}{10} - \frac{3}{10} = \frac{7}{10} \text{ baterie}$$

10) Z 800 g mouky odeberu $\frac{1}{4}$.

Kolik mi zbyde?

$$\frac{1}{4} \cdot 800 = 200 \text{ g}$$

$$800 - 200 = 600 \text{ g}$$

$$1 - \frac{1}{4} = \frac{3}{4}$$

$$\frac{3}{4} \cdot 800 = 600 \text{ g}$$

11) Z úspor 2000 Kč jsem si vzal $\frac{1}{4}$ na

výlet. Kolik mi zbylo v kasičce?

$$\frac{1}{4} \cdot 2000 = 500$$

$$2000 - 500 = 1500 \text{ Kč}$$

12) Z 24 hodin dne spím $\frac{1}{3}$. Kolik hodin

jsem vzhůru?

$$1 - \frac{1}{3} = \frac{2}{3} - \frac{1}{3} = \frac{2}{3}$$

$$\frac{2}{3} \cdot 24 = 16 \text{ hodin}$$

Zlomky a celá čísla 15 – slovní úlohy

1) Matěj prospí $\frac{5}{12}$ dne. Kolik hodin je vzhůru?

$$\begin{aligned} 1, 2p. \quad \frac{5}{12} \approx 24 \text{ hodin} &\rightarrow \frac{5}{12} \cdot 24 = 10 \text{ h} \\ 24 - 10 &= 14 \text{ h} \\ 1, 2p. \quad 1 - \frac{5}{12} &= \frac{12}{12} - \frac{5}{12} = \frac{7}{12} \quad \frac{7}{12} \cdot 24 = 14 \text{ h} \\ \text{celý den} & \\ O: \text{Matěj je vzhůru } 14 \text{ hodin} \end{aligned}$$

3) Na maturitním plesu Gymnázia Čelákovice bylo v tombole 36 cen. Škola zajistila $\frac{2}{9}$ cen, zbytek přinesli žáci. Kolik cen zajistili žáci?

$$\begin{aligned} \text{škola} \\ \frac{2}{9} \text{ cen} &\rightarrow \frac{2}{9} \approx 36 \text{ cen} = \frac{2}{9} \cdot 36 = 8 \text{ cen} \\ \text{žáci} \\ 36 - 8 &= 28 \text{ cen} \\ O: \text{Žáci zajistili } 28 \text{ cen.} \end{aligned}$$

5) Tatínek si spočítal, že ve škole strávil dvě pětiny svého dosavadního života. Celkem studoval 18 let. Kolik let je tatínkovi nyní?

$$\begin{aligned} \frac{2}{5} \text{ života} &\dots\dots 18 \text{ let} \\ \cdot 2 &\left(\frac{1}{5} \text{ života} \dots\dots 9 \text{ let} \right) \cdot 2 \\ \cdot 5 &\left(\frac{1}{5} = 1 \text{ život} \dots\dots 45 \text{ let} \right) \cdot 5 \\ \text{Tatínkovi je nyní } &45 \text{ let} \end{aligned}$$

7) Lenka měla našetřeno 1750 Kč. Za svetr utratila $\frac{4}{7}$ svých úspor. Za knihu utratila $\frac{1}{3}$ zbytku. Kolik korun jí zůstalo po obou nákupech?

$$\begin{aligned} \text{utratila } \frac{4}{7} &\rightarrow \text{zbylo } \frac{3}{7} \\ \frac{3}{7} \approx 1750 &= \frac{3}{7} \cdot 1750 = 750 \text{ Kč} \\ 1750 : 7 &= 250 \\ 3500 & \\ O: \text{Lence zbylo } 500 \text{ Kč.} \end{aligned}$$

2) Délka řeky je 210 km. Vodáci sjeli tři pětiny jejího toku. Kolik kilometrů řeky jim ještě zbývá sjet?

$$\begin{aligned} \frac{5}{5} - \frac{3}{5} &= \frac{2}{5} \text{ zbývá} \\ \frac{2}{5} \approx 210 &= \frac{2}{5} \cdot 210 = 84 \text{ km} \\ 210 : 5 &= 42 \\ O: \text{Vodákům zbývá } 84 \text{ km.} \end{aligned}$$

4) Tatínek šel do řeznictví nakoupit maso. Koupil $1\frac{1}{4}$ kg vepřového masa, $1\frac{1}{5}$ kg hovězího masa, $1\frac{1}{8}$ kg kuřecího masa. Jakou hmotnost měl jeho nákup? Výsledek uveď ve smíšeném čísle.

$$\begin{aligned} 1\frac{1}{4} + 1\frac{1}{5} + 1\frac{1}{8} &= \frac{10}{4} + \frac{6}{5} + \frac{9}{8} = \frac{50}{40} + \frac{48}{40} + \frac{45}{40} = \frac{143}{40} = 3\frac{23}{40} \\ \hookrightarrow \frac{14+1}{4} &= \frac{5}{4} \quad \frac{143}{40} : 40 = 3 \text{ (zby. 23)} \\ O: \text{Nákup měl hmotnost } 3\frac{23}{40} \text{ kg.} \end{aligned}$$

6) Klárka měla odpoledne $2\frac{1}{4}$ hodiny volného času. Ze svého volného času věnovala $\frac{2}{3}$ sportu a 30 minut se dívala na televizi. Kolik času jí zbylo na čtení knihy?

$$\begin{aligned} \frac{1}{3} \text{ času sportovala} &\rightarrow \frac{1}{3} \text{ času měla volno} \\ \frac{1}{3} \approx 2\frac{1}{4} \text{ hodiny} &= \frac{1}{3} \cdot \frac{9}{4} = \frac{3}{4} \text{ hodiny} = 45 \text{ minut} \\ 45 \text{ minut} - 30 \text{ minut} &= 15 \text{ minut} \\ O: \text{Na čtení jí zbylo } 15 \text{ minut.} \end{aligned}$$

8) Adam měl plnou 90 litrovou nádrž u auta. Třetinu spotřeboval cestou na dovolenou a polovinu zbytku během dovolené. Kolik mu zbývá na cestu zpět?

	spotřeboval	zbylo
90 litrů	$\frac{1}{3} \cdot 90 = 30$	$90 - 30 = 60$
60 litrů	$\frac{1}{2} \cdot 60 = 30$	$60 - 30 = 30$

O: Adamovi zbývá 30 litrů.

Zlomky a celá čísla 16 – slovní úlohy (cermat 7. ročník)

1) Zapište zlomkem v základním tvaru dvě pětiny z $\frac{30}{24}$.

$$\frac{2}{5} \approx \frac{30}{24} = \frac{\overset{1}{2} \cdot \overset{6}{30}}{\underset{1}{5} \cdot \underset{12}{24}} = \frac{6}{12} = \frac{1}{2}$$

2) Z 24 litrového sudu odlijeme nejdříve tři osminy objemu, později ještě jednu třetinu zbytku. Kolik litrů vody v sudu zůstalo?

$$\begin{aligned} \frac{3}{8} \approx 24 &= \frac{3}{8} \cdot 24 = 9 & 24 - 9 &= 15 \text{ litrů} \\ \frac{1}{3} \approx 15 &= \frac{1}{3} \cdot 15 = 5 & 15 - 5 &= \underline{10 \text{ litrů}} \end{aligned}$$

1, způsob

$$\frac{2}{3} \approx \left[\frac{5}{8} \approx 24 \right] = \frac{2}{3} \cdot \frac{5}{8} \cdot 24 = 10 \text{ litrů}$$

O: V sudu zbylo 10 litrů vody.

3) Kolik je $\frac{5}{6}$ z takového čísla, které je rovno $\frac{2}{3}$ z 270?

$$1, \frac{2}{3} \approx 270 = \frac{2}{3} \cdot 270 = 180$$

$$2, \frac{5}{6} \approx 180 = \frac{5}{6} \cdot 180 = \underline{150}$$

4) Závodník uběhl celou trasu za 3 hodiny. Během první hodiny uběhl třetinu celé trasy. Během poslední hodiny uběhl jen 9 km, což byla čtvrtina celé trasy. Vypočítejte, kolik km uběhl závodník během druhé hodiny.

$$\begin{aligned} \frac{1}{4} \text{ trasy} &\dots\dots 9 \text{ km} \\ \frac{1}{4} \text{ trasy} &\dots\dots 36 \text{ km} \quad \downarrow :4 \\ &\rightarrow \text{třetina trasy} \quad 36 : 3 = 12 \text{ km} \\ \begin{matrix} 1.h & 2.h & 3.h \end{matrix} \\ 36 - 12 - 9 &= 15 \end{aligned}$$

O: Závodník během druhé hodiny uběhl 15 km.

5) Zájezd byl zdražen o pětinu na 3 600 korun. O kolik korun byl zájezd zdražen?

$$1 + \frac{1}{5} = \frac{6}{5}$$

$$\frac{6}{5} \text{ ceny} \dots\dots 3600$$

$$\rightarrow \frac{1}{5} \text{ ceny} : 3600 : 6 = 600$$

$$\frac{1}{5} \text{ ceny} \dots\dots 600$$

$$\frac{5}{5} \text{ ceny (původní cena)} \dots\dots 3000$$

$$\begin{aligned} &\cdot 5 \quad 2k \\ &3000 : 5 = 600 \\ &3000 + 600 = 3600 \checkmark \end{aligned}$$

O: 0 600 Kč

6) Během prosince ze skladu odvezli pětinu posypové soli, a ve skladu tak zbylo ještě 9 000 kg posypové soli. Kolik kg posypové soli odvezli ze skladu během prosince?

$$1 - \frac{1}{5} = \frac{5}{5} - \frac{1}{5} = \frac{4}{5}$$

ke skladu zbyly $\frac{4}{5}$ zásob.

$$\begin{aligned} \frac{4}{5} &\dots\dots 9000 \\ \frac{1}{5} &\dots\dots 2250 \end{aligned} \quad \downarrow :4$$

$$\begin{aligned} 9000 : 4 &= 2250 \\ 10 & \\ 20 & \\ 00 & \end{aligned}$$

O: Během prosince odvezli 2250 kg.

Zlomky a celá čísla 17 – slovní úlohy (cermat 7. ročník)

1) Pepa už přečetl třetinu skvělé knížky o rychlovlacích a když přečte ještě 26 stránek, bude v půlce. Kolik má knížka o rychlovlacích stran?

$$\begin{array}{c} \frac{1}{3} \quad ? \quad \frac{1}{2} \\ \hline 1 - \frac{1}{3} - \frac{1}{2} = \frac{6}{6} - \frac{2}{6} - \frac{3}{6} = \frac{1}{6} \end{array}$$

$$\begin{array}{l} \frac{1}{6} \text{ knížky} \dots\dots 26 \text{ str.} \\ \text{knížka} \dots\dots 156 \text{ str.} \end{array} \cdot 6$$

O: Kniha má 156 stránek.

3) Vypočítejte, o kolik litrů se liší tři čtvrtiny z 24 litrů a třetina z 12 litrů.

$$\begin{array}{l} \frac{3}{4} \cdot 24 = 18 \text{ litrů} \\ \frac{1}{3} \cdot 12 = 4 \text{ litrů} \\ 18 - 4 = 14 \end{array}$$

O: Liší se o 14 litrů

5) Vítek, Ondra a Rudolf jeli společně autem k moři. Každý z nich odřídil část trasy. Vítek odřídil třetinu celé trasy, Ondra dvě pětiny celé trasy a zbytek trasy odřídil Rudolf. Rudolf odřídil o 60 km méně než Vítek. Vypočítejte, kolik km měřila celá trasa.

$$\begin{array}{c} \text{Vítek} \quad \frac{1}{3} \quad \text{Ondra} \quad \frac{2}{5} \quad \text{Rudolf} \quad ? \left(\frac{4}{15} \right) \\ \hline \text{celá trasa} \\ R: 1 - \frac{1}{3} - \frac{2}{5} = \frac{15}{15} - \frac{5}{15} - \frac{6}{15} = \frac{4}{15} \\ V: \frac{1}{3} \text{ trasy} \quad \frac{1}{15} \quad \frac{1}{3} - \frac{4}{15} = \frac{5}{15} - \frac{4}{15} = \frac{1}{15} \\ R: \frac{1}{15} \text{ trasy} \quad 60 \text{ km} \end{array}$$

$$\begin{array}{l} \frac{1}{15} \text{ trasy} \dots\dots 60 \text{ km} \\ 60 \cdot 15 = 900 \text{ km} \dots\dots \text{celá trasa} \end{array}$$

O: Celá trasa měří 900 km.

2) Po jarních prázdninách postupně onemocnělo mnoho žáků.

V pondělí chyběla $\frac{1}{6}$ všech žáků školy. V úterý byla nemocná

již $\frac{1}{4}$ všech žáků školy. V pátek byla ve škole už jen $\frac{1}{3}$ všech žáků školy, tedy 80 nejodolnějších žáků. Všichni ostatní žáci školy byli nemocní. O kolik nemocných žáků bylo v úterý více než v pondělí.

$$\begin{array}{l} \frac{1}{3} \text{ žáků} \dots\dots 80 \text{ žáků} \\ \text{všichni} \dots\dots 240 \end{array} \cdot 3$$

$$\begin{array}{l} \text{Pon: } \frac{1}{6} \cdot 240 = 40 \text{ žáků} \\ \text{Út: } \frac{1}{4} \cdot 240 = 60 \text{ žáků} \\ 60 - 40 = 20 \end{array}$$

O: V úterý chybělo o 20 žáků víc než v pondělí.

4) Výrobek zdražený o čtvrtin původní ceny stojí 35 Kč.

Kolik Kč by stál výrobek zdražený jen o sedminu původní ceny?

$$\begin{array}{l} \text{o } \frac{1}{4} \text{ dražší} \\ \hookrightarrow \frac{5}{4} \text{ původní ceny} \dots\dots 35 \text{ Kč} \\ \frac{1}{4} \text{ původní ceny} \dots\dots 7 \text{ Kč} \\ \frac{1}{4} = \text{původní cena} \dots\dots 28 \text{ Kč} \end{array} \cdot 4$$

$$\begin{array}{l} 28 : 7 = 4 \\ 28 + 4 = 32 \text{ Kč} \end{array}$$

O: Výrobek by stál 32 Kč

6) V pondělí znečištěná plocha pokrývala šestnáctinu plochy hladiny rybníka. V každém z dalších dnů byla velikost znečištěné plochy na hladině rybníka vždy dvakrát větší než o den dříve. V kterém dnu bude znečištěna polovina rybníka?

$$\begin{array}{c} \text{Pon} \quad \text{Út} \quad \text{St} \quad \text{Čt} \\ \frac{1}{16} \xrightarrow{\cdot 2} \frac{1}{8} \xrightarrow{\cdot 2} \frac{1}{4} \xrightarrow{\cdot 2} \frac{1}{2} \\ \frac{1}{16} \cdot 2 = \frac{1}{8} \quad \frac{1}{8} \cdot 2 = \frac{1}{4} \\ \frac{1}{4} \cdot 2 = \frac{1}{2} \end{array}$$

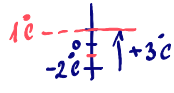
O: Polovina rybníka byla znečištěna ve čtvrtek.

Zlomky a celá čísla 18 – sčítání celých čísel

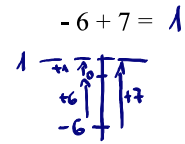
$$+3 - 2 = 1$$



$$-2 + 3 = 1$$



$$7 - 6 = 1$$

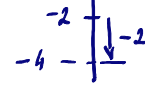
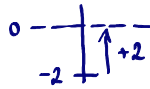


$$2 + 2 = 4$$

$$+2 - 2 = 0$$

$$-2 + 2 = 0$$

$$-2 - 2 = -4$$

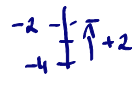


$$+4 + 2 = 6$$

$$+4 - 2 = 2$$

$$-4 + 2 = -2$$

$$-4 - 2 = -6$$

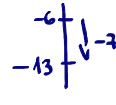
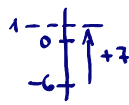
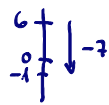


$$6 + 7 = 13$$

$$6 - 7 = -1$$

$$-6 + 7 = 1$$

$$-6 - 7 = -13$$

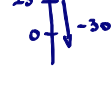
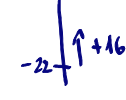
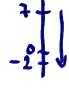
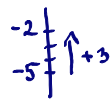


$$-5 + 3 = -2$$

$$7 - 9 = -2$$

$$-22 + 16 = -6$$

$$25 - 30 = -5$$



$$8 - 5 = 3$$

$$-4 + 1 = -3$$

$$15 + 9 = 24$$

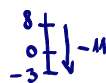
$$-15 - 9 = -24$$

$$-4 - 7 = -11$$

$$-9 - 5 = -14$$

$$8 - 11 = -3$$

$$11 - 8 = 3$$

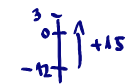


$$-12 + 15 = 3$$

$$-7 + 8 = 1$$

$$-11 - 8 = -19$$

$$11 + 8 = 19$$

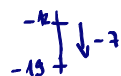
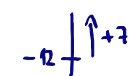


$$-12 + 7 = -5$$

$$-12 - 7 = -19$$

$$17 - 5 = 12$$

$$-5 + 17 = 12$$

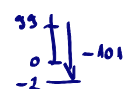
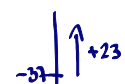


$$-37 + 23 = -14$$

$$-45 + 60 = 15$$

$$-120 - 35 = -155$$

$$99 - 101 = -2$$



$1 + - 1$ $1 + (-1)$
Neuší správný zápis *ok*
Zlomky a celá čísla 19 – závorky a celá čísla

$$1 + (-1) = 1 - 1 = 0$$

$$+(- \rightarrow -$$

$$1 - (+1) = 1 - 1 = 0$$

$$-(+ \rightarrow -$$

$$2 + (-1) = 2 - 1 = 1$$

$$\ominus$$

$$2 - (+1) = 2 - 1 = 1$$

$$\ominus$$

$$-5 + (-2) = -5 - 2 = -7$$

Todle řeším *Todle pakoi k 5*

$$\ominus$$

$$4 - (-7) = 4 + 7 = 11$$

$$+$$

$$-11 + (-2) = -11 - 2 = -13$$

$$\ominus$$

$$9 + (-12) = 9 - 12 = -3$$

$$+$$

$$27 - (-15) = 27 + 15 = 42$$

$$+$$

$$-27 - (-15) = -27 + 15 = -12$$

$$+$$

$$(-14) + 5 = -14 + 5 = -9$$

$$-(-14) - 5 = 14 - 5 = 9$$

$$+$$

$$9 - (-16) = 9 + 16 = 25$$

$$+$$

$$-12 - (-7) = -12 + 7 = -5$$

$$+$$

$$9 - (+7) = 9 - 7 = 2$$

$$+$$

$$11 - (-12) = 11 + 12 = 23$$

$$+$$

$$1 + (+1) = 1 + 1 = 2$$

$$+(+ \rightarrow +$$

$$1 - (-1) =$$

$$-(- \rightarrow +$$

$$2 - (-1) = 2 + 1 = 3$$

$$+$$

$$2 - (+1) = 2 - 1 = 1$$

$$\ominus$$

$$-5 - (-2) = -5 + 2 = -3$$

$$+$$

$$4 + (-7) = 4 - 7 = -3$$

$$\ominus$$

$$-11 + (+2) = -11 + 2 = -9$$

$$+$$

$$9 - (-12) = 9 + 12 = 21$$

$$+$$

$$27 - (+15) = 27 - 15 = 12$$

$$\ominus$$

$$-27 + (-15) = -27 - 15 = -42$$

$$\ominus$$

$$-(-14) + 5 = 14 + 5 = 19$$

$$+$$

$$-(-14) - (-5) = 14 + 5 = 19$$

$$+$$

$$+$$

$$-(-16) + 9 = 16 + 9 = 25$$

$$+$$

$$+$$

$$-14 + (-5) = -14 - 5 = -19$$

$$\ominus$$

$$10 + (-7) = 10 - 7 = 3$$

$$\ominus$$

$$13 + (-7) = 13 - 7 = 6$$

$$\ominus$$

Zlomky a celá čísla 20 - procvičování

$$\begin{array}{l} - (+ \rightarrow -) \quad + (+ \rightarrow +) \\ + (- \rightarrow -) \quad - (- \rightarrow +) \end{array}$$

$$1) \quad (-2) + (-1) - (-3) + (-6) = -2 - 1 + 3 - 6 = -6$$

$$2) \quad -(-4) + (-5) - (-6) + (-7) = +4 - 5 + 6 - 7 = -2$$

$$3) \quad -(-4+6) + (-6-9) = -(2) + (-15) = -2 - 15 = -17$$

$-4+6=2$

Nemůžu odstranit znaménko

$$4) \quad -(-8+5) + (-3-4) = -(-3) + (-7) = 3 - 7 = -4$$

$-8+5=-3$ $-3-4=-7$

čeká až bude hotová závorka

$$5) \quad -[-2 - (-5)] = -[-2+5] = -[3] = -3$$

čeká

$$6) \quad 5 - (-2) - [-(-4)] = 5 + 2 - [+4] = 5 + 2 - 4 = 3$$

závorka je navíc

$$7) \quad 6 - (+11) + [-(-2)] = 6 - 11 - 2 = -5 - 2 = -7$$

čeká už je to jediné číslo

$$8) \quad 4 + (-7) - [-5 + (-2)] = 4 - 7 - [-5 - 2] = 4 - 7 - [-7] = 4 - 7 + 7 = 4$$

čeká

$$9) \quad -(-3) - [3 - 5 + 3 - (-6)] = 3 - [3 - 5 + 3 + 6] = 3 - [7] = -4$$

$$10) \quad -[(-2) - 2] + (-1) = -[2 - 2] - 1 = -[0] - 1 = -1$$

0

Zlomky a celá čísla 21 – násobení celých čísel

$$\underbrace{1+1}_{2 \cdot 1} = 2$$

$$\underbrace{-1-1}_{2 \cdot (-1)} = -2$$

$$4+4+4 = 12$$

$$\underbrace{-4-4-4}_{3 \cdot (-4)} = -12$$

$$2 \cdot 1 = 2$$

$$2 \cdot (-1) = -2$$

dvakrát dluh

$$3 \cdot 4 = 12$$

$$3 \cdot (-4) = -12$$

$$(+ 2) \cdot (+ 2) = 4$$

Plus se nepíše, ale jsou tam

$$+ 2 \cdot (-2) = -4$$

$2 \cdot (-2) = -2 \cdot 2$

$$-2 \cdot 2 = -4$$

$$-2 \cdot (-2) = +4$$

napišeme

$$\oplus \cdot \oplus \rightarrow \oplus$$

$$\oplus \cdot \ominus \rightarrow \ominus$$

$$\ominus \cdot \oplus \rightarrow \ominus$$

$$\ominus \cdot \ominus \rightarrow \oplus$$

1. krok znaménko 2. krok součin

$$5 \cdot 4 = 20$$

$$5 \cdot (-4) = -20$$

$\oplus \cdot \ominus \rightarrow \ominus$

$$-5 \cdot 4 = -20$$

$\ominus \cdot \oplus \rightarrow \ominus$

$$-5 \cdot (-4) = +20$$

$\ominus \cdot \ominus \rightarrow \oplus$

$$-3 \cdot (-3) = 9$$

$$-12 \cdot (-2) = 24$$

$$8 \cdot 8 = 64$$

$\oplus \cdot \oplus$

$$6 \cdot (-6) = -36$$

$$-9 \cdot (-5) = 45$$

$$-8 \cdot 4 = -32$$

$$-5 \cdot 11 = -55$$

$$6 \cdot (-4) = -24$$

$$7 \cdot (-7) = -49$$

$$-7 \cdot (-7) = 49$$

$$-6 \cdot 5 = -30$$

$$40 \cdot (-5) = -200$$

$$(-1) \cdot (-1) \cdot (-2) = 1 \cdot (-2) = -2$$

1. možnosť $\rightarrow$ postupne

$$(-1) \cdot (-1) \cdot 2 = +2$$

2. možnosť [pro těžší příklady]

$\rightarrow$ jen násobíme tak znaménko rovnou

$$7 \cdot (-2) \cdot 3 = -14 \cdot 3 = -42$$

$$5 \cdot (-3) \cdot (-2) = +30$$

2 minus 3

$$-6 \cdot (-4) \cdot (-1) = +24 \cdot (-1) = -24$$

$$(-4) \cdot (-2) \cdot (-2) = -16$$

3 minus

$$-8 \cdot 3 \cdot (-2) = -24 \cdot (-2) = 48$$

2 minus $\rightarrow +$

$$6 \cdot (-4) \cdot (-1) = -24 \cdot (-1) = 24$$

2 minus

$$-10 \cdot 10 \cdot (-10) = 1000$$

$$-10 \cdot (-10) \cdot (-10) = -1000$$

3 minus

$$-1 \cdot 1 \cdot (-1) \cdot 1 \cdot (-1) \cdot (-1) = 1$$

4 minus

$$-1 \cdot (-1) \cdot (-2) \cdot 1 \cdot 2 \cdot (-2) = 8$$

4 minus $\rightarrow +$

Zlomky a celá čísla 22 – dělení celých čísel

$\oplus : \oplus \rightarrow \oplus$ $\oplus : \ominus \rightarrow \ominus$
 $\ominus : \ominus \rightarrow \oplus$ $\ominus : \oplus \rightarrow \ominus$
 1. krok - znaménko 2. krok dělíme

$$4 : 2 = 2$$

$$-4 : (-2) = +2$$

$\ominus : \ominus \rightarrow \oplus$

$$9 : 3 = 3$$

$$-9 : (-3) = 3$$

$$-4 : 2 = -2$$

$\ominus : \oplus \rightarrow \ominus$

$$4 : (-2) = -2$$

$\oplus : \ominus \rightarrow \ominus$

$$-9 : 3 = -3$$

$$9 : (-3) = -3$$

$$10 : 2 = 5$$

$$10 : (-2) = -5$$

$$25 : (-5) = -5$$

$$25 : 5 = 5$$

$$-10 : (-2) = 5$$

$$-10 : 2 = -5$$

$$-25 : 5 = -5$$

$$-25 : (-5) = 5$$

$$20 : (-5) = -4$$

$$-20 : (-5) = 4$$

$$-36 : (-6) = 6$$

$$64 : (-8) = -8$$

$$-21 : 7 = -3$$

$$21 : (-7) = -3$$

$$-84 : (-2) = 42$$

$$125 : 25 = 5$$

$$1) (-5-3) : 4 = -8 : 4 = -2$$

→ odčítání → NEPLÉST S PRAVIDLY PRO NÁSOBENÍ

$\ominus \ominus \rightarrow \oplus$

$$2) (-5-3) : (-4) = -8 : (-4) = 2$$

→ počítám zleva do prava

$$3) (-3) \cdot (-1) : (-3) = 3 : (-3) = -1$$

$$4) -16 : [-2 + (-2)] = -16 : [-2 - 2] = -16 : [-4] = 4$$

$\ominus$

$$5) 8 : (-2) + 8 : 4 = -4 + 2 = -2$$

$$6) 6 : [-(-2)] = 6 : [2] = 3$$

$$7) 8 \cdot (-6 + 8) : (-4) = 8 \cdot 2 : (-4) = 16 : (-4) = -4$$

$$8) (-6 : 2) : [-(-3)] = -3 : [3] = -1$$

$$9) 2 \cdot [(-4-2) : (-2)] = 2 \cdot [-6 : (-2)] = 2 \cdot [3] = 6$$

čeká na konec

$$10) [2 \cdot (-4) - 2] : (-2) = [-8 - 2] : (-2) = -10 : (-2) = 5$$

čeká na konec

Zlomky a celá čísla 23 – záporná desetinná čísla

Stejná znaménka → sečítám cely

$$+0,2 + 0,6 = 0,8$$

$$\text{Vzor: } -2 + 6 = 4$$

$$-0,2 + 0,6 = 0,4$$

$$\text{Vzor: } 2 - 6 = -4$$

$$0,2 - 0,6 = -0,4$$

$$\text{Vzor: } -2 - 6 = -8$$

$$-0,2 - 0,6 = -0,8$$

Různá znaménka – odečítám

$$3,2 - 2,4 = 0,8$$

$$+3,2 + 2,4 = 5,6$$

$$-3,2 - 2,4 = -5,6$$

$$\text{Vzor: } -3 + 2 = -1$$

$$-3,2 + 2,4 = -0,8$$

$$1 - 0,7 = 0,3$$

$$\begin{array}{r} 1,0 \\ -0,7 \\ \hline 0,3 \end{array}$$

$$-1 - 0,7 = -1,7$$

$$-1 + 0,7 = -0,3$$

$$1 + 0,7 = 1,7$$

$$0,3 + 0,02 = 0,32$$

$$0,3 - 0,02 = 0,28$$

$$-0,3 + 0,02 = -0,28$$

$$-0,3 - 0,02 = -0,32$$

$$\begin{array}{r} 0,30 \\ -0,02 \\ \hline 0,28 \end{array}$$

$$23,56 + 15,62 = 39,18$$

$$\begin{array}{r} 23,56 \\ +15,62 \\ \hline 39,18 \end{array}$$

$$-23,56 - 15,62 = -39,18$$

$$23,56 - 15,62 = 7,94$$

$$\begin{array}{r} 23,56 \\ -15,62 \\ \hline 7,94 \end{array}$$

$$-23,56 + 15,62 = -7,94$$

$$2,38 - 3 = -0,62$$

$$-2,38 - 3 = -5,38$$

$$2,38 + 3 = 5,38$$

$$-2,38 + 3 = 0,62$$

$$\begin{array}{r} 3,00 \\ -2,38 \\ \hline 0,62 \end{array}$$

$$\begin{array}{r} -2,38 \\ -3,00 \\ \hline -5,38 \end{array}$$

$$\begin{array}{r} 3,00 \\ -2,38 \\ \hline 0,62 \end{array}$$

$$-43,87 + 22,1 = -21,77$$

$$\begin{array}{r} 43,87 \\ -22,10 \\ \hline 21,77 \end{array}$$

$$-65,87 - 24,99 = -90,86$$

$$\begin{array}{r} 65,87 \\ +24,99 \\ \hline 90,86 \end{array}$$

$$-1,2 \cdot 2 = -2,4$$

1. krok znaménko
2. krok násobení

$$-0,24 \cdot (-5) = +1,2$$

$$\begin{array}{r} 0,24 \\ \times 5 \\ \hline 1,20 \end{array}$$

$$-0,05 \cdot (-0,08) = 0,004$$

$$\begin{array}{r} 0,05 \\ \times 0,08 \\ \hline 0,0040 \end{array}$$

$$17 : (-5) = -3,4$$

$$\begin{array}{r} 20 \\ 10 \end{array}$$

$$-13 : 4 = -3,25$$

$$\begin{array}{r} 10 \\ 20 \\ 0 \end{array}$$

Zlomky a celá čísla 24 – procvičování

1) $(-3) \cdot [-6 + 2 \cdot (9 - \underbrace{3 \cdot 5}_{-6})] = (-3) \cdot [-6 + 2 \cdot (-6)] = -3 \cdot [-18] = 54$

2) $2 + [(-4) + 5] \cdot [(-2) \cdot (-5)] = 2 + 10 = 12$

3) $1 + [-4 \cdot (-4 - 9) - 2 \cdot (-8 + 4)] = 1 + [60] = 61$

4) $(+4) \cdot [\underbrace{(+5) \cdot (-7) + (-9)}_{-35 - 9}] - (5 - 1) \cdot (-7) = 4 \cdot [-44] - 4 \cdot (-7) = -176 + 28 = -148$

5) $22 - [\underbrace{(-8) + (-5)}_{-8 - 5}] \cdot [(-1) \cdot (+7)] = 22 - [-13] \cdot [-7] = 22 + 13 \cdot [-7] = 22 - 91 = -69$

6) $[-(\underbrace{+7 - 2}_5) \cdot (\underbrace{-1 + 6}_5)] - (5) = [-5 \cdot 5] - 5 = -25 - 5 = -30$

7) $(-3) \cdot (-3) - 5 \cdot 5 - 4 \cdot (-4) = 9 - 25 + 16 = 0$

8) $6 - [\underbrace{-(-3) - (-4)}_{+3 + 4}] \cdot (-3) = 6 - [7] \cdot (-3) = 6 + 21 = 27$

9) $(-5) \cdot [\underbrace{(4 - 6) \cdot (-1 + 3) + 4}_0] - 2 = -5 \cdot [0] - 2 = -2$

10) $(\underbrace{-4 - 1}_{-5}) \cdot (\underbrace{+5 - 3}_2) \cdot (\underbrace{-2 + 3}_1) \cdot (\underbrace{-4 - 6}_{-10}) = \underbrace{-5 \cdot 2 \cdot 1}_{10} \cdot (-10) = 100$

Zlomky a celá čísla 25 – procvičování

$$1) \quad 3 \cdot (-4) + \overbrace{(2-8)}^{-6} \cdot (-2) = 3 \cdot (-4) - 6 \cdot (-2) = -12 + 12 = 0$$

$$2) \quad 36 : (-6) + 9 : (-3) = -6 - 3 = -9$$

$$3) \quad -12 - (10 - 4 \cdot 3) = -12 - (10 - 12) = -12 - (-2) = -12 + 2 = -10$$

$$4) \quad -30 - (-60 - 90) \cdot 2 = -30 - \underbrace{(-150)}_{\oplus} \cdot 2 = -30 + 150 \cdot 2 = -30 + 300 = 270$$

$$5) \quad 45 + 5 \cdot (-4) - 20 = 45 - 20 - 20 = 5$$

$$6) \quad 4 + 6 : 2 - 5 \cdot \overbrace{(-3+5)}^2 = 4 + 6 : 2 - 5 \cdot 2 = 4 + 3 - 10 = -3$$

$$7) \quad 0,4 - (0,2 - 0,35) = 0,4 - \overbrace{(-0,15)}^{\text{záporné znaménko}} = 0,4 + 0,15 = 0,55$$

$$\begin{array}{r} \text{L} \rightarrow \begin{array}{r} \text{202011} \\ 0,35 \\ -0,2 \\ \hline 0,15 \end{array} \end{array}$$

$$8) \quad 1,75 : (0,15 : 0,3) = 1,75 : 0,5 = 3,5$$

$$\begin{array}{r} 0,15 : 0,3 = 1,5 : 3 = 0,5 \\ \begin{array}{r} 0,15 \\ \cdot 3 \\ \hline 0,45 \end{array} \end{array} \quad \begin{array}{r} 1,75 : 0,5 = 17,5 : 5 = 3,5 \\ \begin{array}{r} 1,75 \\ \cdot 5 \\ \hline 8,75 \end{array} \end{array}$$

$$9) \quad \begin{array}{c} 80 - 120 \\ (80 - 40 \cdot 7) : 8 + 2 \cdot 12 = \end{array} \quad \begin{array}{c} -200 \\ (-200) : 8 + 2 \cdot 12 = \end{array} \quad \begin{array}{c} -25 + 24 \\ = -25 + 24 = \end{array} \quad \begin{array}{c} -1 \end{array}$$

$$10) \quad (0,08 - 1) : 0,2 = \overbrace{(-0,92)}^{1302} : 0,2 = -9,2 : 2 = -4,6$$

$$\begin{array}{r} \text{L} \rightarrow \begin{array}{r} 1,00 \\ -0,08 \\ \hline 0,92 \end{array} \quad \begin{array}{c} 1302 \\ 8 - 100 = -92 \end{array} \end{array}$$

$$1) \quad (-3-2) \cdot (21-\overset{24}{3 \cdot 8}) = (-5) \cdot (-3) = 15$$

$$\begin{array}{r} 1,2 \\ 1,5 \\ \hline 60 \\ 12 \\ \hline 180 \end{array}$$

$$\begin{array}{r} 1,2 \\ \cdot 0,5 \\ \hline 0,60 \end{array}$$

$$\begin{array}{r} 1,0 \\ - 0,2 \\ \hline 0,8 \end{array}$$

$$2) \quad (1,2 \cdot 1,5 - 1,2 \cdot 0,5) : 1,2 - 0,2 = \underset{1,8}{1,8} - \underset{0,6}{0,6} = (1,8 - 0,6) : 1,2 - 0,2 = 1,2 : 1,2 - 0,2 = 1 - 0,2 = 0,8$$

$$3) \quad -0,5 \cdot 0,2 - 0,1 \cdot (\overset{-5}{3-8}) = -0,5 \cdot 0,2 - 0,1 \cdot (-5) = -0,1 + 0,5 = 0,4$$

$$\begin{array}{r} 0,5 \\ 0,2 \\ \hline 0,10 \end{array}$$

$$4) \quad 5 \cdot (-3 \cdot 2) - 21 : (1 - 0,7) = 5 \cdot (-6) - 21 : (0,3) = -30 - 70 = -100$$

$$\begin{array}{r} 1,0 \\ - 0,3 \\ \hline 0,3 \end{array}$$

$$21 : 0,3 = 210 : 3 = 70$$

$$5) \quad 20 - 0,6 \cdot (-0,8) - 20 + (\overset{+6}{-0,6 \cdot 8}) = \overset{\sqrt{20 \cdot 2} \cdot 1 - 10 = -9}{20 + 0,48 - 20 - 4,8} = -4,32$$

$$\begin{array}{r} 0,6 \\ 0,8 \\ \hline 0,48 \end{array}$$

$$\begin{array}{r} 0,6 \\ \cdot 8 \\ \hline 4,8 \end{array}$$

$$\begin{array}{r} -4,80 \\ 0,48 \\ \hline -4,32 \end{array}$$

$$6) \quad 0,5 + 1,5 \cdot (\overset{+6}{10-4}) - 1,5 : 5 = 0,5 + 9 - 0,3 = 9,2$$

$$\begin{array}{r} 1,5 \\ \cdot 6 \\ \hline 9,0 \end{array}$$

$$\rightarrow 1,5 : 5 = 0,3$$

$$\sqrt{20 \cdot 2} \cdot 1 - 10 = -9$$

$$7) \quad 0,4 \cdot 0,3 - 0,3 \cdot 1,6 = 0,12 - 0,48 = -0,36$$

$$\begin{array}{r} 0,4 \\ \cdot 0,3 \\ \hline 0,12 \end{array}$$

$$\begin{array}{r} 0,3 \\ 1,6 \\ \hline 18 \\ 3 \\ \hline 0,48 \end{array}$$

$$\begin{array}{r} 0,48 \\ - 0,12 \\ \hline 0,36 \end{array}$$

$$8) \quad 0,5 - (\overset{0,2}{-0,3+0,5}) \cdot 2,1 = 0,5 - 0,2 \cdot 2,1 = 0,5 - 0,42 = 0,08$$

$$\begin{array}{r} 2,1 \\ \cdot 0,2 \\ \hline 0,42 \end{array}$$

$$\begin{array}{r} 0,50 \\ - 0,42 \\ \hline 0,08 \end{array}$$

$$9) \quad 0,025 \cdot 40 - 0,2 : (-0,25) = 1 + 0,8 = 1,8$$

$$\begin{array}{r} 0,025 \\ \cdot 40 \\ \hline 00 \\ 100 \\ \hline 1000 \end{array}$$

$$0,2 : 0,25 = 20 : 25 = 0,8$$

$$10) \quad 1 + [-4 \cdot (\overset{-13}{-4-9}) - 2 \cdot (\overset{-4}{-8+4})] = 1 + [-4 \cdot (-13) - 2 \cdot (-4)] = 1 + [52 + 8] = 1 + 60 = 61$$

$$1) \quad 2,2 : 0,22 - 0,22 : (0,1 - 0,078) + 22 = 2,2 : 0,22 - 0,22 : 0,022 + 22 = 10 - 10 + 22 = 22$$

$$2,2 : 0,22 = 220 : 22 = 10$$

$$0,22 : 0,022 = 220 : 22 = 10$$

$$2) \quad (-7) \cdot 0,3 - 0,7 \cdot (6 - 3) : (-1) = (-7) \cdot 0,3 - 0,7 \cdot 3 : (-1) = -2,1 - 2,1 : (-1) = -2,1 + 2,1 = 0$$

$$3) \quad [-2 \cdot (-4 + 3) - 2] \cdot [-8 + (4 - 7)] = [-2 \cdot (-1) - 2] \cdot [-8 + (-3)] = [2 - 2] \cdot [-8 - 3] = 0 \cdot [-11] = 0$$

$$V_{\text{zov}}: -15 + 6 = -9$$

$$4) \quad (-0,8) : 0,08 - 0,5 : 0,1 + 6,4 = -10 - 5 + 6,4 = -15 + 6,4 = -8,6$$

$$80 : 8 = 10$$

$$5 : 1 = 5$$

$$\begin{array}{r} -15,0 \\ +6,4 \\ \hline -8,6 \end{array}$$

$$5) \quad -(0,11 : 1,1) + 1,1 \cdot [1,1 : (-0,11)] = -0,1 + 1,1 \cdot [-10] = -0,1 - 11 = -11,1$$

$$1,1 : 11 = 0,1$$

$$110 : 11 = 10$$

$$6) \quad -0,4 + 0,1 \cdot (0,1 - 0,4) : 0,01 = -0,4 + 0,1 \cdot (-0,3) : 0,01 = -0,4 - 0,03 : 0,01 = -0,4 - 3 = -3,4$$

$$\begin{array}{r} 0,4 \\ -0,1 \\ \hline 0,3 \end{array}$$

$$\begin{array}{r} 0,1 \\ \cdot 0,3 \\ \hline 0,03 \end{array}$$

$$3 : 1 = 3$$

$$7) \quad 0,16 \cdot (0,1 : 0,001) - 3,2 : 0,1 = 0,16 \cdot 100 - 3,2 : 0,1 = 16 - 32 = -16$$

$$100 : 1 = 100$$

$$32 : 1 = 32$$

$$8) \quad 5,2 : 4 + 0,13 : 0,1 - 0,52 : 0,2 = 1,3 + 1,3 - 2,6 = 2,6 - 2,6 = 0$$

$$5,2 : 4 = 1,3$$

$$1,3 : 1 = 1,3$$

$$5,2 : 2 = 2,6$$

$$12 : 6 = 2$$

$$\begin{array}{r} 0,3 \\ \cdot 0,2 \\ \hline 0,06 \end{array}$$

$$0,6 : 1 = 0,6$$

$$9) \quad -1,2 : 0,6 \cdot (0,4 - 0,5) + (-0,3) \cdot 0,2 : (-0,1) = -1,2 : 0,6 \cdot (-0,1) - 0,3 \cdot 0,2 : (-0,1) = -2 \cdot (-0,1) - 0,06 : (-0,1) = 0,2 + 0,6 = 0,8$$

Zlomky a celá čísla 28 – úprava záporných zlomků

$$\frac{-1}{4} = -\frac{1}{4}$$

$$1-3 = -2$$

$$-\frac{1}{2} - \frac{1}{2} = \frac{-1-1}{2} = \frac{-2}{2} = -1$$

$$\hookrightarrow -\frac{2}{2} = -1$$

$$\frac{1}{3} - \frac{2}{3} = \frac{1-2}{3} = -\frac{1}{3}$$

$$\frac{1}{4} - \frac{1-2}{2-2} = \frac{1}{4} - \frac{2}{4} = -\frac{1}{4}$$

$$\frac{1}{7} - \frac{3}{7} = -\frac{2}{7}$$

$$-\frac{1}{25} - \frac{4}{25} = -\frac{5}{25} = -\frac{1}{5}$$

$$\frac{1}{7} - \frac{3}{7} - \frac{3}{7} = \frac{1-3-3}{7} = -\frac{5}{7}$$

$$-5+2 = -3$$

$$-\frac{5}{3} + \frac{2}{3} = -\frac{3}{3} = -1$$

$$-\frac{13}{12} + \frac{23}{12} - \frac{12}{12} = \frac{-13+23-12}{12} = -\frac{2}{12} = -\frac{1}{6}$$

$$\frac{1}{100} - 1 = \frac{1}{100} - \frac{100}{100} = -\frac{99}{100}$$

$$3 - \frac{1}{2} - \frac{3}{2} = \frac{6}{2} - \frac{1}{2} - \frac{3}{2} = \frac{2}{2} = 1$$

$$-\frac{1-2}{2-2} + \frac{1}{4} = -\frac{2}{4} + \frac{1}{4} = -\frac{1}{4}$$

$$-\frac{1-2}{3-2} + \frac{1}{6} = -\frac{2}{6} + \frac{1}{6} = -\frac{1}{6}$$

$$\frac{2-1}{2-5} - \frac{1}{10} = \frac{2}{10} - \frac{1}{10} = \frac{1}{10}$$

$$\frac{2-1}{2-7} - \frac{3}{14} = \frac{2}{14} - \frac{3}{14} = -\frac{1}{14}$$

$$\frac{-1}{7} + \frac{3}{7} - \frac{1}{14} = \frac{4}{14} - \frac{1}{14} = \frac{3}{14}$$

$$\underbrace{\frac{2}{7}}_{\frac{2}{7} = \frac{4}{14}}$$

$$-1 + \frac{1}{2} + \frac{1}{4} = -\frac{4}{4} + \frac{2}{4} + \frac{1}{4} = -\frac{1}{4}$$

$$\hookrightarrow -\frac{4}{4}$$

$$\frac{4-1}{4-2} - \frac{1-2}{4-2} + \frac{1}{8} = \frac{4}{8} - \frac{2}{8} + \frac{1}{8} = \frac{3}{8}$$

$$\frac{1}{7} - \frac{3-1}{2-1} = 0$$

$$\frac{3-1}{3-2} - \frac{1-2}{3-2} = \frac{3}{6} - \frac{2}{6} = \frac{1}{6}$$

$$-\frac{1}{5} + \frac{1}{2} = -\frac{2}{10} + \frac{5}{10} = \frac{3}{10}$$

$$\frac{2-1}{2-7} - \frac{1-2}{2-7} = \frac{2}{14} - \frac{7}{14} = -\frac{5}{14}$$

$$\frac{3-1}{3-5} + \frac{1-5}{3-5} = -\frac{3}{15} + \frac{5}{15} = \frac{2}{15}$$

$$-\frac{1-4}{7-4} + \frac{1-2}{4-2} = -\frac{4}{28} + \frac{7}{28} = \frac{3}{28}$$

$$\frac{7}{20} - \frac{1-4}{5-4} + \frac{1-10}{2-10} = \frac{7-4+10}{20} = \frac{13}{20}$$

Převod na základní tvar

3en opisu znamenko

$$-1\frac{1}{2} = -\frac{3}{2}$$

Převod na smíšené číslo

$$-\frac{4}{3} = -1\frac{1}{3}$$

$$-2\frac{1}{2} = -\frac{5}{2}$$

$$-\frac{15}{2} = -7\frac{1}{2}$$

Zlomky a celá čísla 29 – úprava záporných zlomků

$$-2 \cdot 1 = -2$$

$$-2 \cdot (-4) = 8$$

$$\frac{1}{-2} = 1 : (-2) = -1 : 2 = -\frac{1}{2}$$

$$(-4) : (-2) = 4 : 2$$

$$-2 \cdot \frac{1}{2} = -1$$

$$\frac{(-4)}{(-2)} = \frac{4}{2} = 2$$

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

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

$$\frac{(-2)}{4} \cdot \frac{(-6)}{2} = \frac{2}{4} \cdot \frac{6}{2} = \frac{3}{2}$$

$$\frac{(-9)}{(-2)} \cdot \frac{(-2)}{9} = \frac{-1}{1} = -1$$

$$\frac{7}{(-3)} \cdot \frac{(-9)}{14} = \frac{1 \cdot 3}{3 \cdot 2} = \frac{3}{2}$$

$$\frac{(-81)}{7} \cdot \frac{14}{9} = -\frac{81}{7} \cdot \frac{14}{9} = -18$$

$$\frac{(-1)}{2} \cdot \frac{(-4)}{5} \cdot \frac{(-5)}{2} = -\frac{1}{2} \cdot \frac{4}{5} \cdot \frac{5}{2} = -1$$

$$\frac{(-1)}{2} \cdot \frac{4}{(-8)} \cdot \frac{5}{2} = 1$$

$$\frac{3}{8} \cdot \frac{(-4)}{9} \cdot \frac{8}{2} = \frac{3}{3 \cdot 2} = \frac{2}{3}$$

$$\frac{6}{7} \cdot \frac{14}{(-15)} \cdot \frac{5}{8} = -\frac{3 \cdot 2}{3 \cdot 4} = -\frac{1}{2}$$

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

$$-\frac{1}{2} : \frac{1}{2} = -\frac{1}{2} \cdot \frac{2}{1} = -1$$

$$\frac{(-1)}{4} : \frac{1}{4} = -\frac{1}{4} : \frac{1}{4} = -1$$

$$\frac{(-1)}{3} : \frac{(-2)}{3} = \frac{1}{3} \cdot \frac{3}{2} = \frac{1}{2}$$

$$\frac{-2}{25} : \frac{(-4)}{(-5)} = -\frac{2}{25} \cdot \frac{5}{4} = -\frac{1}{10}$$

$$\frac{30}{9} : \left(-\frac{10}{3}\right) = -\frac{30}{9} \cdot \frac{3}{10} = -1$$

$$\frac{(-49)}{2} : \frac{(-14)}{8} = \frac{49}{2} \cdot \frac{8}{14} = \frac{7 \cdot 4}{2} = 14$$

$$-\frac{50}{25} : \frac{6}{18} = -\frac{2}{1} \cdot \frac{18}{6} = -6$$

$$\frac{12}{42} : \frac{4}{(-21)} = -\frac{12}{42} \cdot \frac{21}{4} = -\frac{3}{2}$$

$$\frac{(-75)}{21} : \frac{10}{(-7)} = \frac{75}{21} \cdot \frac{7}{10} = \frac{15}{2} = \frac{5}{2}$$

Zlomky a celá čísla 30 – procvičování 1

$$\frac{-\frac{2}{1}}{\frac{1}{2}} = -\frac{2}{1} : \frac{1}{2} = -\frac{2}{1} \cdot \frac{2}{1} = -1$$

2 minusy $\rightarrow +$

$$\frac{-4^2}{-2^4} = \frac{16}{16} = 1$$

$$\frac{-4^2}{-2^4} = \frac{16}{16} = 1$$

$$\frac{-\frac{2}{5}}{-\frac{2}{5}} = 1$$

$\ominus : \ominus \rightarrow \oplus$

$$-\frac{2}{5} : \left(-\frac{2}{5}\right) = \frac{2}{5} : \frac{2}{5} = 1$$

$-(-14) : 7 = 14 : 7$

$$\frac{-14}{7} = -2$$

$$\frac{-14}{7} = -2$$

$$\frac{-7}{\frac{12}{24}} = -7 : \frac{12}{24} = -7 \cdot \frac{24}{12} = -14$$

$$\frac{-3}{\frac{-12}{-4}} = -3 : \frac{-12}{-4} = -3 \cdot \frac{-4}{-12} = -1$$

$$\frac{\frac{30}{14}}{-\frac{15}{21}} = \frac{30}{14} : \frac{-15}{21} = \frac{30}{14} \cdot \frac{21}{-15} = -3$$

$$\frac{-\frac{16}{7}}{\frac{18}{-21}} = -\frac{16}{7} : \frac{18}{-21} = -\frac{16}{7} \cdot \frac{-21}{18} = \frac{16}{3}$$

$$1) 5 \cdot \left(0,5 - \frac{3}{5}\right) = 5 \cdot \left(\frac{5}{10} - \frac{6}{10}\right) = 5 \cdot \left(-\frac{1}{10}\right) = -\frac{5}{10} = -\frac{1}{2}$$

$$2) \frac{\frac{2}{5} - \frac{2}{5}}{-3} = \frac{0}{-3} = 0$$

$$3) \frac{\frac{1}{2} - \left(\frac{2}{3} - \frac{5}{6}\right)}{\frac{1}{2}} = \frac{\frac{1}{2} - \left(\frac{4}{6} - \frac{5}{6}\right)}{\frac{1}{2}} = \frac{\frac{1}{2} - \left(-\frac{1}{6}\right)}{\frac{1}{2}} = \frac{\frac{1}{2} + \frac{1}{6}}{\frac{1}{2}} = \frac{\frac{2}{3} + \frac{1}{6}}{\frac{1}{2}} = \frac{\frac{4}{6} + \frac{1}{6}}{\frac{1}{2}} = \frac{\frac{5}{6}}{\frac{1}{2}} = \frac{5}{6} \cdot \frac{2}{1} = \frac{5}{3}$$

$$4) \frac{\frac{5 \cdot 1}{5 \cdot 3} - \frac{2 \cdot 3}{5 \cdot 3}}{0,1} = \frac{\frac{5}{15} - \frac{6}{15}}{\frac{1}{10}} = \frac{-\frac{1}{15}}{\frac{1}{10}} = -\frac{1}{15} \cdot \frac{10}{1} = -\frac{2}{3}$$

$$5) \frac{4}{3} + 3 \cdot \left(\frac{1}{3} - \frac{3}{5}\right) = \frac{4}{3} + 3 \cdot \left(\frac{5}{15} - \frac{9}{15}\right) = \frac{4}{3} + 3 \cdot \left(-\frac{4}{15}\right) = \frac{4}{3} - \frac{12}{15} = \frac{4}{3} - \frac{4}{5} = \frac{20}{15} - \frac{12}{15} = \frac{8}{15}$$

$$6) \frac{2 + \frac{14}{3}}{\frac{2 \cdot 14}{3}} = \frac{\frac{6}{3} + \frac{14}{3}}{\frac{28}{3}} = \frac{\frac{20}{3}}{\frac{28}{3}} = \frac{20}{3} : \frac{28}{3} = \frac{20}{3} \cdot \frac{3}{28} = \frac{5}{7}$$

$$1) \frac{\frac{6 \cdot 5}{7} + \frac{5 \cdot 7}{6 \cdot 7}}{\frac{7 \cdot 2}{7 \cdot 3} - \frac{3 \cdot 3}{7 \cdot 3}} = \frac{\frac{30}{42} + \frac{35}{42}}{\frac{14}{21} - \frac{9}{21}} = \frac{\frac{65}{42}}{\frac{5}{21}} = \frac{65}{42} : \frac{5}{21} = \frac{65}{42} \cdot \frac{21}{5} = \frac{13}{2}$$

$$2) \frac{\frac{7}{4} - 4}{7 - \frac{4}{7}} = \frac{\frac{7}{4} - \frac{16}{4}}{\frac{49}{7} - \frac{4}{7}} = \frac{-\frac{9}{4}}{\frac{45}{7}} = -\frac{9}{4} : \frac{45}{7} = -\frac{9}{4} \cdot \frac{7}{45} = -\frac{7}{20}$$

$$3) 2 \cdot \frac{1}{6} - \frac{3}{8} \cdot 4 = \frac{2}{3} - \frac{3}{2} = \frac{2}{6} - \frac{9}{6} = -\frac{7}{6}$$

$$\frac{2}{1} \cdot \frac{1}{6}$$

$$4) \frac{6}{7} \cdot \left(\frac{2}{6} - \frac{3}{4} \right) - 1 = \frac{6}{7} \cdot \left(\frac{4}{12} - \frac{9}{12} \right) - 1 = -\frac{6}{7} \cdot \frac{5}{12} - 1 = -\frac{5}{14} - \frac{14}{14} = -\frac{19}{14}$$

$$5) \left(\frac{5}{6} - \frac{3}{8} \right) - \left(2 - \frac{11}{12} \right) = \left(\frac{20}{24} - \frac{9}{24} \right) - \left(\frac{24}{12} - \frac{11}{12} \right) = \frac{11}{24} - \frac{13}{12} = \frac{11}{24} - \frac{26}{24} = -\frac{15}{24} = -\frac{5}{8}$$

$$6) 0,2 \cdot \left(\frac{1}{9} + \frac{7}{12} \right) - \frac{1}{4} = \frac{1}{5} \cdot \left(\frac{4}{36} + \frac{21}{36} \right) - \frac{1}{4} = \frac{1}{5} \cdot \frac{25}{36} - \frac{1}{4} = \frac{5}{36} - \frac{9}{36} = -\frac{4}{36} = -\frac{1}{9}$$

$\hookrightarrow \frac{2}{10} = \frac{1}{5}$

$$7) \frac{\frac{2}{3} - 1}{\frac{8}{9}} = \frac{-\frac{1}{3}}{\frac{8}{9}} = -\frac{1}{3} : \frac{8}{9} = -\frac{1}{3} \cdot \frac{9}{8} = -\frac{3}{8}$$

$$\frac{1}{3} - \frac{3}{3} = -\frac{1}{3}$$

$$8) \frac{6}{5} - \frac{6}{5} : \frac{9}{10} + 0,3 = \frac{6}{5} - \frac{6}{5} \cdot \frac{10}{9} + \frac{3}{10} = \frac{6}{5} - \frac{20}{15} + \frac{3}{10} = \frac{36}{30} - \frac{40}{30} + \frac{9}{30} = -\frac{4}{30} + \frac{9}{30} = \frac{5}{30} = \frac{1}{6}$$

$$9) 3 \cdot \frac{2}{5} - \frac{2 + \frac{2}{5}}{3} = \frac{6}{5} - \frac{\frac{10}{5} + \frac{2}{5}}{3} = \frac{6}{5} - \frac{\frac{12}{5}}{3} = \frac{6}{5} - \frac{12}{5} : 3 = \frac{6}{5} - \frac{12}{5} \cdot \frac{1}{3} = \frac{2}{5}$$

$$1) \quad \frac{\frac{2}{3} - \frac{4}{5}}{\frac{7}{10} - \frac{21}{8}} = \frac{\frac{10}{15} - \frac{12}{15}}{\frac{4}{10} - \frac{21}{8}} = \frac{-\frac{2}{15}}{\frac{4}{15}} = -\frac{2}{15} : \frac{4}{15} = -\frac{2}{15} \cdot \frac{15}{4} = -\frac{1}{2}$$

$$\frac{25}{10} : \frac{5}{5} = \frac{5}{2}$$

$$2) \quad \left(\frac{9}{2} - 2,5\right) \cdot \frac{1}{4} = \left(\frac{9}{2} - \frac{5}{2}\right) \cdot \frac{1}{4} = \frac{4}{2} \cdot \frac{1}{4} = \frac{1}{2}$$

$$3) \quad \frac{\frac{1}{3} \cdot \left(\frac{5}{6} - \frac{1}{2}\right)}{\frac{1}{2} \cdot \left(1 - \frac{2}{3}\right)} = \frac{\frac{1}{3} \cdot \left(\frac{5}{6} - \frac{3}{6}\right)}{\frac{1}{2} \cdot \left(\frac{3}{3} - \frac{2}{3}\right)} = \frac{\frac{1}{3} \cdot \frac{2}{6}}{\frac{1}{2} \cdot \frac{1}{3}} = \frac{\frac{1}{9}}{\frac{1}{6}} = \frac{1}{9} \cdot \frac{6}{1} = \frac{2}{3}$$

$$\frac{3}{15} = \frac{1}{5}$$

$$4) \quad \frac{\frac{1}{4} \cdot \frac{12}{15} + \frac{2}{5}}{\frac{3}{4} + \frac{3}{2} \cdot \frac{2}{3}} = \frac{\frac{1}{5} + \frac{2}{5}}{\frac{3}{4} + \frac{3}{4}} = \frac{\frac{3}{5}}{\frac{3}{4} + \frac{3}{4}} = \frac{\frac{3}{5}}{\frac{12}{4}} = \frac{\frac{3}{5}}{\frac{3}{1}} = \frac{3}{5} : \frac{3}{1} = \frac{3}{5} \cdot \frac{1}{3} = \frac{1}{5}$$

$$5) \quad \frac{\frac{3 \cdot 15}{4} - \frac{71}{12}}{\frac{21}{6} - \frac{13}{3}} = \frac{\frac{45}{4} - \frac{71}{12}}{\frac{21}{6} - \frac{26}{6}} = \frac{-\frac{26}{12}}{-\frac{5}{6}} = -\frac{13}{6} : \left(-\frac{5}{6}\right) = \frac{13}{6} \cdot \frac{6}{5} = \frac{13}{5}$$

$$6) \quad \frac{\frac{3}{5} \cdot \frac{2}{7} - \frac{14}{5} \cdot \frac{6}{7}}{\frac{3}{5} \cdot \frac{7}{2} - \frac{14}{5} \cdot \frac{6}{7}} = \frac{\frac{6}{35} - \frac{14}{5} \cdot \frac{6}{7}}{\frac{21}{10} - \frac{12}{5}} = \frac{\frac{6}{35} - \frac{24}{5}}{\frac{21}{10} - \frac{24}{10}} = -\frac{3}{10}$$

$$\frac{25}{100} = \frac{5}{20} = \frac{1}{4}$$

$$7) \quad \frac{2}{3} \cdot 0,25 - \frac{1}{4} \cdot \left(2 - \frac{2}{3}\right) = \frac{2}{3} \cdot \frac{1}{4} - \frac{1}{4} \cdot \frac{4}{3} = \frac{1}{6} - \frac{1}{3} = \frac{1}{6} - \frac{2}{6} = -\frac{1}{6}$$

$$\frac{2}{1} = \frac{6}{3}$$

$$8) \quad 3 : \frac{2 \cdot 6}{2+6} - \frac{12}{8} \cdot \frac{5}{8} = 3 : \frac{3}{2} - \frac{1}{1} \cdot \frac{5}{8} = 3 \cdot \frac{2}{3} - \frac{5}{8} = 2 - \frac{5}{8} = \frac{16}{8} - \frac{5}{8} = \frac{11}{8}$$

$$\hookrightarrow \frac{12}{8} = \frac{3}{2}$$

$$\hookrightarrow \frac{2}{1} \cdot \frac{2}{2}$$

$$\hookrightarrow \frac{2}{1} = \frac{4}{2}$$

$$1) \quad \begin{aligned} & \text{L} \rightarrow \frac{5}{10} = \frac{1}{2} \\ & \frac{0,5 + \frac{2}{7}}{1\frac{2}{9} \cdot 2\frac{4}{7}} = \frac{\frac{1}{2} + \frac{2}{7}}{\frac{11}{9} \cdot \frac{18}{7}} = \frac{\frac{7}{14} + \frac{4}{14}}{\frac{22}{7}} = \frac{\frac{11}{14}}{\frac{22}{7}} = \frac{11}{14} : \frac{22}{7} = \frac{11}{14} \cdot \frac{7}{22} = \frac{1}{4} \end{aligned}$$

$$2) \quad \begin{aligned} & \frac{1\frac{3}{5} - \frac{8}{9}}{9 - 5\frac{2}{3}} = \frac{\frac{8}{5} - \frac{8}{9}}{9 - \frac{17}{3}} = \frac{\frac{32}{45} - \frac{40}{45}}{\frac{27}{3} - \frac{17}{3}} = \frac{\frac{32}{45}}{\frac{10}{3}} = \frac{32}{45} : \frac{10}{3} = \frac{32}{45} \cdot \frac{3}{10} = \frac{16}{75} \\ & \text{L} \rightarrow \frac{9}{1} : \frac{3}{3} = \frac{27}{3} \end{aligned}$$

$$3) \quad \begin{aligned} & \frac{1\frac{5}{6} - \frac{3}{3}}{\frac{5}{6} + 1\frac{1}{9}} = \frac{\frac{11}{6} - \frac{6}{6}}{\frac{5}{6} + \frac{10}{9}} = \frac{\frac{5}{6}}{\frac{15}{18} + \frac{20}{18}} = \frac{\frac{5}{6}}{\frac{35}{18}} = \frac{5}{6} : \frac{35}{18} = \frac{5}{6} \cdot \frac{18}{35} = \frac{3}{7} \end{aligned}$$

$$4) \quad \begin{aligned} & \frac{-2 + \frac{3}{-(-1-2)}}{3 - (-1)} = \frac{-2 + \frac{3}{-(-3)}}{3 + 1} = \frac{-2 + \frac{3}{3}}{4} = \frac{-2 + 1}{4} = \frac{-1}{4} = -\frac{1}{4} \end{aligned}$$

$$5) \quad \begin{aligned} & \frac{\left(\frac{2}{7} + \frac{1}{2}\right) \cdot \frac{7}{11}}{\frac{1}{5}} = \frac{\left(\frac{4}{14} + \frac{7}{14}\right) \cdot \frac{7}{11}}{\frac{1}{5}} = \frac{\frac{11}{14} \cdot \frac{7}{11}}{\frac{1}{5}} = \frac{\frac{1}{2}}{\frac{1}{5}} = \frac{1}{2} : \frac{1}{5} = \frac{1}{2} \cdot \frac{5}{1} = \frac{5}{2} \end{aligned}$$

$$6) \quad \begin{aligned} & \frac{3}{8} - \frac{5}{6} + \frac{3}{4} + \frac{7}{2} : 6 = \frac{3}{8} - \frac{5}{6} + \frac{3}{4} + \frac{7}{12} = \frac{9}{24} - \frac{20}{24} + \frac{18}{24} + \frac{14}{24} = \frac{21}{24} = \frac{7}{8} \\ & \text{L} \rightarrow \frac{7}{2} : \frac{6}{1} = \frac{7}{2} \cdot \frac{1}{6} = \frac{7}{12} \end{aligned}$$

$$7) \quad \begin{aligned} & \left(\frac{1}{3 \cdot 4} - 3\right) : \left(\frac{1}{3 \cdot 4} + 4\right) = \left(\frac{1}{12} - 3\right) : \left(\frac{1}{12} + 4\right) = \left(\frac{1}{12} - \frac{36}{12}\right) : \left(\frac{1}{12} + \frac{48}{12}\right) = \frac{-35}{12} : \frac{49}{12} = -\frac{35}{12} \cdot \frac{12}{49} = -\frac{5}{7} \\ & \frac{3 \cdot 12}{1 \cdot 12} = \frac{36}{12} \quad \frac{4 \cdot 12}{1 \cdot 12} = \frac{48}{12} \end{aligned}$$

$$8) \quad \begin{aligned} & \left(0,2 - 1\frac{2}{3}\right) : \frac{11}{3} = \left(\frac{1}{5} - \frac{5}{3}\right) : \frac{11}{3} = \left(\frac{3}{15} - \frac{25}{15}\right) : \frac{11}{3} = -\frac{22}{15} : \frac{11}{3} = -\frac{22}{15} \cdot \frac{3}{11} = -\frac{2}{5} \\ & \text{L} \rightarrow \frac{2}{10} = \frac{1}{5} \end{aligned}$$

$$1) \quad \frac{2}{3} : \frac{5}{6} - 1,5 : \frac{15}{4} = \frac{2}{3} \cdot \frac{6}{5} - \frac{15}{4} \cdot \frac{4}{15} = \frac{4}{5} - \frac{2}{5} = \frac{2}{5}$$

$\downarrow$
 $\frac{15}{10}$

$$2) \quad \left(2\frac{1}{3} - \frac{11}{9}\right) \cdot \left(\frac{7}{8} - \frac{7}{40}\right) = \left(\frac{21}{9} - \frac{11}{9}\right) \cdot \left(\frac{35}{40} - \frac{7}{40}\right) = \frac{10}{9} \cdot \frac{28}{40} = \frac{28}{36} = \frac{7}{9}$$

$\hookrightarrow \frac{7}{3} : \frac{3}{3} = \frac{21}{9}$

$$3) \quad 10 \cdot \frac{1}{0,7} \cdot \left(\frac{2}{5} - \frac{3}{4}\right) = 10 \cdot \frac{10}{7} \cdot \left(\frac{8}{20} - \frac{15}{20}\right) = \frac{100}{7} \cdot \left(-\frac{7}{20}\right) = -\frac{100}{20} = -5$$

$$1 - \left(-\frac{23}{24}\right) = \frac{5}{4}$$

$$4) \quad 1 - \frac{\frac{3}{8} - \frac{4}{3}}{\frac{5}{4}} = 1 - \frac{\frac{9}{24} - \frac{32}{24}}{\frac{5}{4}} = 1 - \frac{-\frac{23}{24}}{\frac{5}{4}} = 1 + \frac{23}{24} \cdot \frac{4}{5} = 1 + \frac{23}{30} = \frac{30}{30} + \frac{23}{30} = \frac{53}{30}$$

$$5) \quad \frac{\frac{2}{3} : \frac{4}{9} - \frac{5}{8}}{\frac{2}{3}} = \frac{\frac{2}{3} \cdot \frac{9}{4} - \frac{5}{8}}{\frac{2}{3}} = \frac{\frac{3}{2} - \frac{5}{2}}{\frac{2}{3}} = \frac{-\frac{2}{2}}{\frac{2}{3}} = -\frac{1}{\frac{2}{3}} = -1 : \frac{2}{3} = -1 \cdot \frac{3}{2} = -\frac{3}{2}$$

$$6) \quad \left(\frac{2}{3} - 1\right) \cdot \frac{9}{10} : \left(\frac{7}{15} + \frac{1}{3}\right) = -\frac{1}{3} \cdot \frac{9}{10} : \frac{12}{15} = -\frac{3}{10} \cdot \frac{15}{12} = -\frac{3}{8}$$

$\downarrow$
 $\frac{3}{3}$

[ve videtu chyba: místo $-\frac{3}{8}$ je tam $-\frac{3}{4}$]

$$7) \quad 1 : \left(\frac{\frac{6}{5} - \frac{5}{6}}{\frac{2}{3}}\right) = 1 : \left(\frac{\frac{36}{30} - \frac{25}{30}}{\frac{2}{3}}\right) = 1 : \frac{\frac{11}{30}}{\frac{2}{3}} = \begin{cases} 1 \cdot \frac{\frac{2}{3}}{\frac{11}{30}} = \frac{2}{3} : \frac{11}{30} = \frac{2}{3} \cdot \frac{30}{11} = \frac{20}{11} \\ 1 : \left[\frac{11}{30} : \frac{2}{3}\right] = 1 : \left[\frac{11}{30} \cdot \frac{3}{2}\right] = 1 : \frac{11}{20} = 1 \cdot \frac{20}{11} = \frac{20}{11} \end{cases}$$

$$\begin{aligned} 2 : (-1) &= -2 \\ 3 : (-3) &= -1 \end{aligned}$$

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

$$1) \quad \begin{aligned} & \rightarrow \frac{16}{5} \\ & \frac{-\frac{6}{5} + 3\frac{1}{5}}{2 + \frac{2}{3}} = \frac{-\frac{6}{5} + \frac{16}{5}}{\frac{6}{3} + \frac{2}{3}} = \frac{\frac{10}{5}}{\frac{8}{3}} = \frac{10}{5} : \frac{8}{3} = \frac{10}{5} \cdot \frac{3}{8} = \frac{2}{1} \cdot \frac{3}{4} = \frac{3}{4} \end{aligned}$$

$$2) \quad \left(\frac{3}{4} - \frac{2}{3}\right) : \frac{1}{6} + 0,8 = \left(\frac{3}{12} - \frac{8}{12}\right) : \frac{1}{6} + \frac{8}{10} = \frac{1}{12} \cdot \frac{6}{1} + \frac{8}{10} = \frac{1}{2} + \frac{8}{10} = \frac{5}{10} + \frac{8}{10} = \frac{13}{10}$$

$$3) \quad \begin{aligned} & \rightarrow \frac{125}{1000} = \frac{25}{200} = \frac{1}{8} \\ & \left(0,125 + \frac{3}{4}\right) : 3\frac{1}{2} = \left(\frac{1}{8} + \frac{6}{8}\right) : \frac{7}{2} = \frac{7}{8} : \frac{7}{2} = \frac{1}{4} \end{aligned}$$

$$4) \quad 0,25 \cdot \frac{8}{15} - \frac{2}{3} \cdot 0,6 = \frac{1}{4} \cdot \frac{8}{15} - \frac{2}{3} \cdot \frac{6}{10} = \frac{2}{15} - \frac{2 \cdot 3}{5 \cdot 3} = \frac{2}{15} - \frac{6}{15} = -\frac{4}{15}$$

$$5) \quad \begin{aligned} & \rightarrow \frac{6}{5} \\ & \frac{4}{5} : 1\frac{1}{5} - \frac{2}{3} : \frac{5}{18} = \frac{4}{5} \cdot \frac{5}{6} - \frac{2}{3} \cdot \frac{18}{5} = \frac{2}{3} - \frac{36}{5} = \frac{10}{15} - \frac{36}{15} = -\frac{26}{15} \end{aligned}$$

$$6) \quad \begin{aligned} & \rightarrow \frac{7}{34} = \frac{28}{12} \\ & \left(\frac{5}{12} + 2\frac{1}{3}\right) : \left(\frac{1}{5} + \frac{1}{6}\right) = \left(\frac{5}{12} + \frac{28}{12}\right) : \left(\frac{6}{30} + \frac{5}{30}\right) = \frac{33}{12} : \frac{11}{30} = \frac{33}{12} \cdot \frac{30}{11} = \frac{3 \cdot 10}{4} = \frac{15}{2} \end{aligned}$$

$$7) \quad \begin{aligned} & \rightarrow \text{čekají na konec} \\ & \frac{3}{8} - 0,2 \cdot \left(\frac{9}{2} + 3\right) : 1,5 = \frac{3}{8} - \frac{2}{10} \cdot \left(\frac{9}{2} + \frac{6}{2}\right) : \frac{15}{10} = \frac{3}{8} - \frac{2}{10} \cdot \frac{15}{2} \cdot \frac{10}{15} = \frac{3}{8} - 1 = \frac{3}{8} - \frac{8}{8} = -\frac{5}{8} \\ & \rightarrow \frac{3}{1} = \frac{6}{2} \end{aligned}$$

$$8) \quad \begin{aligned} & \frac{63}{5} : 0,6 - \frac{96}{8} : \frac{132}{24} = \frac{63}{5} \cdot \frac{10}{6} - \frac{96}{8} \cdot \frac{24}{132} = 21 - \frac{24 \cdot 3}{33} = 21 - \frac{24}{11} = \frac{231}{11} - \frac{24}{11} = \frac{207}{11} \\ & \rightarrow \frac{6}{10} \end{aligned}$$

$96 : 4 = 24$
 $132 : 4 = 33$

$\frac{21}{11}$
 $\frac{24}{11}$
 $\hline \frac{207}{11}$

$$1) \quad \frac{1\frac{1}{5} - \frac{7}{9}}{1\frac{1}{10} - \frac{7}{15}} = \frac{\frac{3 \cdot 6}{3 \cdot 5} - \frac{7 \cdot 5}{3 \cdot 9}}{\frac{11}{10} - \frac{7}{15}} = \frac{\frac{54}{45} - \frac{35}{45}}{\frac{33}{30} - \frac{14}{30}} = \frac{\frac{19}{45}}{\frac{19}{30}} = \frac{19}{45} : \frac{19}{30} = \frac{19}{45} \cdot \frac{30}{19} = \frac{2}{3}$$

$$2) \quad \frac{1\frac{5}{7} - \frac{2}{3}}{\frac{1}{2} + 1\frac{1}{14}} = \frac{\frac{3 \cdot 12}{3 \cdot 7} - \frac{2 \cdot 7}{3 \cdot 3}}{\frac{7}{2} + \frac{15}{14}} = \frac{\frac{36}{21} - \frac{14}{21}}{\frac{7}{14} + \frac{15}{14}} = \frac{\frac{22}{21}}{\frac{22}{14}} = \frac{22}{21} : \frac{22}{14} = \frac{22}{21} \cdot \frac{14}{22} = \frac{14}{21} = \frac{2}{3}$$

$$3) \quad \frac{\frac{2}{3} - 0,5 + \frac{2}{4}}{\frac{2}{3} : \frac{6}{11}} = \frac{\frac{2}{3} - \frac{1}{2} + \frac{1}{2}}{\frac{2}{3} \cdot \frac{11}{6}} = \frac{\frac{2}{3}}{\frac{2}{3} \cdot \frac{11}{6}} = \frac{1}{11} = 1 : \frac{11}{6} = 1 \cdot \frac{6}{11} = \frac{6}{11}$$

$$4) \quad \left(\frac{13}{7} \cdot \frac{5}{10} + \frac{26}{14} \right) : \frac{13}{35} = \left(\frac{13}{14} + \frac{26}{14} \right) : \frac{13}{35} = \frac{39}{14} : \frac{13}{35} = \frac{39}{14} \cdot \frac{35}{13} = \frac{15}{2}$$

$$5) \quad \frac{-\frac{5}{14} \cdot \left(\frac{3}{4} - \frac{2}{5} \right)}{3 \cdot \frac{10}{40}} = \frac{-\frac{5}{14} \cdot \left(\frac{15}{20} - \frac{8}{20} \right)}{\frac{3}{4}} = \frac{-\frac{5}{14} \cdot \frac{7}{20}}{\frac{3}{4}} = \frac{-\frac{1}{8}}{\frac{3}{4}} = -\frac{1}{8} : \frac{3}{4} = -\frac{1}{8} \cdot \frac{4}{3} = -\frac{1}{6}$$

$$6) \quad -\frac{7}{12} + 2,5 - \frac{5}{8} : 0,6 = -\frac{7}{12} + \frac{5}{2} - \frac{5}{8} \cdot \frac{5}{3} = -\frac{7}{12} + \frac{5}{2} - \frac{25}{24} = -\frac{14}{24} + \frac{60}{24} - \frac{25}{24} = \frac{21}{24} = \frac{7}{8}$$

$$7) \quad 2\frac{1}{5} - \frac{1}{5 + \frac{1}{5}} = \frac{2}{5} - \frac{1}{\frac{26}{5}} = \frac{2}{5} - 1 : \frac{26}{5} = \frac{2}{5} - 1 \cdot \frac{5}{26} = \frac{26}{130} - \frac{5}{26} = \frac{52}{130} - \frac{25}{130} = \frac{27}{130}$$

$\hookrightarrow \frac{25}{5} + \frac{1}{5} = \frac{26}{5}$

$$8) \quad \frac{5\frac{2}{3} + \left(\frac{-37}{9} \right)}{\frac{22}{7} - 1\frac{1}{7}} = \frac{\frac{3 \cdot 12}{3 \cdot 3} - \frac{37}{9}}{\frac{22}{7} - \frac{8}{7}} = \frac{\frac{51}{9} - \frac{37}{9}}{\frac{14}{7}} = \frac{\frac{14}{9}}{\frac{14}{7}} = \frac{14}{9} : \frac{14}{7} = \frac{14}{9} \cdot \frac{7}{14} = \frac{7}{9}$$

$$1) \quad \frac{\frac{3}{2} \cdot \frac{4}{3} - \frac{3}{8}}{2 - \frac{7}{16} - \frac{3}{4}} = \frac{\frac{3}{2} \cdot \frac{4}{3} - \frac{3}{8}}{\frac{32}{16} - \frac{7}{16} - \frac{12}{16}} = \frac{\frac{3}{8} - \frac{3}{8}}{\frac{13}{16}} = \frac{\frac{6}{8}}{\frac{13}{16}} = \frac{6}{8} : \frac{13}{16} = \frac{6}{8} \cdot \frac{16}{13} = \frac{12}{13}$$

$$\hookrightarrow \frac{2}{1} - \frac{32}{16}$$

$$2) \quad \left(\frac{5 \cdot 3 - 3 \cdot 6 + 1 \cdot 4}{8 \cdot 3 - 4 \cdot 6} \right) : \left(\frac{1}{8} : 0,3 - \frac{2}{3} \right) = \left(\frac{15}{24} - \frac{18}{24} + \frac{4}{24} \right) : \left(\frac{1}{8} \cdot \frac{10}{3} - \frac{5}{3} \right) = \frac{1}{24} : \left(\frac{3 \cdot 15}{3 \cdot 4} - \frac{5 \cdot 4}{3 \cdot 4} \right) = \frac{1}{24} : \left(\frac{45}{12} - \frac{20}{12} \right)$$

$$= \frac{1}{24} : \frac{25}{12} = \frac{1}{24} \cdot \frac{12}{25} = \frac{1}{50}$$

$$3) \quad \frac{\frac{3}{10} - \frac{1}{2} \cdot \frac{1}{6}}{\frac{2}{5} : \left(-\frac{1}{3} \right)} = \frac{\frac{3}{10} - \frac{1}{6}}{\frac{2}{5} : \left(-\frac{1}{3} \right)} = \frac{\frac{3}{10} - \frac{1}{6}}{-\frac{2}{5} \cdot \frac{3}{1}} = \frac{\frac{6}{20} - \frac{5}{20}}{-\frac{3}{10}} = \frac{\frac{1}{20}}{-\frac{3}{10}} = -\frac{1}{20} : \frac{3}{10} = -\frac{1}{20} \cdot \frac{10}{3} = -\frac{1}{6}$$

$$4) \quad 1 - \frac{2 - \frac{3}{4+5}}{2 + \frac{3}{4-5}} = 1 - \frac{2 - \frac{3}{9}}{2 + \frac{3}{-1}} = 1 - \frac{2 - \frac{1}{3}}{2 - 3} = 1 - \frac{\frac{6}{3} - \frac{1}{3}}{(-1)} = 1 - \frac{\frac{5}{3}}{-1} = 1 + \frac{5}{3} = \frac{3}{3} + \frac{5}{3} = \frac{8}{3}$$

$$5) \quad \frac{0,5 + \frac{0,04 \cdot 100}{0,8 \cdot 100}}{\frac{100 \cdot 0,3}{100 \cdot 0,02} + \frac{0,9 \cdot 10}{0,6 \cdot 10}} = \frac{0,5 + \frac{4}{80}}{\frac{30}{2} + \frac{3}{2}} = \frac{\frac{1}{2} + \frac{1}{20}}{\frac{30}{2} + \frac{3}{2}} = \frac{\frac{10}{20} + \frac{1}{20}}{\frac{33}{2}} = \frac{\frac{11}{20}}{\frac{33}{2}} = \frac{11}{20} : \frac{33}{2} = \frac{11}{20} \cdot \frac{2}{33} = \frac{1}{30}$$

$$6) \quad \frac{-2 \cdot \frac{7}{9} - \frac{3}{7} \cdot \frac{9}{14}}{\frac{5}{6} - \frac{2}{3}} = \frac{-\frac{14}{9} - \frac{3}{7} \cdot \frac{9}{14}}{\frac{5}{6} - \frac{1}{6}} = \frac{-\frac{14}{9} - \frac{6}{9}}{\frac{1}{6}} = \frac{-\frac{20}{9}}{\frac{1}{6}} = -\frac{20}{9} : \frac{1}{6} = -\frac{20}{9} \cdot \frac{6}{1} = -\frac{40}{3}$$

$$7) \quad \frac{\frac{2}{3} - \frac{4}{5} - \frac{10}{11}}{0,6 + \frac{8}{12}} = \frac{\frac{10}{15} - \frac{12}{15} - \frac{10}{11}}{\frac{6}{10} + \frac{1}{2}} = \frac{-\frac{2}{15} - \frac{10}{11}}{\frac{6}{10} + \frac{5}{10}} = \frac{-\frac{2}{15} - \frac{10}{11}}{\frac{11}{10}} = \frac{-\frac{2}{15}}{\frac{11}{10}} - \frac{10}{11} = -\frac{2}{15} : \frac{11}{10} - \frac{10}{11} = -\frac{4}{33} - \frac{10 \cdot 3}{11 \cdot 3} = -\frac{4}{33} - \frac{30}{33} = -\frac{34}{33}$$

$$\hookrightarrow \frac{2}{15} : \frac{11}{10} = -\frac{2}{15} \cdot \frac{10}{11} = -\frac{4}{33}$$

$$8) \quad \left(\frac{4 - \frac{7}{3}}{2 \cdot \frac{2}{3}} \right) : \left(\frac{\frac{2}{5}}{1 - \frac{2}{5}} \right) \cdot \frac{9}{10} = \frac{\frac{12}{3} - \frac{7}{3}}{\frac{4}{3}} : \frac{\frac{2}{5}}{\frac{5}{5} - \frac{2}{5}} \cdot \frac{9}{10} = \frac{\frac{5}{3}}{\frac{4}{3}} : \frac{\frac{2}{5}}{\frac{3}{5}} \cdot \frac{9}{10} = \frac{5}{4} : \frac{2}{3} \cdot \frac{9}{10} = \frac{5}{4} \cdot \frac{3}{2} \cdot \frac{9}{10} = \frac{5}{4} \cdot \frac{27}{20} = \frac{135}{80} = \frac{27}{16}$$

$$\frac{4}{1} - \frac{12}{3} = 1 - \frac{5}{5}$$

$$\hookrightarrow \frac{5}{3} : \frac{4}{3} = \frac{5}{3} \cdot \frac{3}{4} = \frac{5}{4}$$

$$= \frac{5}{4} - \frac{3}{5} = \frac{25}{20} - \frac{12}{20} = \frac{13}{20}$$

$$1) \quad 4 \cdot \frac{-3 \cdot \frac{9}{4}}{9 \cdot \left(-\frac{3}{4}\right)} + \frac{\frac{7}{12} \cdot \frac{6}{14}}{\frac{2}{2}} = 4 \cdot 1 + \frac{1}{4} = \frac{16}{4} + \frac{1}{4} = \frac{17}{4}$$

$$\hookrightarrow \frac{-\frac{23}{4}}{-\frac{23}{4}} = 1$$

$$2) \quad \frac{\frac{17}{\frac{2}{5} \cdot 3 - \frac{1}{3 \cdot 5}}}{14,2} = \frac{17}{\frac{3 \cdot 6}{5} - \frac{1}{15}} - 14,2 = \frac{17}{\frac{18}{5} - \frac{1}{15}} - 14,2 = \frac{17}{\frac{17}{15}} - 14,2 = 15 - 14,2$$

$$\begin{aligned} \frac{150}{10} - \frac{142}{10} &= \frac{8}{10} = \frac{4}{5} \\ 0,8 &= \frac{8}{10} = \frac{4}{5} \end{aligned}$$

$$\hookrightarrow 17 : \frac{17}{15} = 17 \cdot \frac{15}{17} = 15$$

$$3) \quad \frac{\frac{2}{3} \cdot \frac{2}{3}}{3 + \frac{2}{3}} + \frac{5}{11} - \left(\frac{34}{54} - \frac{12}{20} \right) \cdot \frac{123}{456} = \frac{2}{\frac{11}{3}} + \frac{5}{11} - \left(\frac{12}{20} - \frac{12}{20} \right) \cdot \frac{123}{456} = \frac{2}{\frac{11}{3}} + \frac{5}{11} = \frac{6}{11} + \frac{5}{11} = \frac{11}{11} = 1$$

$$\hookrightarrow \frac{9}{3} + \frac{2}{3}$$

$$\hookrightarrow 2 : \frac{11}{3} = 2 \cdot \frac{3}{11} = \frac{6}{11}$$

$$4) \quad \frac{-3 \cdot \frac{1}{2} + 0,9 + \left(-1 \cdot \frac{2}{5}\right)}{\frac{9}{14} - 1} = \frac{-\frac{3}{2} + \frac{9}{10} - \frac{2}{5}}{\frac{9}{14} - \frac{14}{14}} = \frac{-\frac{35}{10} + \frac{9}{10} - \frac{4}{10}}{-\frac{5}{14}} = \frac{-\frac{40}{10}}{-\frac{5}{14}} = \frac{-4}{-\frac{5}{14}} = \frac{4}{\frac{5}{14}}$$

$$= \frac{4}{\frac{5}{14}} = \frac{4}{1} \cdot \frac{14}{5} = \frac{56}{5}$$

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$$\frac{\left(\frac{7}{15} + \frac{14}{45} + \frac{2}{9}\right) \cdot 10 \cdot \frac{1}{3} - 1 \cdot \frac{1}{11} \cdot \left(2 \cdot \frac{2}{3} - 1 \cdot \frac{3}{4}\right)}{\left(\frac{3}{7} - \frac{1}{4}\right) : \frac{3}{28} - 1} = \frac{\left(\frac{21}{45} + \frac{14}{45} + \frac{10}{45}\right) \cdot \frac{31}{3} - \frac{12}{11} \cdot \left(\frac{32}{12} - \frac{21}{12}\right)}{\left(\frac{12}{28} - \frac{7}{28}\right) : \frac{3}{28} - 1} = \frac{\frac{65}{45} \cdot \frac{31}{3} - \frac{12}{11} \cdot \frac{11}{12}}{\frac{5}{28} \cdot \frac{28}{3} - 1}$$

$$= \frac{\frac{31}{3} - 1}{\frac{5}{3} - 1} = \frac{\frac{31}{3} - \frac{3}{3}}{\frac{5}{3} - \frac{3}{3}} = \frac{\frac{28}{3}}{\frac{2}{3}} = \frac{28}{3} \cdot \frac{3}{2} = \frac{28}{1} = 28$$