

1-6 Solving Compound and Absolute Value Inequalities

Objective: Solve compound and absolute value inequalities.

Let us read the definition on page 40 together...

How to solve an "and" compound inequality

Ex 1) $10 \leq 3y - 2 < 19$

$$\begin{array}{r} +2 \quad +2 \\ \hline 12 \leq 3y < 21 \\ \hline \frac{12}{3} \leq \frac{3y}{3} < \frac{21}{3} \end{array}$$

Same $\rightarrow [4, 7)$

$y | 4 \leq y < 7$

Ex 2) $-8 \leq 3y - 20 \leq 52$

$$\begin{array}{r} +20 \quad +20 \\ \hline 12 \leq 3y \leq 72 \\ \hline \frac{12}{3} \leq \frac{3y}{3} \leq \frac{72}{3} \end{array}$$

$y | 4 \leq y \leq 24$

$[4, 24]$

How to solve an "or" compound inequality.

Ex 3) $x + 3 < 2$ or $-x \leq -4$

$$\begin{array}{r} -3 \quad -3 \\ \hline x < -5 \end{array}$$

$$\begin{array}{r} -1 \quad -1 \\ \hline -x \leq -4 \\ \hline x \geq 4 \end{array}$$

$x | x < -5$ or $x \geq 4$

$(-\infty, -5) \cup [4, \infty)$

OR

Ex 4) $2x - 3 > 15$ or $3 - 7x < 17$

$$\begin{array}{r} +3 \quad +3 \\ \hline 2x > 18 \\ \hline \frac{2x}{2} > \frac{18}{2} \end{array}$$

$$\begin{array}{r} -3 \quad -3 \\ \hline -7x < 14 \\ \hline \frac{-7x}{-7} < \frac{14}{-7} \end{array}$$

$x | x > 9$ or $x > -2$

$x | x > -2$

$(-2, \infty)$

How to solve an absolute value inequality with $<$, \leq (AND)

Ex 5) $|a| < 4$

$a < 4$ AND $a > -4$

Ex 6) $3 > |d|$

$|d| < 3$

$d < 3$ and $d > -3$

How to solve an absolute value with $>$, \geq (or)

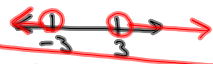
Ex 7) $|a| > 4$

$a > 4$ or $a < -4$



Ex 8) $3 < |d|$

$d > 3$ or $d < -3$

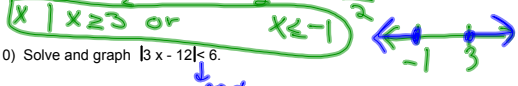


Ex 9) Solve and graph $|2x - 2| \geq 4$.

$2x - 2 \geq 4$ or $2x - 2 \leq -4$

$\frac{2x - 2}{2} \geq \frac{4}{2}$ or $\frac{2x - 2}{2} \leq \frac{-4}{2}$

$x \geq 3$ or $x \leq -1$



Ex 10) Solve and graph $|3x - 12| < 6$.

$3x - 12 < 6$ And $3x - 12 > -6$

$3x - 12 > -6$

$\frac{3x - 12}{3} < \frac{6}{3}$

$\frac{3x - 12}{3} > \frac{-6}{3}$

$x < 6$ AND $x > 2$



$(2, 6)$