



## PREVERJANJE ZNANJA IZ MATEMATIKE, 9. razred

## IZRAZI, ENAČBE, UPORABA ENAČB V BESEDILNIH NALOGAH

## 1. Zapiši izraz po besedilu.

a) Kvadrat vsote števil a in b.  $(a+b)^2$

b) Zmnožek vsote in razlike spremenljivk x in y.  $(x+y)(x-y)$

c) Razlika kvadratov dveh zaporednih celih števil.  $x^2 - (x+1)^2$ ;  $x \in \mathbb{Z}$

## 2. Zmnoži in poenostavi.

a)  $(3x - 5)^2 = 9x^2 - 30x + 25$

b)  $(5x + y)(5x - y) = 5x^2 - y^2$

c)  $(y - \frac{1}{2})^2 = y^2 - y + \frac{1}{4}$

d)  $(\frac{3}{4}a - \frac{1}{2})(\frac{3}{4}a + \frac{1}{2}) = \frac{9}{16}a^2 - \frac{1}{4}$

e)  $(2a - 7)(2a + 3) = 4a^2 + 6a - 14a - 21 = 4a^2 - 8a - 21$

f)  $-(3 - x)5 = -15 + 5x$

3. Razstavi:  $= 4a^2 - 8a - 21$

a)  $x^2 - 49 = (x+7)(x-7)$

b)  $12x^2y - 3y = 3y(4x^2 - 1) = 3y(2x+1)(2x-1)$

c)  $4a^2 - 36 = (2a+6)(2a-6)$

č)  $x^2 + 16x + 84 =$

d)  $a^2 - a - 12 = (a-4)(a+3)$

e)  $196 - 16b^4 = (14 - 4b^2)(14 + 4b^2)$  !

4. Izraz najprej poenostavi, nato pa izračunaj njegovo vrednost za  $x = 2$ 

a)  $(x - 8)(x + 8) - x(x + 5) =$

$$x^2 - 64 - (x^2 + 5x) =$$

$$= x^2 - 64 - x^2 - 5x =$$

$$= -5x - 64$$

$$x = 2 \Rightarrow -5 \cdot 2 - 64 = -10 - 64 = -74$$

$$(\sqrt{14} + 2b)$$

$$(\sqrt{14} - 2b)$$

$$(14 + 4b^2)$$

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

$$= x^2 - x + \frac{1}{4} - \left(x^2 - \frac{2}{3}x + \frac{1}{4}x - \frac{2}{12}\right) =$$

$$= x^2 - x + \frac{1}{4} - x^2 + \frac{2}{3}x - \frac{1}{4}x + \frac{1}{6}$$

$$= -x - \frac{1}{4}x + \frac{2}{3}x + \frac{1}{4} + \frac{1}{6}$$

$$= -\frac{3}{12}x + \frac{8}{12}x + \frac{3}{12} + \frac{2}{12}$$

$$= \underline{\underline{-\frac{7}{12}x + \frac{5}{12}}}$$

5. Izračunaj vrednost algebrskih ulomkov za  $x = -3$ .

$$\frac{2x+1}{4x} \Rightarrow \frac{2 \cdot (-3) + 1}{4 \cdot (-3)} = \frac{-5}{-12} = \frac{5}{12}$$

$$\frac{x^2}{x+6} \Rightarrow \frac{9}{-3+6} = \frac{9}{3} = \underline{\underline{3}}$$

6. Ugotovi, za katere vrednosti spremenljivke dani ulomki niso določeni.

$$\frac{x+3}{x+2}$$

$$x+2=0$$

$$x=-2$$

$$\frac{2-x}{x^2-3x}$$

$$x(x-3)=0$$

$$x_1=0 \quad x_2=3$$

$$\frac{6}{x^2-25}$$

$$x^2-25=0$$

$$(x+5)(x-5)=0$$

$$x_1=-5$$

$$x_2=+5$$

7. Okrajšaj algebrske ulomke.

$$\frac{5x^3}{30x^2} = \frac{x}{6}$$

$$\frac{x^2-7x-18}{3x-27} =$$

$$\frac{(x-9)(x+2)}{3(x-9)} = \frac{x+2}{3}$$

8. Seštej oz. odštej.

$$a) \frac{5-x}{x-2} + \frac{7x}{x-2} = \frac{5-x+7x}{x-2} = \frac{5+6x}{x-2}$$

$$b) \frac{x+1}{6x} - \frac{x-1}{8x} = \frac{4(x+1) - 3(x-1)}{24x} = \frac{4x+4-3x+3}{24x} = \frac{x+7}{24x}$$

$$c) \frac{5x}{x-2} + \frac{3}{x} =$$

9. Zmnoži oz. deli.

$$a) \frac{7x}{18x} \cdot \frac{2x}{x^2} = \frac{14x^2}{18x^3} = \frac{7}{9x}$$

$$b) \frac{a+1}{6a} : \frac{2a+2}{10} = \frac{(a+1) \cdot 10}{6a \cdot 2(a+1)} = \frac{10}{12a} = \frac{5}{6a}$$

$$c) \frac{x^2-121}{6x-12} \cdot \frac{8x-16}{x^2-22x+121} =$$

$$\frac{(x+11)(x-11) \cdot 8(x-2)}{6(x-2) \cdot (x-11)^2} = \frac{8(x+11)}{6(x-11)} = \frac{4(x+11)}{3(x-11)}$$

10. Dopolni tako, da dobiš enakovreden ulomek.

$$a) \frac{4x}{x+1} = \frac{20x^2}{5x^2+5x}$$

$\overset{-5x}{\curvearrowright}$        $\underset{-5x}{\curvearrowleft}$

$$b) \frac{1}{x+3} = \frac{x+4}{x^2+7x+12}$$

$\overset{(x+4)}{\curvearrowright}$        $\underset{(x+3)(x+4)}{\curvearrowleft}$  *menjšan*

11. Reši enačbe. Pri primeru e in g naredi preizkus.

<p>a) <math>6x - 15 = x + 9</math> <math>\quad / -x, +15</math>  <math>5x = 24</math>  <math>x = \frac{24}{5} = 4\frac{4}{5}</math></p>	<p>b) <math>-3x - 18 = 6x - 17</math> <math>\quad / -6x, +18</math>  <math>-3x - 6x = -17 + 18</math>  <math>-9x = 1</math>  <math>x = -\frac{1}{9}</math></p>
<p>c) <math>-6 - (4x - 1) = 7x - (x + 12)</math>  <math>-6 - 4x + 1 = 7x - x - 12</math>  <math>-5 - 4x = 6x - 12</math> <math>\quad / -6x, +5</math>  <math>-10x = -7</math>  <math>x = \frac{7}{10}</math></p>	<p>d) <math>5x - (4x - 2 - (3x - 5)) = 3 - 2x</math>  <math>5x - (4x - 2 - 3x + 5) = 3 - 2x</math>  <math>5x - 4x + 2 + 3x - 5 = 3 - 2x</math>  <math>4x - 3 = 3 - 2x</math> <math>\quad / +2x, +3</math>  <math>6x = 6</math> <math>\quad /6</math>  <math>x = 1</math></p>
<p>e) <math>6(2z + 3) = 18z - 24</math>  <math>12z + 18 = 18z - 24</math> <math>\quad / -18z, +42</math>  <math>-6z = -42</math> <math>\quad / (-6)</math>  <math>z = 7</math></p>	<p>f) <math>(x - 3)^2 - (2x + 1)^2 = (x + 3)^2 - (2x + 5)^2</math>  <math>x^2 - 6x + 9 - (4x^2 + 4x + 1) = x^2 + 6x + 9 - (4x^2 + 20x + 25)</math>  <math>x^2 - 6x + 9 - 4x^2 - 4x - 1 = x^2 + 6x + 9 - 4x^2 - 20x - 25</math>  <math>-10x + 8 = -14x - 16</math> <math>\quad / +14x, +8</math>  <math>4x = -24</math>  <math>x = -6</math></p>
<p>g) <math>\frac{x}{2} + 5 = \frac{3x}{2}</math> <math>\quad / \cdot 2</math>  <math>x + 10 = 3x</math> <math>\quad / -</math>  <math>3x = x + 10</math> <math>\quad / -x</math>  <math>2x = 10</math> <math>\quad / : 2</math>  <math>x = 5</math></p>	<p>h) <math>\frac{x+3}{3} - \frac{2x-1}{5} = \frac{2(3x+2)}{15}</math> <math>\quad / \cdot 15</math>  <math>5(x+3) - 3(2x-1) = 2(3x+2)</math>  <math>5x + 15 - 6x + 3 = 6x + 4</math>  <math>-x + 18 = 6x + 4</math> <math>\quad / -6x, -14</math>  <math>-7x = -14</math>  <math>x = 2</math></p>

$$\frac{3x-1}{4} = \frac{5x-11}{12} + 1\frac{2}{3} \quad / \cdot 12$$

$$\begin{aligned} 3(3x-1) &= 5x-11 + 5 \cdot 4 \\ 9x-3 &= 5x+9 \quad / -5x+3 \\ 4x &= 12 \quad / : 4 \\ x &= 3 \end{aligned}$$

$$\frac{7-3x}{12} - 2(x-2) = \frac{5(5-2x)}{6} \quad / \cdot 12$$

$$\begin{aligned} 7-3x-24(x-2) &= 10(5-2x) \\ 7-3x-24x+48 &= 50-20x \\ 7-3x-24x+48 &= 50-20x \quad / +20x \\ -27x+55 &= 50 \\ -27x &= 5-55 \\ -27x &= -50 \\ x &= \frac{50}{27} \end{aligned}$$

$$\frac{(x-1)(x+5)}{3} - \frac{(x+2)(x+5)}{12} = \frac{(x-1)(x+2)}{4} \quad / \cdot 12$$

$$\begin{aligned} 4(x^2+4x-5) - (x^2+7x+10) &= 3(x^2+x-2) \\ 4x^2+16x-20-x^2-7x-10 &= 3x^2+3x-6 \\ 3x^2+9x-30 &= 3x^2+3x-6 \\ 9x-30 &= 3x-6 \\ 6x &= 24 \\ x &= 4 \end{aligned}$$

$$\frac{2}{3} \left( \frac{9}{10}(x-5) \right) + 0,75(x+4) = \frac{3}{7}(3x+3)$$

$$\begin{aligned} \frac{2}{3} \left( \frac{9}{10}(x-5) \right) + \frac{3}{4}(x+4) &= \frac{3}{7}(3x+3) \\ \frac{2 \cdot 9 \cdot 3}{3 \cdot 10 \cdot 5} (x-5) + \frac{3}{4}x + 3 &= \frac{9x}{7} + \frac{9}{7} \\ \frac{3}{5}x - 3 + \frac{3}{4}x + 3 &= \frac{9x}{7} + \frac{9}{7} \quad / \cdot 140 \\ 28 \cdot \frac{3}{5}x + 3 \cdot 35x &= 20 \cdot 9x + 20 \cdot 9 \\ 84x + 105x &= 180x + 180 \quad / -180x \\ 189x - 180x &= 180 \\ 9x &= 180 \\ x &= 20 \end{aligned}$$

12. Iz zapisanih matematičnih obrazcev izrazi

$$P = \frac{U}{I}$$

$$\begin{aligned} I &= U \\ I &= \frac{U}{P} \end{aligned}$$

$$P = 20 + pl$$

$$\begin{aligned} P - pl &= 20 \quad / : 2 \\ \sigma &= \frac{P - pl}{2} \end{aligned}$$

$$V = \pi r^2 v$$

$$\begin{aligned} \frac{V}{\pi r} &= r^2 \sqrt{v} \\ r &= \sqrt{\frac{V}{\pi r v}} \end{aligned}$$

13. Za katero vrednost spremenljivke a sta enačbi ekvivalentni?

$$3x + 2 = 11 \quad / -2$$

$$\begin{aligned} 3x &= 9 \\ x &= 3 \end{aligned}$$

$$x + a + 12 = 3a + 13 \quad / -3a, -12$$

$$\begin{aligned} x - 2a &= 1 \\ x &= 1 + 2a \\ a &= 1 \end{aligned}$$