

12/08/06 Objective: TSWBAT solve compound and absolute value inequalities and graph their solutions on the number line

Vocabulary

① compound inequality - two inequalities that are joined by the word and or the word or. A solution of a compound inequality joined by and is any number that makes both inequalities true.

Solving Compound Inequalities Containing "and"

Today's temperatures will be above 32°F , but not as high as 40°F

This can be written as $32 < T$ and $T < 40$. Then combine the two inequalities into one, which you can read in two ways. $32 < T < 40$

T is greater than 32
and less than 40

T is between 32 and 40

the graph of $32 < T < 40$ is an interval on a number line.



Graph $32 \leq T \leq 40$



T is greater than or equal to 32 and less than or equal to 40.

Examples

Solve $-4 < r - 5 \leq -1$

Graph the solutions on the number line.

$$-4 < r - 5$$

and

$$r - 5 \leq -1$$

$$\begin{array}{r} +5 \\ \hline \end{array} \quad \begin{array}{r} +5 \\ \hline \end{array}$$

$$\begin{array}{r} +5 \\ \hline \end{array} \quad \begin{array}{r} +5 \\ \hline \end{array}$$

$$1 < r$$

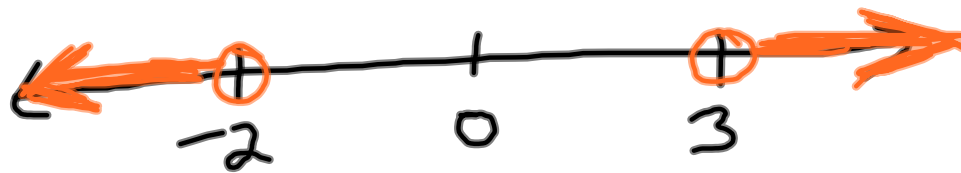
$$r \leq 4$$



Solve $4v+3 < -5$ or $-2v+7 < 1$

$$\begin{array}{r} 4v+3 < -5 \\ \underline{-3} \quad \underline{-3} \\ 4v < -8 \\ \underline{4} \quad \underline{4} \\ v < -2 \end{array} \quad \text{or} \quad \begin{array}{r} -2v+7 < 1 \\ \underline{-7} \quad \underline{-7} \\ -2v < -6 \\ \underline{-2} \quad \underline{-2} \\ v > 3 \end{array}$$

a solution of a compound inequality containing or is any number that makes either inequality true



Try These

① $2 < 5 - x < 5$

$$\begin{array}{r|l} 2 < 5 - x & 5 - x < 5 \\ \hline -5 & -5 \\ \hline -3 < -x & +x < 0 \\ \hline -1 & +1 \\ \hline \end{array}$$

$3 > x$

$x > 0$



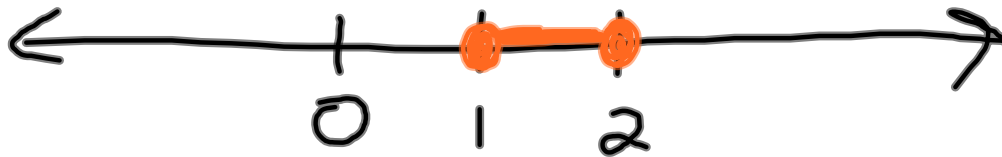
② $4 + k > 3$ or $6k < -30$

$$\begin{array}{r} -4 \\ \hline k > -1 \end{array} \quad \begin{array}{r} -4 \\ \hline k < -5 \end{array} \quad \begin{array}{r} 6k < -30 \\ \hline k < -5 \end{array}$$



$$\textcircled{c} \quad 3 \geq 4r - 5 \geq -1$$

$$\begin{array}{l|l} 3 \geq 4r - 5 & 4r - 5 \geq -1 \\ \hline \begin{array}{l} +5 \quad +5 \\ \hline 8 \geq 4r \\ \hline \frac{8}{4} \geq \frac{4r}{4} \\ 2 \geq r \end{array} & \begin{array}{l} +5 \quad +5 \\ \hline 4r \geq 4 \\ \hline \frac{4r}{4} \geq \frac{4}{4} \\ r \geq 1 \end{array} \end{array}$$



Solving Absolute Value Inequalities

$$|v-3| \geq 4$$

Solve and Graph solutions on a Number line

Write $|v-3| \geq 4$ as two inequalities joined by or

Reverse the inequality and use the (-)

$$v-3 \leq -4 \quad \text{or} \quad v-3 \geq 4$$
$$\begin{array}{r} +3 \quad +3 \\ \hline v \leq -1 \end{array} \quad \begin{array}{r} +3 \quad +3 \\ \hline v \geq 7 \end{array}$$



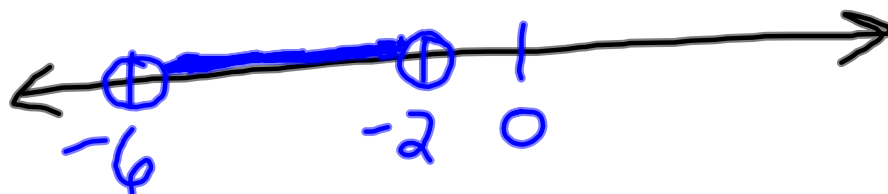
try $|s+4| < 2$

$$s+4 > -2$$
$$\underline{-4} \quad \underline{-4}$$

$$s > -6$$

$$s+4 < 2$$
$$\underline{-4} \quad \underline{-4}$$

$$s < -2$$



Try $|3c-6| \geq 3$

$$3c-6 \leq -3$$

$$\begin{array}{r} +6 \\ \hline \end{array} \quad \begin{array}{r} +6 \\ \hline \end{array}$$

$$\frac{3c}{3} \leq \frac{3}{3}$$

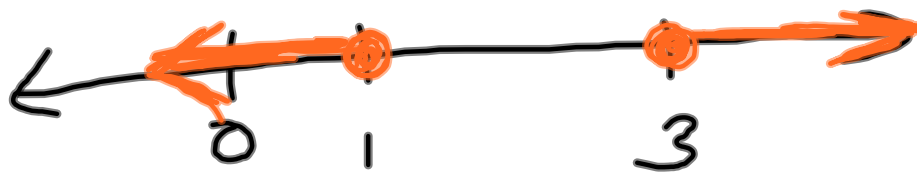
$$c \leq 1$$

$$3c-6 \geq 3$$

$$\begin{array}{r} +6 \\ \hline \end{array} \quad \begin{array}{r} +6 \\ \hline \end{array}$$

$$\frac{3c}{3} \geq \frac{9}{3}$$

$$c \geq 3$$



Ex 3 $|2n+3| \leq 5$

$$2n+3 \geq -5$$
$$\underline{-3} \quad \underline{-3}$$

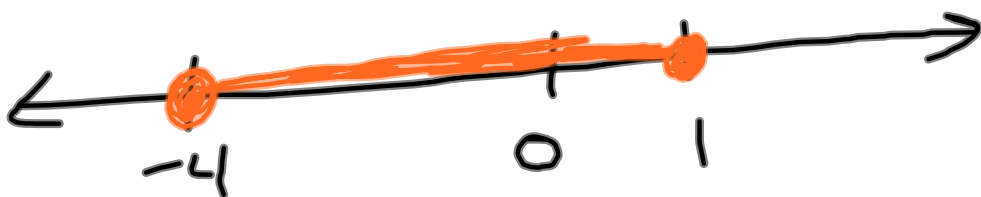
$$\underline{2n} \geq \underline{-8}$$
$$\underline{2} \quad \underline{2}$$

$$n \geq -4$$

$$2n+3 \leq 5$$
$$\underline{-3} \quad \underline{-3}$$

$$\underline{2n} \leq \underline{2}$$
$$\underline{2} \quad \underline{2}$$

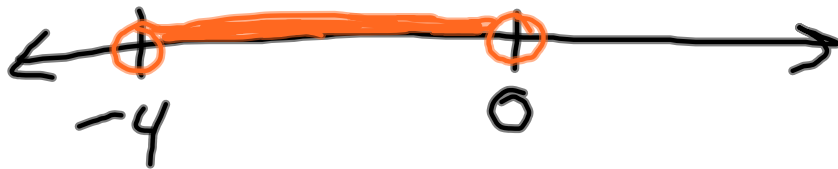
$$n \leq 1$$



(E14) $5 > |v+2| + 3$
-3 -3

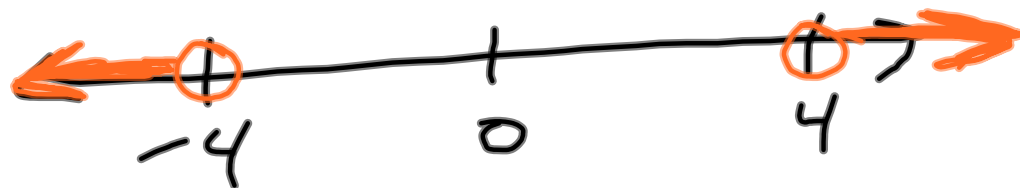
$2 > |v+2|$

$-2 < v+2$		$2 > v+2$
<u>-2</u> <u>-2</u>		<u>-2</u> <u>-2</u>
$-4 < v$		$0 > v$



(Ex5) $|2k| > 8$

$$\frac{2k}{2} < \frac{-8}{2} \quad | \quad \frac{2k}{2} > \frac{8}{2}$$
$$k < -4 \quad | \quad k > 4$$



Ex 6

$$|4y + 11| < 7$$

$$4y + 11 > -7$$
$$\underline{-11} \quad \underline{-11}$$

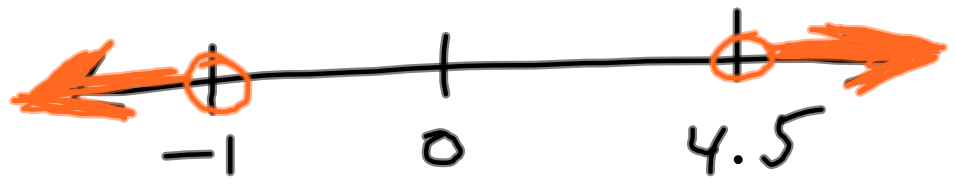
$$4y > -18$$
$$\underline{4} \quad \underline{4}$$

$$y > 4.5$$

$$4y + 11 < 7$$
$$\underline{-11} \quad \underline{-11}$$

$$4y < -4$$
$$\underline{4} \quad \underline{4}$$

$$y < -1$$



(EX7) $|J| - 2 \geq 6$
+2 +2

$|J| \geq 8$

$J \leq -8$

$J \geq 8$

