

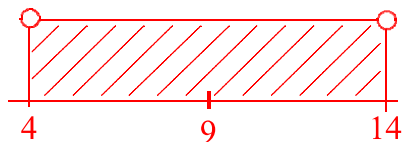
5. kapitola – Další kvadratické rovnice a nerovnice s absolutní hodnotou

1. Řeš kvadratickou rovnici s absolutní hodnotou $|x^2 - 9| < 5$.

$$|x^2 - 9| < 5$$

Použijeme substituci: $y = x^2$

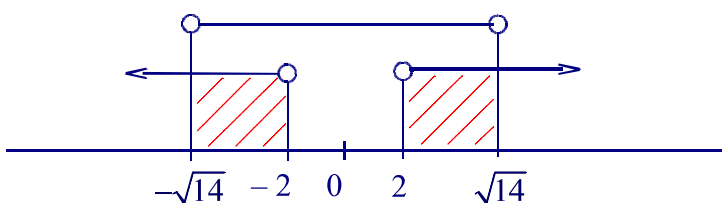
$$|y - 9| < 5$$



$$4 < y < 14$$

$$4 < x^2 < 14$$

$$2 < |x| < \sqrt{14}$$



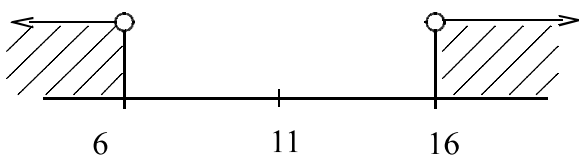
$$\underline{\underline{P = (-\sqrt{14}, -2) \cup (2, \sqrt{14})}}$$

2. Řeš kvadratickou rovnici s absolutní hodnotou $|x^2 - 11| > 5$.

$$|x^2 - 11| > 5$$

Použijeme substituci: $y = x^2$

$$|y - 11| > 5$$



$$\text{a) } y < 6$$

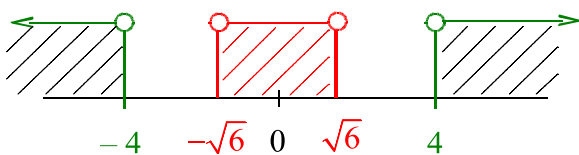
$$x^2 < 6$$

$$|x| < \sqrt{6}$$

$$\text{b) } y > 16$$

$$x^2 > 16$$

$$|x| > 4$$



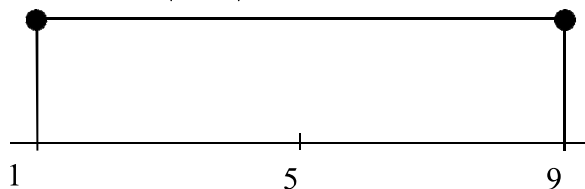
$$\underline{\underline{P = (-\infty, -4) \cup (-\sqrt{6}, \sqrt{6}) \cup (4, \infty)}}$$

3. Vypočítej nerovnici $4 - |x^2 - 5| \geq 0$

$$4 - |x^2 - 5| \geq 0$$

$$4 - |y - 5| \geq 0$$

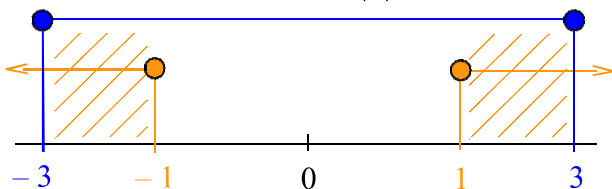
$$|y - 5| \leq 4$$



$$1 \leq y \leq 9$$

$$1 \leq x^2 \leq 9$$

$$1 \leq |x| \leq 3$$



$$\underline{\underline{P = \langle -3; -1 \rangle \cup \langle 1; 3 \rangle}}$$

4. Kolik řešení má rovnice $x^2 + 9|x| + 8 = 0$?

$$|a| = \begin{cases} a; & a \geq 0 \\ -a; & a < 0 \end{cases}$$

a) $x \geq 0$

$$|x| = x$$

$$x^2 + 9x + 8 = 0$$

$$x_{1,2} = \frac{-9 \pm 7}{2} = \begin{cases} -8 \\ -1 \end{cases}$$

$$K_a = \emptyset$$

b) $x < 0$

$$|x| = -x$$

$$x^2 - 9x + 8 = 0$$

$$x_{3,4} = \frac{9 \pm 7}{2} = \begin{cases} 1 \\ 8 \end{cases}$$

$$K_b = \emptyset$$

$K = \emptyset$ Rovnice nemá žádné řešení

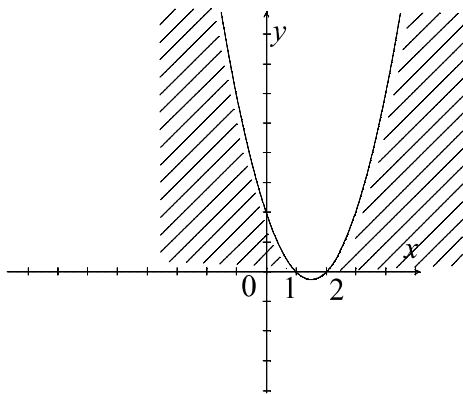
5. Jaké množině je rovna množina všech reálných čísel, pro která platí $x^2 - 3|x| + 2 > 0$?

a) $x \geq 0$

$|x| = x$

$x^2 - 3x + 2 > 0$

$x_{1,2} = \frac{3 \pm \sqrt{9-8}}{2} = \begin{matrix} \nearrow 1 \\ \searrow 2 \end{matrix}$



$P_a = \langle 0, 1 \rangle \cup (2, +\infty)$

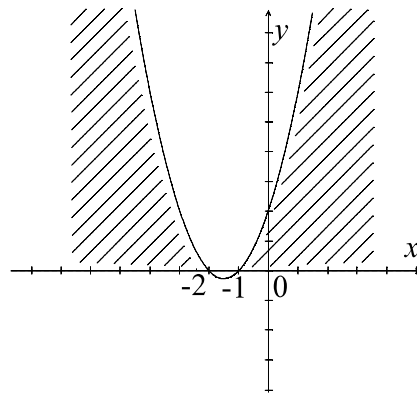
b) $x < 0$

$|x| = -x$

$x^2 - 3 \cdot (-x) + 2 > 0$

$x^2 + 3x + 2 > 0$

$x_{1,2} = \frac{-3 \pm \sqrt{9-8}}{2} = \begin{matrix} \nearrow -2 \\ \searrow -1 \end{matrix}$



$P_b = (-\infty, -2) \cup (-1, 0)$

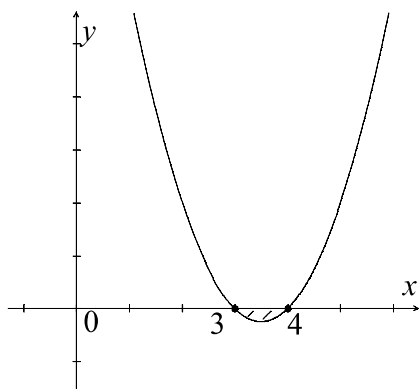
$P = (-\infty, -2) \cup (-1, 1) \cup (2, +\infty)$

6. Jaké množině je rovna množina všech reálných čísel, pro která platí $x^2 - 7|x| + 12 \leq 0$?

a) $x \geq 0$

$x^2 - 7x + 12 \leq 0$

$x_{1,2} = \frac{7 \pm \sqrt{49-48}}{2} = \begin{matrix} \nearrow 3 \\ \searrow 4 \end{matrix}$

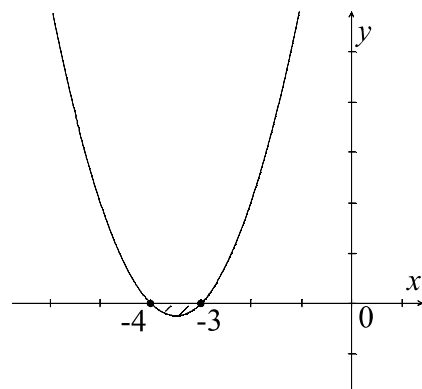


$P_a = \langle 3, 4 \rangle$

b) $x < 0$

$x^2 + 7x + 12 \leq 0$

$x_{1,2} = \frac{-7 \pm \sqrt{49-48}}{2} = \begin{matrix} \nearrow -4 \\ \searrow -3 \end{matrix}$



$P_b = \langle -4, -3 \rangle$

$P = \langle -4, -3 \rangle \cup \langle 3, 4 \rangle$