Solve Inequality Equations

Solve and Graph on Number Line using ○ and ●

Name:_____ Date:_____

Inequalities are algebraic expressions related by

<	"is less than,"	≤	"is less than or equal to,"
>	"is greater than,"	≥	"is greater than or equal to."

Graphing an Inequality

Inequalities on the number line will show the range of numbers by graphing a straight line and indicating the end points with an open circle, closed circle, arrow for infinity.

An open circle, ○, shows the value is not included (<, >).

$x > -2$

A closed circle, ●, shows the value is not included (≤, ≥).

$x \leq -5$

Solving and Inequality

Solving linear inequalities is exactly like solving a linear equation except:
** Multiply or Divide by a negative number, change the direction of the inequality symbol.**

$$\frac{-3x}{-3} > \frac{15}{-3} \quad x < -5$$

$$\frac{-2x}{-2} \leq \frac{-14}{-2} \quad x \geq 7$$

$$\frac{-2x}{-2} + 4 \leq -10 \quad \frac{-4}{-4} \quad \frac{-2x}{-2} \leq \frac{-14}{-2} \quad x \geq 7$$

$$\frac{-x}{-1} - 3 > 2 \quad \frac{+3}{+3} \quad \frac{-x}{-1} > \frac{5}{-1} \quad x < -5$$

Do **NOT** change sign when adding or subtracting.

$$x + 5 \leq -20 \quad \frac{-5}{-5} \quad x \leq -25$$

$$x - 7 \leq -8 \quad \frac{+7}{+7} \quad x \leq -1$$

Practice

Solve and graph each inequality equation.

1) $2x - 3 > 5$

2) $3 - x < 0$

3) $-4x + 1 \leq 5$

4) $5x - 7 \geq 3$

5) $6 - 2x > 4$

6) $7x + 2 < 16$

7) $-3x - 9 \leq 0$

8) $4(x - 1) > 3x$

9) $6(3 - x) < 22$

10) $-5x + 15 \geq 0$

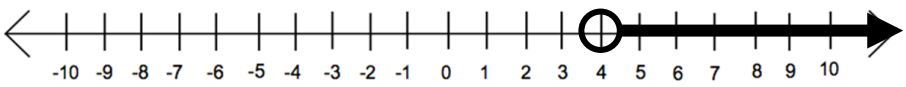
Solutions

1) $2x - 3 > 5$

$+3 \quad +3$

$\frac{2x}{2} > \frac{8}{2}$

$x > 4$

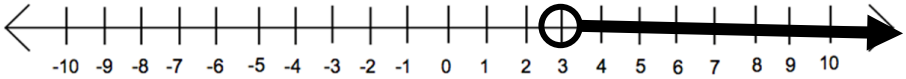


2) $3 - x < 0$

$-3 \quad -3$

$\frac{-x}{-1} < \frac{-3}{-1}$

$x > 3$



3) $-4x + 1 \leq 5$

$-1 \quad -1$

$\frac{-4x}{-4} \geq \frac{4}{-4}$

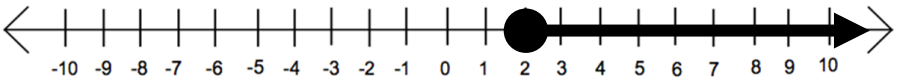
$x \leq -1$

4) $5x - 7 \geq 3$

$+7 \quad +7$

$\frac{5x}{5} \geq \frac{10}{5}$

$x \geq 2$

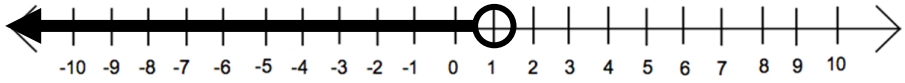


5) $6 - 2x > 4$

$-6 \quad -6$

$\frac{-2x}{-2} > \frac{-2}{-2}$

$x < 1$



6) $7x + 2 < 16$

$\underline{-2} \quad \underline{-2}$

$\frac{7x}{7} < \frac{14}{7}$

$x < 2$

7) $-3x - 9 \leq 0$

$\underline{+9} \quad \underline{+9}$

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

$x \geq -3$

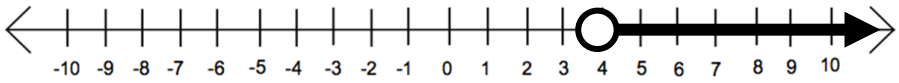
8) $4(x - 1) > 3x$

$4x - 4 > 3x$

$\underline{-4x} \quad \underline{-4x}$

$\frac{-4}{-1} > \frac{-x}{-1}$

$4 < x$



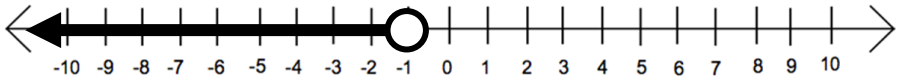
9) $6(3 - x) < 22$

$16 - 6x < 22$

$\underline{-16} \quad \underline{-16}$

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

$x < -1$



10) $-5x + 15 \geq 0$

$\underline{-15} \quad \underline{-15}$

$\frac{-5x}{-5} \geq \frac{-15}{-5}$

$x \leq 3$