

Solve Inequalities, Graph Solutions & Write Solutions in
Interval Notation

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4 < 7
smaller
less than bigger
greater than

$$2 < 5$$

or

$$8 > 1$$

With inequalities, always read from the variable.

x is greater than 3

$$x > 3$$

x is greater than 3

$$3 < x$$

x is less than 10

$$x < 10$$

x is less than 10

$$10 > x$$

With inequalities, always read from the variable.

x is greater than or equal to 2

$$x \geq 2$$

x is greater than or equal to 2

$$2 \leq x$$

x is less than or equal to 8

$$x \leq 8$$

x is less than or equal to 8

$$8 \geq x$$

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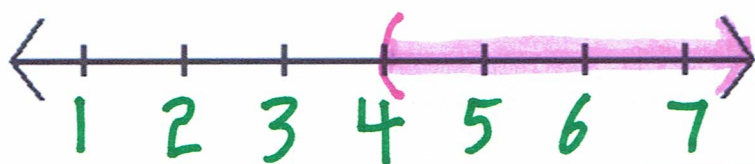
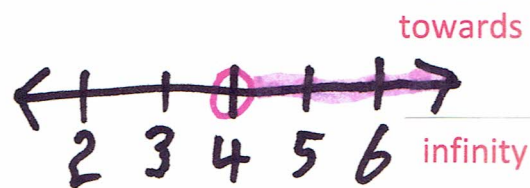
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number lines courtesy of
MathWarehouse.com

$$\begin{array}{r} 19 < 3x + 7 \\ -7 \quad -7 \\ \hline \end{array}$$

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

$$4 < x \quad \text{solve inequality}$$



$$(4, \infty)$$

write solutions in
interval notation

$$7r + 4 - r \leq 17 - 2r + 3$$

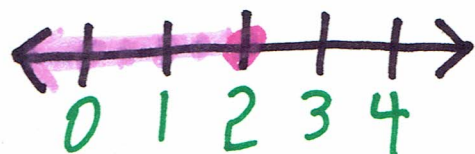
$$\begin{array}{r} 6r + 4 \leq 20 - 2r \\ +2r \quad +2r \\ \hline \end{array}$$

$$8r + 4 \leq 20$$

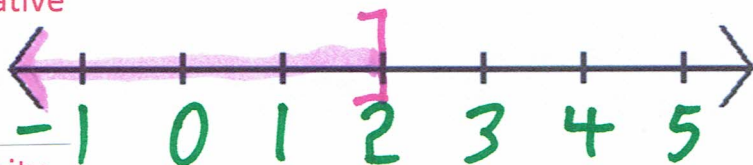
$$\begin{array}{r} -4 \quad -4 \\ \hline \end{array}$$

$$\frac{8r}{8} \leq \frac{16}{8}$$

$$r \leq 2 \quad \text{solve}$$



"towards"
negative



graph

$$(-\infty, 2]$$

interval notation

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$$-3(4 + 7q) - 28 < -5(2 + 3q)$$

$$-12 - 21q - 28 < -10 - 15q$$

$$-21q - 40 < -10 - 15q$$

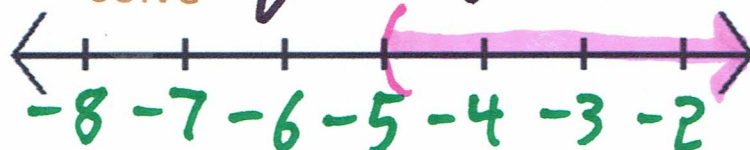
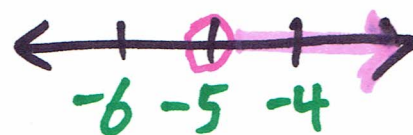
$$+15q \qquad \qquad \qquad +15q$$

$$\begin{array}{r} -6q - 40 < -10 \\ +40 \quad +40 \end{array}$$

$$\begin{array}{r} -6q < 30 \\ \hline -6 \end{array}$$

solve $q > -5$

Whenever you multiply or divide by a negative number you must reverse or "flip" the inequality sign.



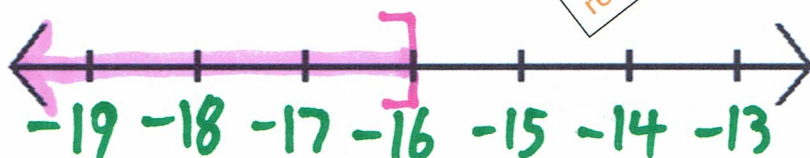
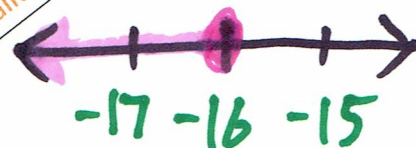
graph

$(-5, \infty)$ interval notation

$$-\frac{8}{15} \cdot \frac{10}{1} \leq -\frac{5}{8}k \left(-\frac{8}{5}\right)$$

solve $-16 \geq k$

Whenever you multiply or divide by a negative number you must reverse or "flip" the inequality sign.



graph

$(-\infty, -16]$ interval notation