Intervale

Scrieți sub formă de interval sau reuniuni de intervale

$A = \{x \in \mathbb{R} \mid |-3x-1| < 4\}$

$|x \cdot y| = |x| \cdot |y|$
$(\forall) x \in \mathbb{R}$; $(\forall) y \in \mathbb{R}$

Ex:

$|3| \cdot |-4| = 3 \cdot 4 = 12$
$|3 \cdot (-4)| = |-12| = 12$
$\Rightarrow |3| \cdot |-4| = |3 \cdot (-4)|$

$|-3x-1| = |(-1) \cdot (3x+1)| = \underbrace{|-1|}_{\lambda} \cdot |3x+1| = |3x+1|$

$|-3x-1| < 4 \iff |3x+1| < 4 \iff -4 < 3x+1 < 4 \mid -1$
$-5 < 3x < 3 \mid \cdot \frac{1}{3} \iff -\frac{5}{3} < x < 1 \Rightarrow A = \left(-\frac{5}{3}; 1\right)$

$B = \{x \in \mathbb{R} \mid |-2x+5| < 6\}$

$|-2x+5| < 6 \iff -6 < -2x+5 < 6 \mid -5 \iff$

$-11 < -2x < 1 \mid \cdot \frac{1}{2} \iff -\frac{11}{2} < -x < \frac{1}{2} \mid \cdot (-1)$

$\frac{11}{2} > x > -\frac{1}{2} \iff -\frac{1}{2} < x < \frac{11}{2} \Rightarrow B = \left(-\frac{1}{2}; \frac{11}{2}\right)$

$A = \{x \in \mathbb{R} \mid |4x-3| \geq 7\}$

$|4x-3| \leq -7 \iff$
$4x-3 \leq -7 \mid +3 \iff$
$4x \leq -4 \mid \cdot \frac{1}{4} \iff$
$x \leq -1 \in \Rightarrow x \in (-\infty, -1]$

SAU

$4x-3 \geq 7 \mid +3 \iff$
$4x \geq 10 \mid \cdot \frac{1}{4} \iff$
$x \geq \frac{10}{4} \iff x \geq \frac{5}{2} \iff x \in \left[\frac{5}{2}, +\infty\right)$

$x \in (-\infty, -1] \cup [\frac{5}{3}, +\infty) \Rightarrow A = (-\infty, -1] \cup [\frac{5}{3}, +\infty)$

$B = \{ x \in \mathbb{R} \mid |3x+7| > 1 \}$

$|3x+7| > 1 \iff$

$3x+7 < -1 \mid -7 \iff$ SAU $3x+7 > 1 \mid -7 \iff$

$3x < -8 \mid \cdot \frac{1}{3} \iff$

$x < -\frac{8}{3} \iff$

$x \in (-\infty, -\frac{8}{3})$

$3x > -6 \mid \cdot 3$

$x > -2 \iff$

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

$B = (-\infty, -\frac{8}{3}) \cup (-2, +\infty)$

$C = \{ x \in \mathbb{R} \mid |4x-5| \geq 7 \}$

$|4x-5| \geq 7 \iff$

$4x-5 \leq -7 \mid +5$ SAU $4x-5 \geq 7 \mid +5 \iff$

$4x \leq -2 \mid \cdot \frac{1}{4} \iff$

$x \leq -\frac{1}{2} \iff x \in (-\infty, -\frac{1}{2}]$

$4x \geq 12 \mid \cdot \frac{1}{4} \iff$

$x \geq 3 \iff x \in [3, +\infty)$

$C = (-\infty, -\frac{1}{2}] \cup [3, +\infty)$

$D = \{ x \in \mathbb{R} \mid |2x-3| \geq -1 \}$

$|2x-3| \geq 0, (\forall) x \in \mathbb{R}$

$0 \geq -1$

} $\Rightarrow |2x-3| \geq -1, (\forall) x \in \mathbb{R} \Rightarrow$

$D = \mathbb{R} = (-\infty, +\infty)$

} S.Tim că $|x| \geq 0, (\forall) x \in \mathbb{R}$