MNOŽINY A OPERÁCIE S NIMI

- VYMENOVANIE PRVKOV

  $M = \{1,2,3\}$

- UVEDENIE MNOŽINY CHARAKT. VLASTNOSTI

  $M = \{x \in \mathbb{N} : x < 100\}$

Nech A, B sú množiny

$A = B$

$A \subset B$ ... A je podmnožina B

$A, B \subset M$

zjednotenie ... $A \cup B = \{x \in M : x \in A \vee x \in B\}$

prienik ... $A \cap B = \{x \in M : x \in A \wedge x \in B\}$

Ak $A \subset B$, tak $B \setminus A$ je doplnok mn. A v mn. B

$B \setminus A = \{x \in M : x \in B \wedge x \notin A\}$

ČÍSELNÉ MNOŽINY (OBORY)

$\mathbb{N} = \{1,2,3,\dots\}$

$\mathbb{Z} = \{\dots,-3,-2,-1,0,1,2,\dots\}$

$\mathbb{Q} = \{\frac{p}{q} : q \in \mathbb{N} \wedge p \in \mathbb{Z}\}$

$\mathbb{I} = \{x \in \mathbb{R} : x \in \mathbb{Q}\}$ ... $\pi, e, \sqrt{3}$ ...

$\mathbb{R} = \dots$

$\mathbb{C} = \dots$

OZNAČENIA (pre INTERVALY)

$a, b \in \mathbb{R} \quad a < b$

$\langle a,b \rangle = \{x \in \mathbb{R} : a \le x \le b\}$

$(a,b) = \{x \in \mathbb{R} : a < x < b\}$

$\langle a,b) = \{x \in \mathbb{R} : a \le x < b\}$

$(a,b\rangle = \{x \in \mathbb{R} : a < x \le b\}$

$(-\infty; a\rangle = \{x \in \mathbb{R} : x \le a\}$ ... $\langle a;\infty)$

$(-\infty; a) = \{x \in \mathbb{R} : x < a\}$ ... $(a;\infty)$

$\mathbb{R} = (-\infty;\infty)$

ALGEBRAICKÉ VÝRAZY

$a,b,c,d \in \mathbb{R} \qquad b,d \neq 0$

1. $\frac{a \cdot b}{d \cdot b} = \frac{a}{d}$

2. $\frac{a}{b} \pm \frac{c}{d} = \frac{a \cdot d \pm b \cdot c}{b \cdot d}$

3. $\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$

4. $\frac{a}{b} : \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{a \cdot d}{b \cdot c} \qquad c \neq 0$

5. $\frac{a \pm b}{c} = \frac{a}{c} \pm \frac{b}{c}$

   ~~$\frac{a}{b \pm c} = \frac{a}{b} \pm \frac{a}{c}$~~

6. $r, s \in \mathbb{R}$

   $a^r \cdot a^s = a^{r+s}$

   $(a^r)^s = a^{r \cdot s}$

   $\frac{a^r}{a^s} = a^{r-s} \qquad \sqrt[s]{a^r} = a^{\frac{r}{s}}$

7. $a^r \cdot b^r = (a \cdot b)^r \qquad \frac{a^r}{b^r} = \left(\frac{a}{b}\right)^r$

8. $a^{-r} = \frac{1}{a^r}$

   $a^r = \frac{1}{a^{-r}}$

9. $(a \pm b)^2 = a^2 \pm 2ab + b^2$

   $a^2 - b^2 = (a+b) \cdot (a-b)$

   $(a \pm b)^3 = a^3 \pm 3a^2b + 3ab^2 \pm b^3$

   $a^3 - b^3 = (a-b) \cdot (a^2 + ab + b^2)$

   $a^3 + b^3 = (a+b) \cdot (a^2 - ab + b^2)$

Pr. $\frac{-1}{2^2} - \left(\frac{-2^2}{3}\right)^2 - \frac{16}{(-3)^2} + \left(-\frac{1}{2}\right)^2 =$

$= \frac{-1}{4} - \frac{16}{9} - \frac{16}{9} + \frac{1}{4} = \frac{-32}{9}$

Pr. $\sqrt{0{,}03 + \frac{1}{100}} \cdot \sqrt{10^2 - 8^2} - (\sqrt{3})^2 =$

$= \sqrt{\frac{3}{100} + \frac{1}{100}} \cdot \sqrt{36} - 3 = \sqrt{\frac{4}{100}} \cdot 6 - 3 =$

$= \frac{2}{10} \cdot 6 - 3 = \frac{6}{5} - 3 = \frac{6 - 3.5}{5} = \frac{-9}{5}$

Pr. $\frac{\sqrt{8} + \sqrt{18} - \sqrt{32}}{\sqrt{12} - \sqrt{27} + \sqrt{48}} = \frac{\sqrt{2^3} + \sqrt{2 \cdot 3^2} - \sqrt{2^5}}{\sqrt{2^2 \cdot 3} - \sqrt{3^3} + \sqrt{3 \cdot 2^4}} =$

$= \frac{2\sqrt{2} + 3\sqrt{2} - 4\sqrt{2}}{2\sqrt{3} - 3\sqrt{3} + 4\sqrt{3}} = \frac{\sqrt{2}(2+3-4)}{\sqrt{3}(2-3+4)} =$

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

Pr. $x^3 - 2x^2 - x + 2 = x^2(x-2) - (x-2) =$

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

Pr. $x^3 - x^2 + 4x - 4 = x^2(x-1) + 4(x-1) =$

$= (x-1)(x^2+4)$

$x^2 + 4 = 0$

$D = b^2 - 4 \cdot a \cdot c = 0^2 - 4 \cdot 1 \cdot 4 = -16$

Pr. $(6n+17)^2 - (n-3)^2 =$

$= (6n+17+n-3) \cdot (6n+17-n+3) =$

$= (7n+14) \cdot (5n+20) =$

$= 7(n+2) \cdot 5(n+4) = 35(n+2) \cdot (n+4)$

Pr. $(x+y)^4 - (x-y)^4 =$

$= \left((x+y)^2 - (x-y)^2\right) \cdot \left((x+y)^2 + (x-y)^2\right) =$

$= (x^2 + 2xy + y^2 - x^2 + 2xy - y^2) \cdot (x^2 + 2xy + y^2 + x^2 - 2xy + y^2) =$

$= 4xy(2x^2 + 2y^2) = 8xy(x^2 + y^2)$

DOPLŇTE DANÝ VÝRAZ NA ŠTVOREC

$x^2 \pm px \pm q = \left(x \pm \frac{p}{2}\right)^2 - \left(\frac{p}{2}\right)^2 \pm q$

Pr. $x^2 - 2x + 2 = (x-1)^2 - 1^2 + 2 =$

$= (x-1)^2 + 1 \qquad (a-b)^2$

inak $x^2 - 2x + 2 = x^2 - 2 \cdot 1 \cdot x + 1^2 - 1^2 + 2 =$

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

Pr. $x^2 + 4x - 7 = (x+2)^2 - 2^2 - 7 = (x+2)^2 - 11$

$x^2 + 4x - 7 = x^2 + 2 \cdot 2 \cdot x + 2^2 - 2^2 - 7 =$

$= (x+2)^2 - 11$

Pr. $6y - y^2 = -y^2 + 6y = -(y^2 - 6y) =$

$= -\left((y-3)^2 - 3^2\right) = -(y-3)^2 + 9$