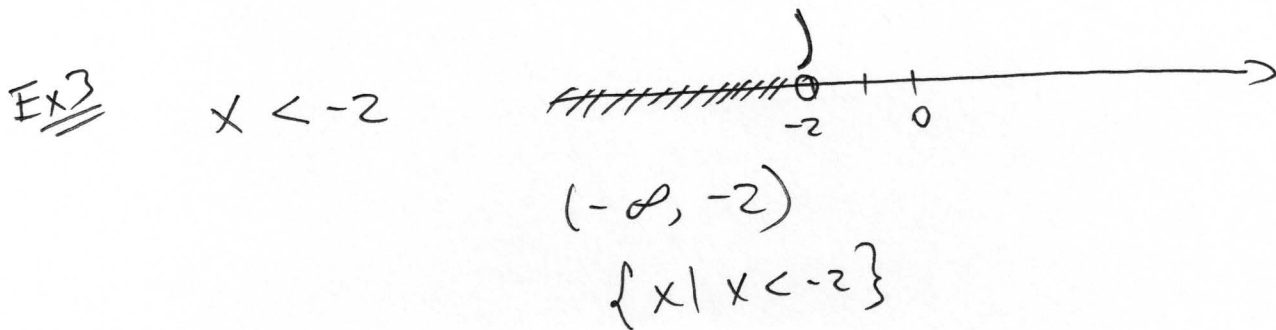
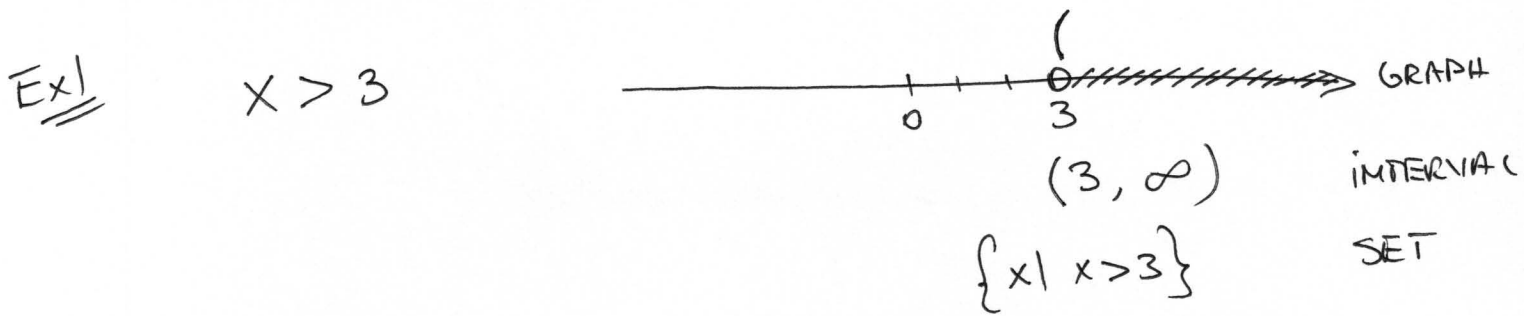


INEQUALITIES (IN ONE VARIABLE)

NOTATIONS

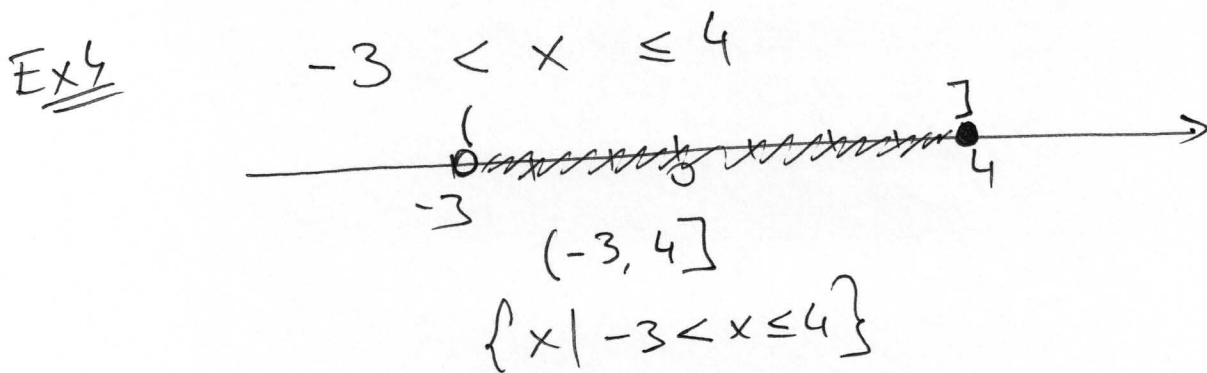


CONVENTION :

$(,) \longleftrightarrow \circ \longleftrightarrow <, >$

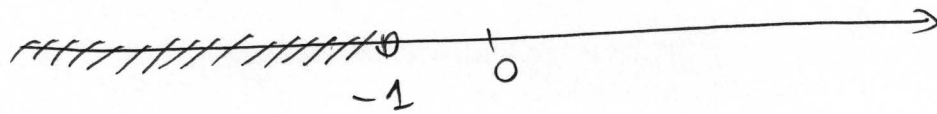
$[,] \longleftrightarrow \bullet \longleftrightarrow \leq, \geq$

$\infty, -\infty \longleftrightarrow \infty$



Ex 5

$$\begin{array}{r} x+3 > 4x+6 \\ -x \quad -x \\ \hline 3 > 3x+6 \\ -6 \quad -6 \\ \hline -3 > 3x \\ \frac{-3}{3} > \frac{3x}{3} \\ -1 > x \end{array}$$

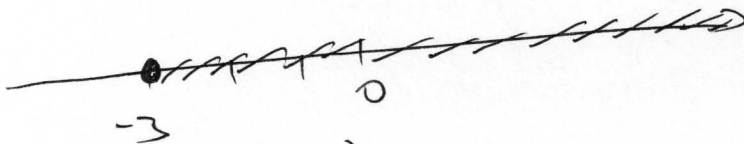


Remark : $-1 > x \Leftrightarrow x < -1$

$$\{x \mid x < -1\}$$

Ex 6

$$\begin{array}{r} 3 - 2x \leq 9 \\ -3 \quad -3 \\ \hline -2x \leq 6 \\ \frac{-2x}{-2} \leq \frac{6}{-2} \\ x \geq -3 \end{array}$$



$$[-3, \infty)$$

$$\{x \mid x \geq -3\}$$

$$\begin{array}{r} 2 < 5 \quad / \cdot (-1) \\ \vdots \\ -2 > -5 \end{array}$$

! MULT/DIV BY
(-) SWITCH SIGN

Ex 7

$$5x - 2 \leq 4 - 3(x - 2)$$

$$5x - 2 \leq 4 - 3x + 6$$

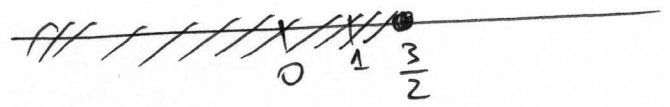
$$5x - 2 \leq 10 - 3x$$

$$3x \qquad \qquad \qquad 3x$$

$$8x - 2 \leq 10$$
$$\qquad \qquad \qquad \frac{2}{2} \qquad \qquad \frac{2}{2}$$

$$\frac{8x}{8} \leq \frac{12}{8}$$

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



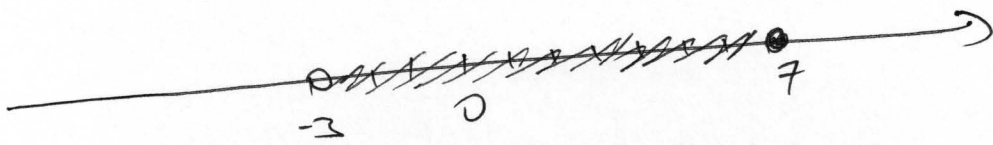
$$(-\infty, \frac{3}{2}]$$

Ex 8

$$-5 < 3x + 4 \leq 25$$
$$\qquad \qquad \qquad -4 \qquad \qquad -4$$

$$\frac{-9}{3} < \frac{3x}{3} \leq \frac{21}{3}$$

$$-3 < x \leq 7$$



$$(-3, 7]$$

$$\{x \mid -3 < x \leq 7\}$$

Ex 9

$$\begin{array}{r} 3 - 4x > 7 \\ -3 \quad -3 \\ \hline -4x > 4 \\ \frac{-4}{-4} \quad \frac{4}{-4} \\ \hline x < -1 \end{array}$$

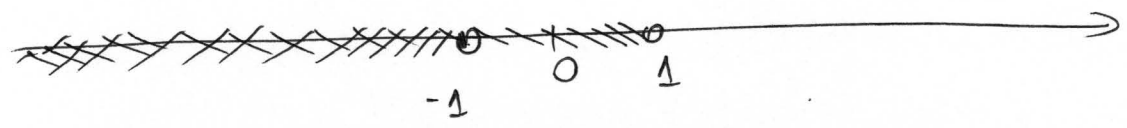
$x < -1$

OR

$$\begin{array}{r} 4x + 5 < 9 \\ -5 \quad -5 \\ \hline 4x < 4 \\ \frac{4x}{4} < \frac{4}{4} \end{array}$$

$x < 1$

∪ UNION



$(-\infty, 1)$

Ex 10

$$\begin{array}{r} 11 - 2x > -3 \\ -11 \quad -11 \\ \hline -2x > -14 \\ \frac{-2x}{-2} > \frac{-14}{-2} \end{array}$$

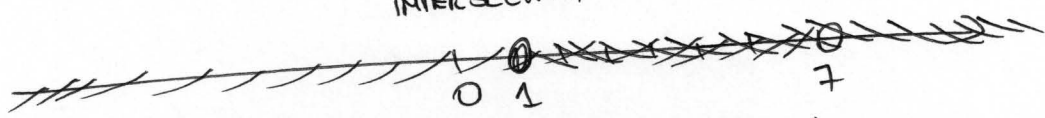
$x < 7$

AND

$$\begin{array}{r} 7 - 3x < 4 \\ -7 \quad -7 \\ \hline -3x < -3 \\ \frac{-3x}{-3} < \frac{-3}{-3} \end{array}$$

$x > 1$

∩ INTERSECTION



$(1, 7)$

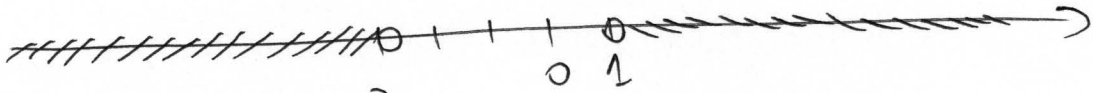
∅ EMPTY SET

Ex 11

$$\begin{array}{r} 2 - 3x > 11 \\ -2 \quad \quad -2 \\ \hline -3x > 9 \\ \frac{-3x}{-3} > \frac{9}{-3} \\ x < -3 \end{array}$$

OR

$$\begin{array}{r} 5 + 2x > 7 \\ -5 \quad \quad -5 \\ \hline 2x > 2 \\ \frac{2x}{2} > \frac{2}{2} \\ x > 1 \end{array}$$



$$(-\infty, -3) \cup (1, \infty)$$

$$\{x \mid x < -3\} \cup \{x \mid x > 1\}$$