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1.

$$\begin{aligned} \frac{x-1}{x+1} &\leq 1 \quad (x \neq -1) \\ \frac{x-1}{x+1} - 1 &\leq 0 \\ \frac{x-1-(x+1)}{x+1} &\leq 0 \\ \frac{-2}{x+1} &\leq 0 \\ K &= (-1, \infty) \end{aligned}$$

2.

$$x \leq \left| \frac{x+2}{x-3} \right| \quad (x \neq 3)$$

$i) x \in (-\infty, -2) \cup (3, \infty)$

$$\begin{aligned} x &\leq \frac{x+2}{x-3} \\ 0 &\leq \frac{x+2}{x-3} - x \\ \frac{x+2-x\cdot(x-3)}{x-3} &\geq 0 \\ \frac{x^2-4x-2}{x-3} &\leq 0 \\ D &= 16+8=24 \\ x_{1,2} &= \frac{4 \pm 2\sqrt{6}}{2} = \begin{cases} 2-\sqrt{6} \in \langle -2, 3 \rangle \\ 2+\sqrt{6} \geq 3 \end{cases} \end{aligned}$$

	$-\infty$	-2	3	$2+\sqrt{6}$	∞
x^2-4x-2		+	-	0	+
$x-3$		-	+		+
		-	-	0	+

$$K_1 = (-\infty, -2) \cup \left(3, 2+\sqrt{6}\right\rangle$$

$ii) x \in \langle -2, 3)$

$$\begin{aligned} x &\leq -\frac{x+2}{x-3} \\ \frac{x+2}{x+3} + x &\leq 0 \\ \frac{x+2+x\cdot(x-3)}{x-3} &\leq 0 \\ \frac{x^2-2x+2}{x-3} &\leq 0 \\ D &= 4-8<0 \\ x^2-2x+2>0 &\wedge x-3<0 \\ K_2 &= \langle -2, 3) \end{aligned}$$

$$K = K_1 \cup K_2 = (-\infty, 3) \cup \left(3, 2+\sqrt{6}\right\rangle = \left(-\infty, 2+\sqrt{6}\right\rangle - \{3\}$$

3.
UP $M \subseteq \mathbb{R}:\quad M \cap (1,2) \neq \emptyset,\quad$ min $M = -1,\quad$ sup $M = 3,\quad \nexists$max M

$$M = \langle -1, 3)$$

4.
$M = \{x^2 - 2;\ x \in \langle -2, 2)\}$
min $M =$ inf $M = -2$
max $M =$ sup $M = 2$
M je ohraničená

5.
$\delta > 0:\ o_\delta^-(9) \cap o_\delta^+(3) = \emptyset$
$(9 - \delta, 9\rangle \cap \langle 3, 3 + \delta) = \emptyset$
$9 - \delta \geq 3 + \delta \Rightarrow 6 \geq 2\delta \Rightarrow \delta \in (0, 3\rangle$

6.
$o_3(5) \cap o_2(2) = (2, 8) \cap (0, 4) = (2, 4)$