6.3 Seštevanje in odštevanje ulomkov

Seštevanje ulomkov

Ulomke **seštevamo** tako, da jih razširimo na skupni imenovalec, nato seštejemo števce, imenovalce pa prepišemo.

$$\frac{x}{y}+\frac{z}{w}=\frac{xw}{yw}+\frac{yz}{yw}=\frac{xw+yz}{yw};\quad x,z\in\mathbb{Z}\wedge y,w\in\mathbb{Z}\backslash\{0\}$$

Odštevanje ulomkov

Ulomke **odštevamo** tako, da prištejemo nasprotni ulomek.

$$\frac{x}{y}-\frac{z}{w}=\frac{x}{y}+\left(-\frac{z}{w}\right)=\frac{xw}{yw}+\frac{-yz}{yw}=\frac{xw-yz}{yw};\quad x,z\in\mathbb{Z}\wedge y,w\in\mathbb{Z}\backslash\{0\}$$

Naloga 6.12. *Izračunajte.*

- $\frac{5}{7}+\frac{1}{14}$
- $\frac{2}{9}-\frac{1}{3}$
- $\frac{3}{8}+1\frac{1}{2}$
- $1-\frac{5}{6}$

Naloga 6.13. *Izračunajte.*

- $\left(\frac{2}{3}-2\frac{1}{4}\right)+\frac{1}{12}$
- $\frac{2}{7}-\frac{3}{4}+\left(\frac{1}{2}-2\right)$
- $\left(\frac{2}{3}-\left(\frac{1}{3}-3\right)+\frac{1}{4}\right)-\frac{1}{2}$
- $1-\left(2-\left(3-4-\left(5-\frac{1}{2}\right)\right)+\frac{1}{3}\right)$

Naloga 6.14. *Poenostavite.*

- $\frac{x}{x-1}-\frac{x}{x+1}$
- $\frac{3}{x^2}+\frac{4}{x^3}-\frac{1}{x}$
- $\frac{3}{x^2-4x}-\left(\frac{1}{x-4}+\frac{2}{x^2-5x+4}\right)$
- $\frac{2}{xy}+\frac{3}{x}-\frac{2}{y}$

Naloga 6.15. *Poenostavite.*

- $\frac{(x-3)^2+(x+3)^2}{x^2+9}-\frac{3x^2}{2x^2-x^2}$
- $\frac{(a-3)^3-(a-1)^3+26}{6a}+\left(-\frac{1}{2}\right)^{-1}$
- $\frac{x^3-2x^2-x+2}{-x(1-x)-2}-\left(\frac{x-1}{x}-1\right)^{-1}$
- $\left(\frac{x}{2}-\left(\frac{x}{3}-\left(\frac{x}{4}-\frac{x}{5}\right)\right)\right)-\left(\frac{60}{x}\right)^{-1}$

6.4 Množenje ulomkov

Ulomka **množimo** tako, da števce množimo s števci, imenovalce pa množimo z imenovalci.

$$\frac{x}{y}\cdot\frac{z}{w}=\frac{xz}{yw};\quad x,z\in\mathbb{Z}\wedge y,w\in\mathbb{Z}\backslash\{0\}$$

Produkt danega in njemu obratnega ulomka je enak 1.

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

Naloga 6.16. *Izračunajte.*

- $\frac{1}{3} \cdot \frac{3}{7}$
- $\frac{-2}{13} \cdot \left(-\frac{39}{4}\right)$
- $\frac{2}{5} \cdot \frac{4}{9}$
- $2\frac{1}{3} \cdot 3\frac{3}{4}$
- $\frac{-2}{5} \cdot 4\frac{2}{7}$
- $3 \cdot \frac{2}{3}$

Naloga 6.17. *Poenostavite.*

- $\frac{x^2-9}{x^2+3x+9} \cdot \frac{x^3-27}{x^2-6x+9}$
- $\frac{x^2+5x}{-x+2} \cdot \frac{2x^2-8}{x^2+7x+10}$
- $\frac{x^3-4x^2-4x+16}{2x+4} \cdot \frac{6x}{3x-6}$
- $2 \cdot \frac{x}{x-1} \cdot \frac{x^2-1}{x^2+x}$

Naloga 6.18. *Poenostavite.*

- $\frac{x^2-4}{x^2-1} \cdot \frac{x^3-1}{x^3+x^2+x} \cdot \frac{x^2+x}{2-x}$
- $\left(\frac{6-x}{x^2+6x} - \frac{x}{36-x^2}\right) \cdot \left(\frac{2x-6}{x^2+6x}\right)^{-1} + \frac{x}{6-x}$
- $\left(\left(x - y + \left(\frac{x+y}{2xy}\right)^{-1}\right) \cdot \left(\frac{1}{x+y}\right)^{-1} - 2xy\right) \cdot (x-y)^{-1}$
- $\left(xy + y^2 - \frac{xy+y^2}{3xy-3x^2}\right) \cdot \left(\frac{x+y}{3x}\right)^{-1} - \left(-\frac{y-x}{y}\right)^{-1}$

6.5 Deljenje ulomkov

Ulomek **delimo** z neničelnim ulomkom tako, da prvi ulomek množimo z obratno vrednostjo drugega ulomka.

$$\frac{x}{y} : \frac{z}{w} = \frac{x}{y} \cdot \left(\frac{z}{w}\right)^{-1} = \frac{x}{y} \cdot \frac{w}{z} = \frac{xw}{yz}; \quad x \in \mathbb{Z} \wedge y, z, w \in \mathbb{Z}\backslash\{0\}$$

Deljenje ulomkov lahko zapišemo kot **dvojni ulomek**.

$$\frac{x}{y} : \frac{z}{w} = \frac{\frac{x}{y}}{\frac{z}{w}}; \quad x \in \mathbb{Z} \wedge y, z, w \in \mathbb{Z}\backslash\{0\}$$

Naloga 6.19. *Izračunajte.*

- $2 : \frac{4}{5}$
- $1\frac{2}{3} : 2\frac{5}{6}$
- $\frac{7}{12} : 14$
- $\frac{3}{8} : \frac{9}{32}$

Naloga 6.20. *Izračunajte.*

- $\frac{\frac{3}{4}}{\frac{6}{8}}$
- $\frac{\frac{1}{2}}{\frac{2}{3}}$
- $\frac{3}{\frac{5}{6}}$
- $\frac{\frac{2}{-5}}{\frac{-1}{5}}$

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

Naloga 6.21. *Poenostavite.*

- $\frac{x^2+x-6}{x+2} : (x-2)$
- $\frac{x-1}{2x^2-4x} : \frac{x^2}{x-2}$
- $x : \frac{x^2+x}{x^3+1}$

Naloga 6.22. *Poenostavite.*

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