$$4^{x-1} + 4^{2-x} = 5$$

$$\frac{1}{4} \cdot 4^x + 16 \cdot \frac{1}{4^x} = 5 \qquad y = 4^x \neq 0$$

$$\frac{1}{4} y + \frac{16}{y} = 5 \qquad / \cdot 4y$$

$$y^2 + 64 = 20y$$

$$y^2 - 20y + 64 = 0$$

$$D = 400 - 256 = 144 = 12^2$$

$$y_{1,2} = \frac{20 \pm 12}{2} = \begin{cases} 16 \\ 4 \end{cases}$$

$$4^x = \begin{cases} 16 \\ 4 \end{cases}$$

$$x = \begin{cases} 2 \\ 1 \end{cases}$$

$$\sin x - \underbrace{\sin(\pi + x)} = 2\sin^2 x$$

$\sin(a+b) = \sin a \cos b + \cos a \sin b$

$$= \underbrace{\sin\pi}_{=0} \cos x + \underbrace{\cos\pi}_{=-1} \sin x = -\sin x$$

$$\sin x + \sin x = 2\sin^2 x$$

$$\cancel{2}\sin x = \cancel{2}\sin^2 x$$

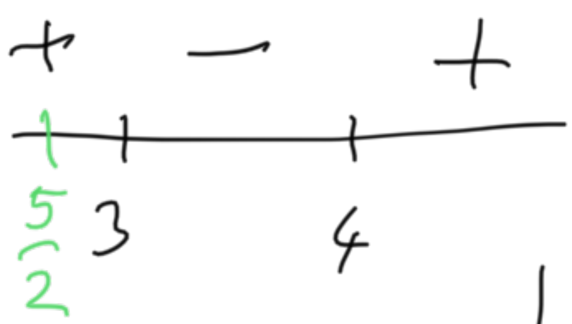
$$\sin x = \sin^2 x \quad / : \sin x$$

$\sin x = 0$	$\sin x \neq 0$	množina všech řešení
$0 = 0$	$1 = \sin x$	$\{k\pi, k \in \mathbb{Z}\} \cup \{\frac{\pi}{2} + 2k\pi, k \in \mathbb{Z}\}$
$x = k\pi, k \in \mathbb{Z}$	$x = \frac{\pi}{2} + 2k\pi, k \in \mathbb{Z}$	

$x-1 \qquad x-2$

$$\frac{\quad}{x-4} > \frac{\quad}{x-3} \quad \Big/ \cdot (x-3)(x-4)$$

$x \neq 3,\ x \neq 4$



a) $x < 3 \lor x > 4$

$$(x-1)(x-3) > (x-2)(x-4)$$

$$\cancel{x^2} - 4x + 3 > \cancel{x^2} - 6x + 8$$

$$2x > 5$$

$$x > \frac{5}{2}$$

dohromady $x \in \left(\frac{5}{2}, 3\right) \cup (4, +\infty)$

b) $x \in (3, 4)$

$$x < \frac{5}{2}$$

$$\emptyset$$

$$\frac{x^2 - x - 4}{x+1} \geq 0 \qquad x \neq -1$$

$x^2 - x - 4 \geq 0$ & $x + 1 > 0$ $\qquad x \in (1+\sqrt{17} \ldots)$

... & $x+1 \geq 0$ ..... $x \in \langle \frac{1+\sqrt{17}}{2}, +\infty)$

$x \geq -1$

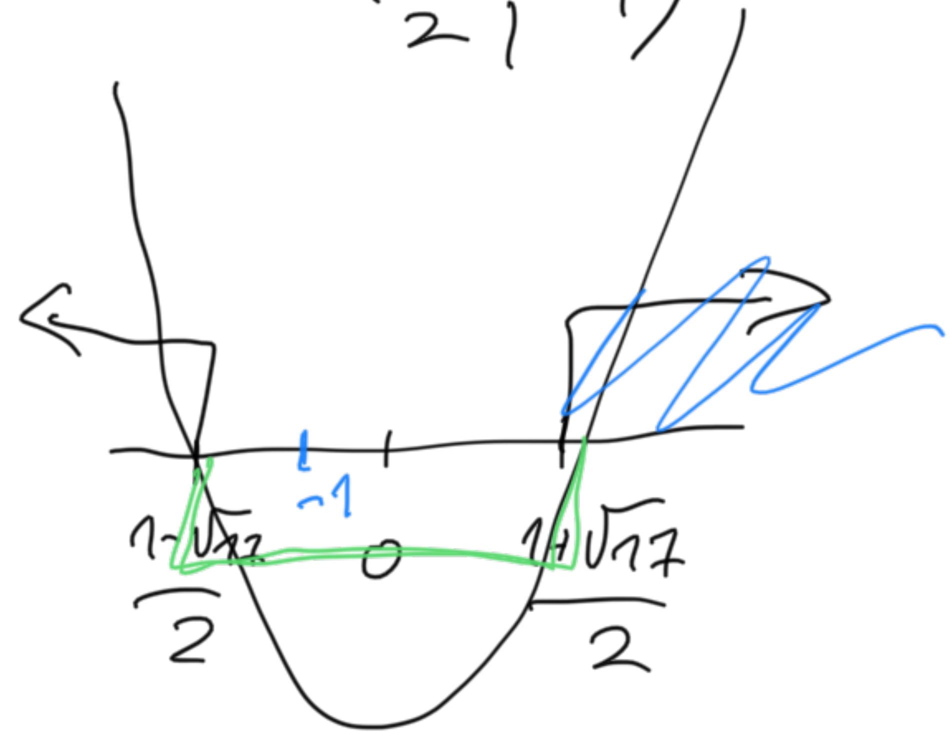
$x^2 - x - 4 \leq 0$ & $x+1<0$ ..... $x \in \langle \frac{1-\sqrt{17}}{2}, -1)$

$x < -1$

$$x^2 - x - 4 = 0$$

$$D = 1 + 16 = 17$$

$$x_{1,2} = \frac{1 \pm \sqrt{17}}{2}$$



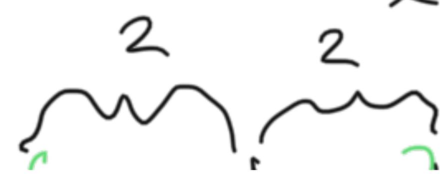
$$x \in \langle \frac{1-\sqrt{17}}{2}, -1) \cup \langle \frac{1+\sqrt{17}}{2}, +\infty)$$

$$\left|4 - |x-3|\right| < 2$$

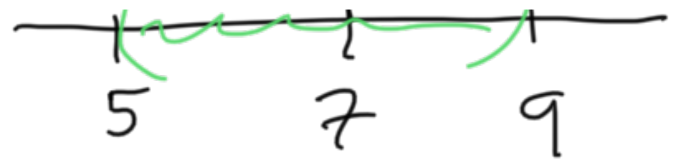
a) $x \geq 3$: $\quad |4 - (x-3)| < 2$

$$|7-x| < 2$$

$|7-x|$ ... vzdálenost x od 7



$x \in (5,9)$



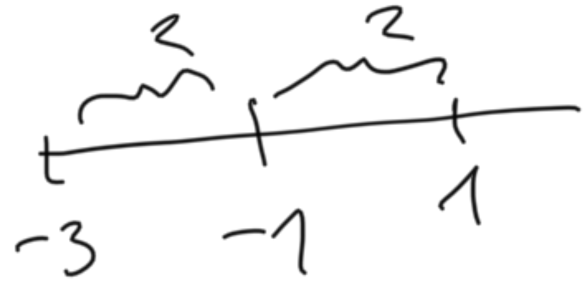
b) $x < 3$:

$|4 - (3-x)| < 2$

$|x+1| < 2$

$|x-(-1)| < 2$

$x \in (-3,1)$



Dohromady: $x \in (-3,1) \cup (5,9)$

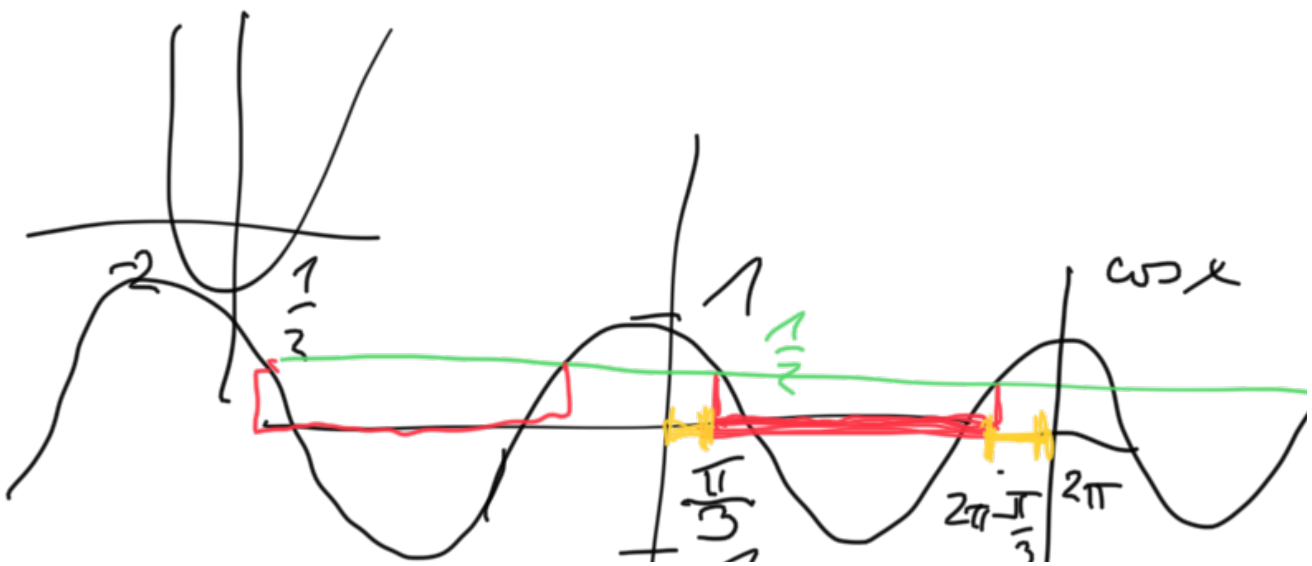
$\cos^2 x + \frac{3}{2}\cos x - 1 < 0$

$y = \cos x$

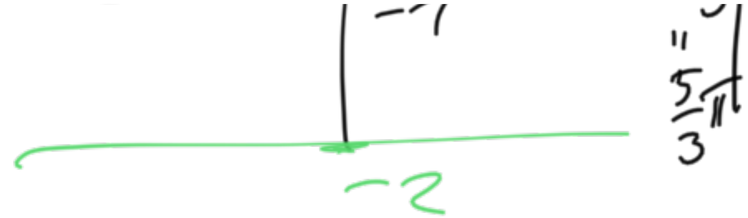
$y^2 + \frac{3}{2} y - 1 < 0$

$(y+2)\left(y - \frac{1}{2}\right) < 0$

$y \in \left(-2, \frac{1}{2}\right)$

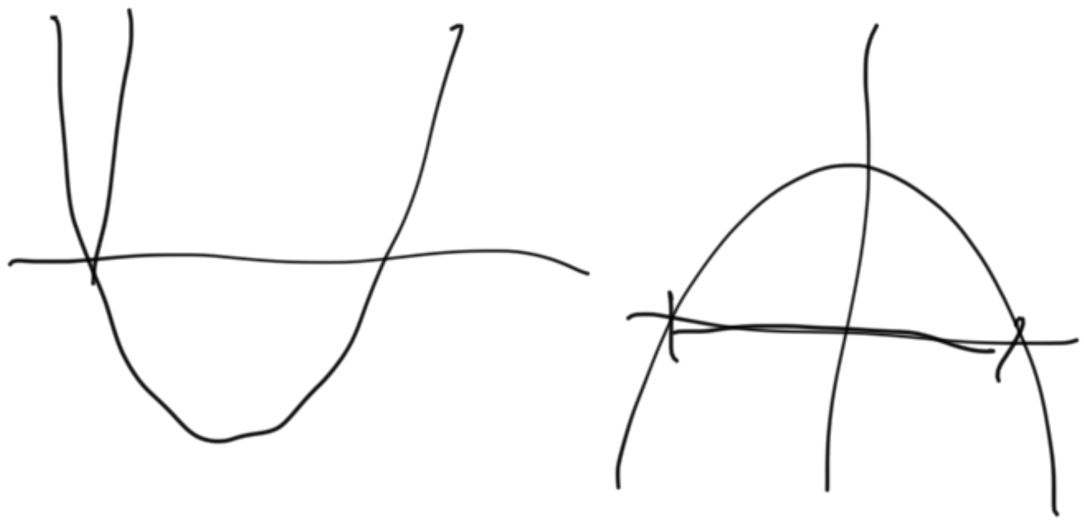


$$-2 \leq \cos x < \frac{1}{2}$$



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

$$cx^2 + x + 1 > 0$$



$\underline{c = 0}$ $\quad x + 1 > 0$

$$\underline{x > -1}$$

$\underline{c < 0}$ $\quad D = 1 - 4c > 0$

$$x_{1,2} = \frac{-1 \pm \sqrt{1-4c}}{2c} \qquad x \in \left(\frac{-1 + \sqrt{1-4c}}{2c}, \ \frac{-1 - \sqrt{1-4c}}{2c} \right)$$

$\underline{c > 0}$ $\quad D = 1 - 4c$

$c > \frac{1}{4} \quad D < 0$

$x \in \mathbb{R}$

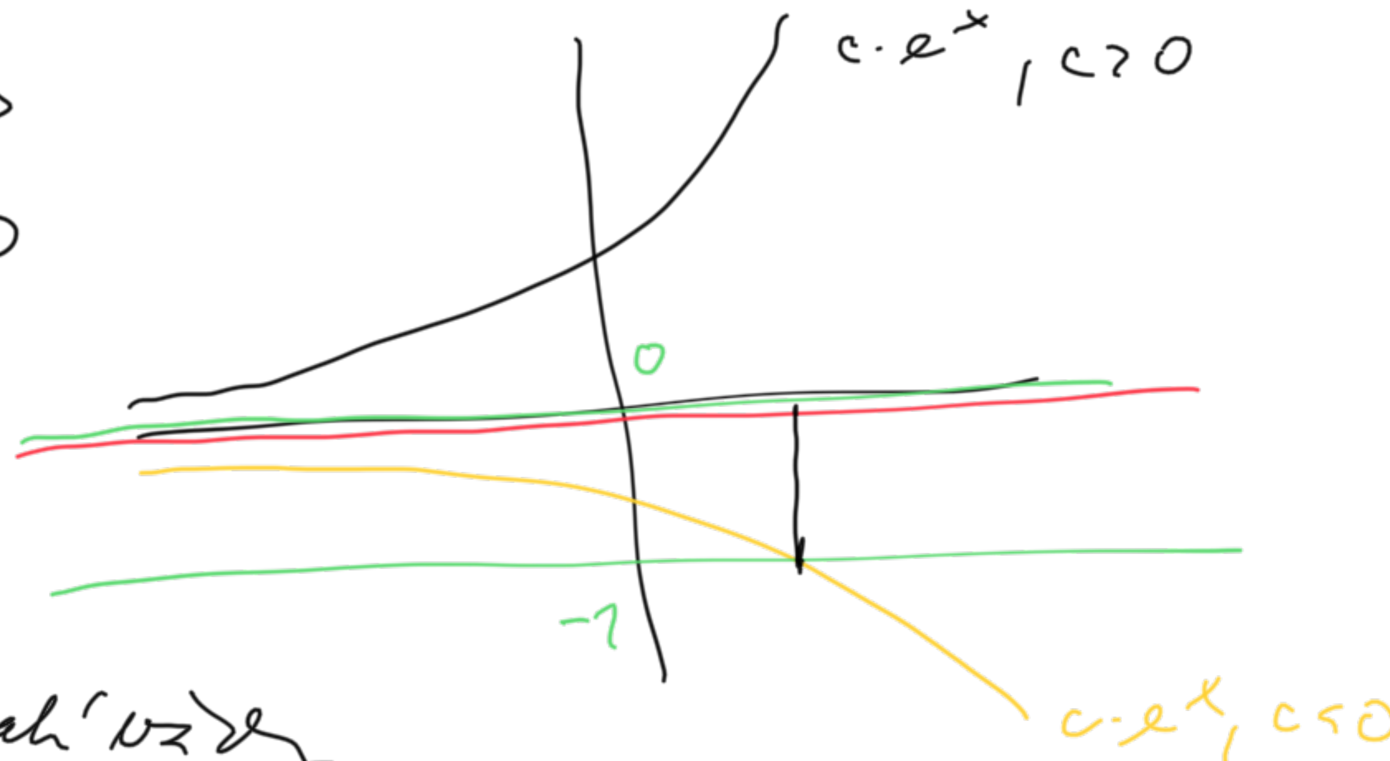
$0 < c \le \frac{1}{4}$ $\quad D \ge 0$

$$x_{1,2} = \frac{-1 \pm \sqrt{1-4c}}{2c}$$

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

$ce^x \in (-1, 0\rangle$

$-1 < ce^x \le 0$



$\underline{c > 0}$ $\quad x \in \emptyset$

$\underline{c = 0}$ $\quad x \in \mathbb{R}$

$\underline{c < 0}$ $\quad c \cdot e^x \le 0$ platí vždy

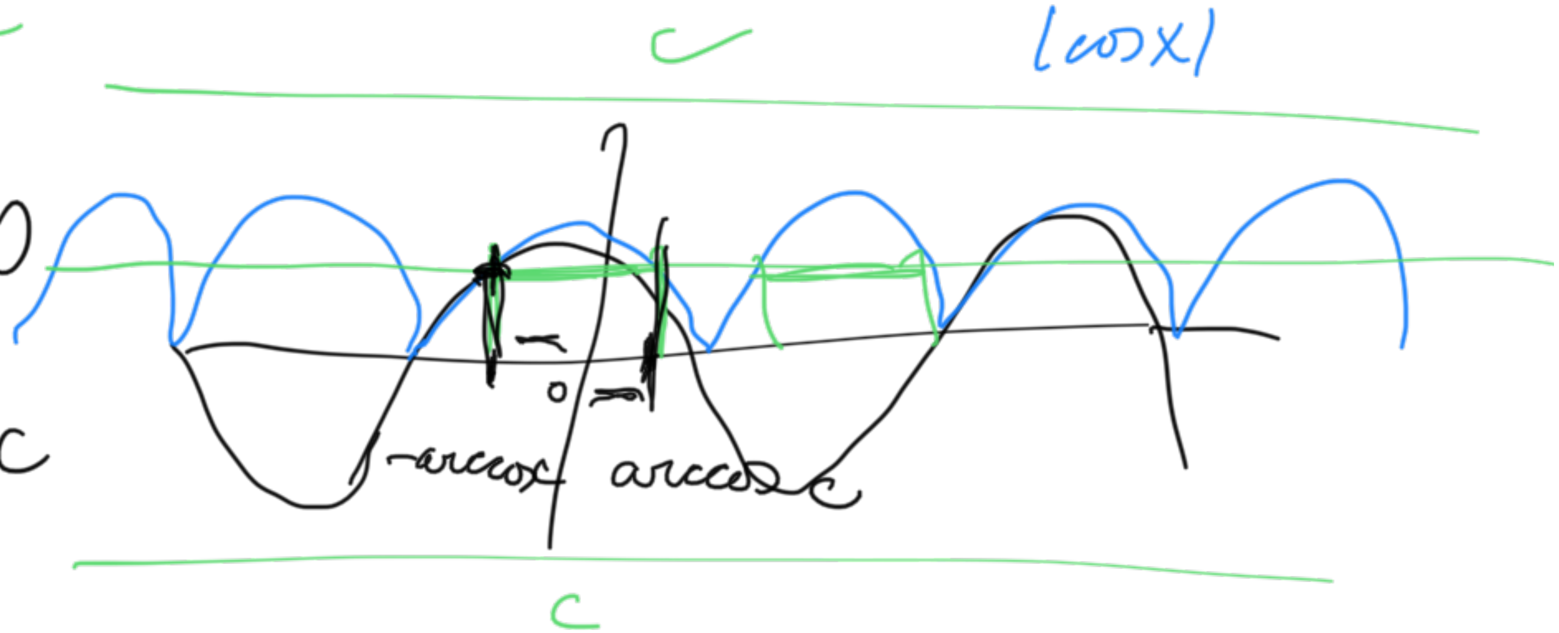
$c \cdot e^x > -1$

$e^x < -\frac{1}{c}$

$x < \log\left(-\frac{1}{c}\right)$

$|\cos x| - c > 0$

$|\cos x| > c$



$\underline{c<0}$ $\quad x \in \mathbb{R}$

$\underline{c \geq 1}$ $\quad x \in \emptyset$

$\underline{c \in \langle 0, 1)}$: $\quad x \in \bigcup_{k \in \mathbb{Z}} \left(-\arccos c + k\pi, \arccos c + k\pi \right)$