

Absolute Value Inequalities

Solve and write solution in interval notation.

a) $|2x + 7| < 11$ $\left. \begin{matrix} < \\ \leq \end{matrix} \right\}$ "and" b) $|3x - 2| \geq 8$ $\left. \begin{matrix} > \\ \geq \end{matrix} \right\}$ "or"

less than (d) great (or)

$2x + 7 < 11$ $2x + 7 > -11$ $3x - 2 \geq 8$ $3x - 2 \leq -8$

$2x < 4$ $2x > -18$ $3x \geq 10$ $3x \leq -6$

$x < 2$ and $x > -9$ $x \geq \frac{10}{3}$ OR $x \leq -2$

$x = -10$ X $x = 0$ ✓ $x = 5$ X

$(-9, 2)$

$x = -3$ ✓ $x = 0$ X $x = 5$ ✓

$(-\infty, -2] \cup [\frac{10}{3}, \infty)$

c) $|x + 4| - 1 > 6x$ OR d) $|x + 3| < -2$

$|x + 4| > 6x + 1$ \uparrow

$x + 4 > 6x + 1$ $x + 4 < -6x - 1$ $\square \emptyset$

$3 > 5x$ $7x < -5$

$\frac{3}{5} > x$

$x < \frac{3}{5}$ OR $x < -\frac{5}{7}$

$x < -\frac{5}{7}$ $\frac{3}{5}$

$(-\infty, \frac{3}{5})$

$x + 3 < -2$ and $x + 3 > 2$

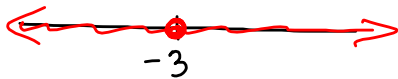
$x < -5$ and $x > -1$

-5 -1

e) $|x + 3| \geq 0$

$x + 3 \geq 0$ $x + 3 \leq -0$

$x \geq -3$ or $x \leq -3$



$(-\infty, \infty)$

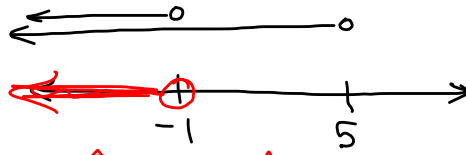
f) $|4 + x| < 1 - 2x$

↳ less th(and)

$4 + x < 1 - 2x$ $4 + x > -1 + 2x$

$3x < -3$ $5 > x$

$x < -1$ and $x < 5$



\uparrow \uparrow \uparrow
 $x = -2$ $x = 0$ $x = 6$
 $2 < 1 + 4$ \times $10 < -11$
 \times \times

$(-\infty, -1)$

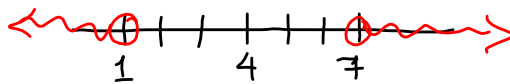
Describe each solution in words.

$|x - 4| > 3$

distance from 4 is more than 3

$x - 4 = 0$
 $x = 4$

great(or)

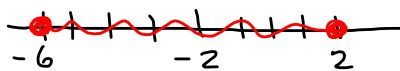


$(-\infty, 1) \cup (7, \infty)$

$|x + 2| \leq 4$

distance from -2 is at most 4

less th(and)



$[-6, 2]$