1. cvičení - výsledky

Příklad 1.

(a) $x = 1000$

(b) $x = -1$

(c) $x \in \{\frac{\pi}{4} + 2k\pi, \frac{3\pi}{4} + 2k\pi, k \in \mathbb{Z}\}$

(d) $x = 100$

(e) $x \in \{\frac{\pi}{3} + 2k\pi, \frac{5\pi}{3} + 2k\pi, k \in \mathbb{Z}\}$

(f) $x = \log_2 \frac{1}{3}$

(g) $x \in \{\frac{\pi}{6} + 2k\pi, \frac{\pi}{2} + k\pi, \frac{5\pi}{6} + 2k\pi, k \in \mathbb{Z}\}$

(h) $x = \frac{4}{3}$

(i) $x \in \{\ln 3, \ln 4\}$

Příklad 2.

(a) $x \in (-\infty, 1] \cup [2, \infty)$

(b) $x \in (1 - \sqrt{2}, 1 + \sqrt{2})$

(c) $x \in (4, 6]$

(d) $x \in (-6, -3) \cup \left(-\frac{1}{2} - \frac{\sqrt{13}}{2}, -\frac{1}{2} + \frac{\sqrt{13}}{2}\right)$

(e) $x \in \left(-\infty, -\frac{9}{4} - \frac{\sqrt{145}}{4}\right] \cup \left(-4, -\frac{9}{4} + \frac{\sqrt{145}}{4}\right] \cup (1, 2)$

(f) $x \in (-2, 0) \cup (2, 4)$

(g) $x \in (-\infty, -3) \cup (-\frac{7}{5}, \infty)$

(h) $x \in (-\infty, 1)$

(i) $x \in (-\frac{5}{2}, \infty)$

(j) $x \in (1, \infty)$

(k) $x \in \left(-\infty, \frac{1-\sqrt{5}}{2}\right) \cup \left(\frac{1+\sqrt{5}}{2}, \infty\right)$

(l) $x \in \mathbb{R}$

(m) $x \in (-\infty, 1] \cup [2, \infty)$

Příklad 3.

(a) $a < 0 \implies x \in \mathbb{R}$

$a = 0 \implies x \in \mathbb{R} \setminus \{-2; 0\}$

$a \in (0, 1] \implies x \left(-\infty, -1 - \sqrt{1+a}\right) \cup (-1 - \sqrt{1-a}, -1 + \sqrt{1-a}) \cup \left(-1 + \sqrt{1+a}, \infty\right)$

$a \in (1, \infty) \implies x \in \left(-\infty, -1 - \sqrt{1+a}\right) \cup \left(-1 + \sqrt{1+a}, \infty\right)$

(b) $a \leq 0 \implies x \in \emptyset$

$a \in (0, 2] \implies x \in (2, 2+a) \cup (2-a, 2] \cup (-2-a, -2] \cup (-2, a-2) = (-2-a, a-2) \cup (2-a, 2+a)$

$a \in (2, \infty) \implies x \in (2, 2+a) \cup [0, 2] \cup (-2-a, -2] \cup (-2, 0) = (-2-a, 2+a)$

(c) $a \leq 0 \implies x \in \emptyset$

$a \in (0, 4] \implies x \in [0, \sqrt{a}) \cup (-2 + \sqrt{4-a}, 0) = (-2 + \sqrt{4-a}, \sqrt{a})$

$a > 4 \implies x \in (-\sqrt{a}, -2] \cup [0, \sqrt{a}) \cup (-2, 0) = (-\sqrt{a}, \sqrt{a})$

(d) Zřejmě pro $a = 0$ a $a = 1$ jsou řešením všechna reálná čísla.

Pro $a < 0$ nebo $a > 1$ je $a(a-1) > 0$ a řešením je $x \in \left(-\infty, \frac{2^{2137}-1}{a(a-1)}\right)$.

Pro $0 < a < 1$ je řešením $x \in \left(\frac{2^{2137}-1}{a(a-1)}, \infty\right)$.

(e) $x \in \begin{cases} (0, -a), & a < 0 \\ \emptyset, & a = 0 \\ (-a, 0), & a > 0 \end{cases}$.

(f) $a \leq 1 \implies x \in \emptyset$

$a > 1 \implies x \in \left(-\frac{a+1}{2}, \frac{a-1}{2}\right)$

(g) $a = 0 \implies x \in \mathbb{R}$

$a < 0 \implies x \in \left[-\frac{2}{a}, -\frac{3}{a}\right) \cup \left(\frac{1}{a}, 0\right)$

$a > 0 \implies x \in \left(-\frac{3}{a}, -\frac{2}{a}\right] \cup \left[0, \frac{1}{a}\right)$

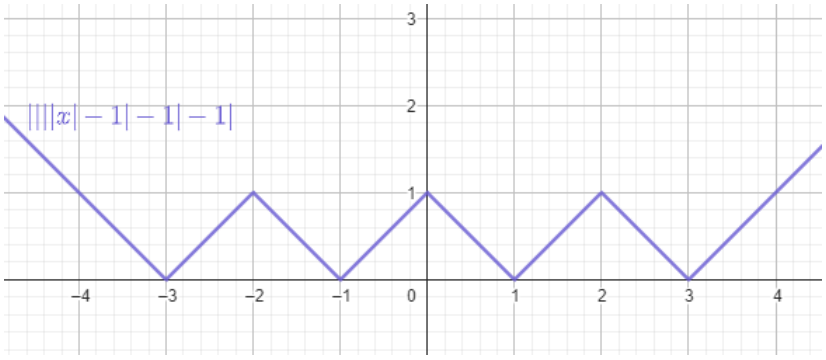
(h)
- pro $a = 0$ rovnice není definována
- $a = 2 \implies x \in \mathbb{R}$
- $a \in \mathbb{R} \setminus \{0; 2\} \implies x = \frac{a^2-4}{a-2} = a + 2$

(i) $a = 0 \implies 2x + 2 = 0 \implies x = -1$

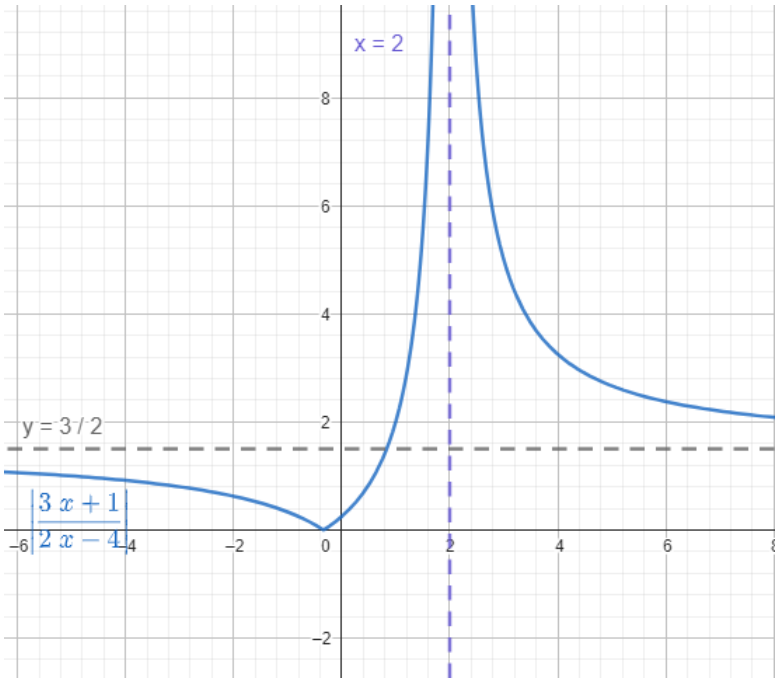
$a \neq 0 \implies x \in \left\{-1, \frac{a-2}{a}\right\}$

Příklad 4.

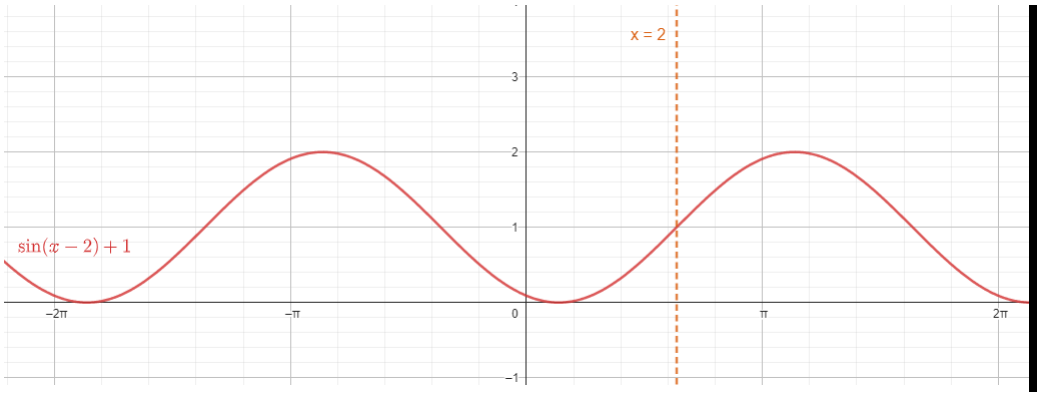
(a)



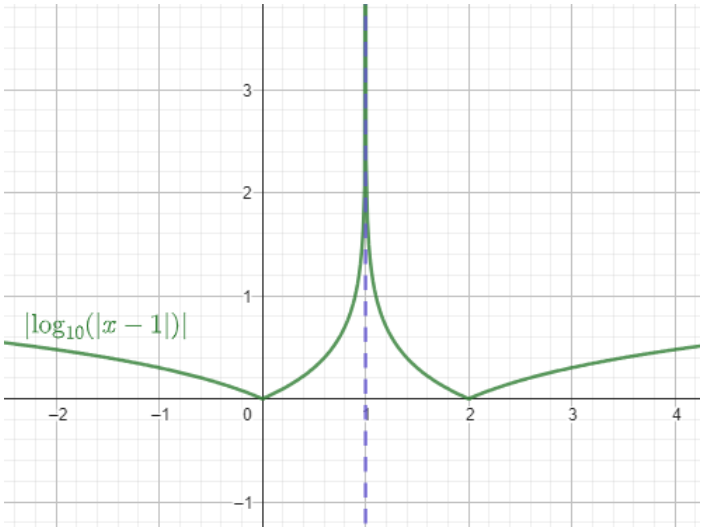
(b)



(c)



(d)



(e)