① $4^x - 2 = \frac{8}{2^{2x}}$ $\quad y = 4^x \quad y \neq 0$ 2

$y - 2 = \frac{8}{y}$

$y_1 = -2$ ale $y > 0$ nelze 2

5 $y^2 - 2y - 8 = 0$ $\quad y_2 = 4 \quad 4^x = 4 \quad \boxed{x = 1}$ 1

$(y+2)(y-4) = 0$

② $\frac{x+4}{x-3} > \frac{x-4}{x+1}$ 1 $\quad x \neq 3, x \neq -1$ 4

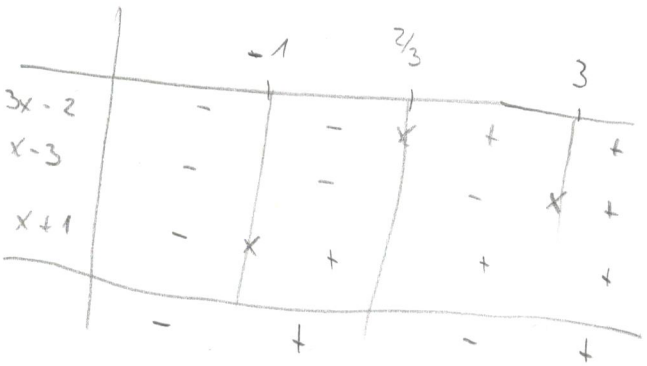
$\frac{(x+4)(x+1) - (x-4)(x-3)}{(x-3)(x+1)} > 0$

$\frac{x^2 + 5x + 4 - x^2 + 7x - 12}{(x-3)(x+1)} > 0$

4

$\frac{12x - 8}{(x-3)(x+1)} > 0$

$\frac{4(3x-2)}{(x-3)(x+1)} > 0$



$x \in (-1, \frac{2}{3}) \cup (3, \infty)$ 1

③ $|x-1| + |x+2| \geq |x-3|$

1

(a) $x \in (-\infty, -2)$

$-x+1 + -x-2 \geq -x+3$

$-x \geq 4$

$-4 \geq x$

$x \in (-\infty, -4]$

(b) $x \in [-2, 1)$

$-x+1+x+2 \geq -x+3$

$x \geq 0 \qquad x \in [0, 1)$

(c) $x \in [1, 3)$

$x-1+x+2 \geq -x+3$

$3x \geq 2$

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

$x \in [1, 3)$

(d) $x \in [3, \infty)$

$x-1+x+2 \geq x-3$

$x \geq -4$ 4x2

$x \in [3, \infty)$

Závěr: $x \in (-\infty, -4] \cup [0, \infty)$ 1

① $10^x - 3 \cdot 10^{-x} = 2$ $\quad y = 10^x \quad y \neq 0$ 2

$y - \frac{3}{y} = 2$

$y_1 = -1$ nelze 2

$y^2 - 2y - 3 = 0$ 5

$y_2 = 3$ $\quad 10^x = 3$

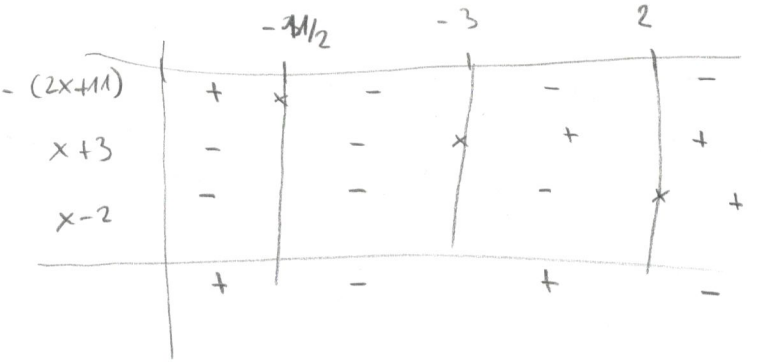
$(y-3)(y+1) = 0$ $\quad \boxed{x = \log_{10} 3}$ 1

② $\frac{x+4}{x+3} < \frac{x+1}{x-2}$ $\quad x \neq 2 \quad x \neq -3$ 1 4

$\frac{(x+4)(x-2) - (x+1)(x+3)}{(x+3)(x-2)} < 0$ 4

$\frac{x^2 - 8 + 2x - x^2 - 3 - 4x}{(x+3)(x-2)} < 0$

$-(2x+11)$ $\quad \frac{-2x - 11}{(x+3)(x-2)} < 0$



$x \in (-11/2, -3) \cup (2, \infty)$ 1

③ $|x+3| - |x+1| \leq |x-1|$

1

(a) $x \in (-\infty, -3)$

$-x - 3 + (+x+1) \leq -x + 1$

$x \leq 3$

$x \in (-\infty, -3)$

(b) $x \in [-3, -1)$

$x + 3 + x + 1 \leq -x + 1$

$3x \leq -3$

$x \leq -1$

$x \in [-3, -1)$

(c) $x \in [-1, 1)$

$x + 3 - x - 1 \leq -x + 1$

$x \leq -1$

$x = -1$ 4 + 2

(d) $x \in [1, \infty)$

$x + 3 - (x+1) \leq x - 1$

$3 \leq x$

$x \in [3, \infty)$

$x \in (-\infty, -1] \cup [3, \infty)$ 1

① $-2\cos^2 x + 3\sin x = 0$

$-2(1-\sin^2 x) + 3\sin x = 0$

$2y^2 + 3y - 2 = 0$

$y_{1,2} = \frac{-3 \pm \sqrt{9+16}}{4}$

$\sin x = y$ 1

$y_1 = -2$ nelze 1

$y_2 = \frac{1}{2}$

$\sin x = \frac{1}{2}$

$x = \frac{\pi}{6} + 2k\pi$

$x = \frac{5}{6}\pi + 2k\pi$ 3

② $\frac{x+3}{x-2} \leq \frac{x+2}{x-1}$

$\frac{(x+3)(x-1) - (x+2)(x-2)}{(x-2)(x-1)} \leq 0$

$\frac{x^2 - 3 + 2x - x^2 + 4}{(x-2)(x-1)} \leq 0$

$\frac{2x+1}{(x-2)(x-1)} \leq 0$ 4

$x \neq 1$ 1
$x \neq 2$

	$-\infty$		$-\frac{1}{2}$		1		2		∞
$2x+1$		$-$	$\times$	$+$		$+$		$+$	
$x-2$		$-$		$-$		$-$	$\times$	$+$	
$x-1$		$-$		$-$	$\times$	$+$		$+$	
		$-$		$+$		$-$		$+$	

$x \in (-\infty, -\frac{1}{2}] \cup (1,2)$ 1

③ $|x+2| - |x-3| < |x|$

1

(a) $x \in (-\infty, -2)$

$-x-2+x-3 < -x$

$x < 5$

$x \in (-\infty, -2)$

(b) $x \in [-2, 0)$

$x+2+x-3 < -x$

$3x < 1$

$x < \frac{1}{3}$

$x \in [-2, 0)$

(c) $x \in [0, 3)$

$x+2+x-3 < x$

$x < 1$

$x \in [0, 1)$

(d) $x \in [3, \infty)$

$x+2-x+3 < x$

$5 < x$

$x \in (5, \infty)$

4 × 2

Celkem $x \in (-\infty, 1) \cup (5, \infty)$ 1