Get out your homework and have it ready to check. Target Check today!

Classwork - Inequalities Intro

Write an equation that represents each situation below. Then solve the equation using inverse operations.

1) A plumber charges a service charge of $60 just to show up to a job site. He then charges you $9 an hour while he is working. Create and solve an equation to find the number of hours the plumber worked on your house if the total cost was $105.

Define variable:

# of hours = h

$9h + 60$ = Total Cost

$9h + 60 = 105$

$-60 \quad -60$

$9h = 45$

$h = 5$ hours

2) Theresa had her birthday party at the movies. It cost $32 for pizza and $6.50 per friend for the movie tickets. Create and solve an equation to find how many friends Theresa had at her party if she spent $110.

Define variable:

# of friends = f

$6.50f + 32$ = Total Spent

$6.50f + 32 = 110$

$-32 \quad -32$

$\frac{6.50f}{6.5} = \frac{78}{6.5}$

$f = 12$ friends

3) An online retailer charges a one-time fee of $6.99 plus $0.55 per pound to ship electronics purchases. Create and solve an equation to find how many pounds a DVD player is if shipping charge is $11.94.

Define variable:

pounds = p

$0.55p + 6.99$ = Shipping Charge

$0.55p + 6.99 = 11.94$

$-6.99 \quad -6.99$

$0.55p = 4.95$

$\frac{0.55p}{0.55} = \frac{4.95}{0.55}$

$p = 9$ pounds

4) Over the weekend it snowed and there were 15 inches of snow on the ground. It then warms up and the snow begins to melt and the depth of the snow decreases at a rate of 0.25 inch per hour. Create and solve an equation to find how many hours have passed if there are 9 inches of snow left on the ground.

Define variable:

hours = h

$15 - 0.25h = 9$

$-0.25h + 15$ = Snow Left (in.)

$-0.25h + 15 = 9$

$-15 \quad -15$

$-0.25h = -6$

$\frac{-0.25h}{-0.25} = \frac{-6}{-0.25}$

$h = 24$ hours

Solve the following equations. Use an area model if you see distribution.

A) $7x + 9 = 65$

$-9 \quad -9$

$\frac{7x}{7} = \frac{56}{7}$

$x = 8$

B) $\frac{1}{3}t - 6 = 4$

$+6 \quad +6$

$3 \cdot \frac{1t}{3} = 10 \cdot 3$

$t = 30$

C) $6x - 10 = -46$

$+10 \quad +10$

$\frac{6x}{6} = \frac{-36}{6}$

$x = -6$

C) $-2.5x + 5 = 20$

$-5 \quad -5$

$\frac{-2.5x}{-2.5} = \frac{15}{-2.5}$

$x = -6$

D) $2(2x - 4) = -24$

$4x$	-8

$2x \quad -4$

$4x - 8 = -24$

$+8 \quad +8$

$\frac{4x}{4} = \frac{-16}{4}$

$x = -4$

E) $-3(4x + 1) = 45$

$-12x$	-3

$4x \quad +1$

$-12x - 3 = 45$

$+3 \quad +3$

$\frac{-12x}{-12} = \frac{48}{-12}$

~~$x = -12$~~

$x = -4$

Warm Up: Solve the following equations.

A) $6x + 10 = 46$

$-10 \quad -10$

$\frac{6x}{6} = \frac{-36}{6}$

$x = -6$

B) $\frac{x}{4} - 5 = 3$

$+5 \quad +5$

$4 \cdot \frac{x}{4} = 8 \cdot 4$

$x = 32$

C) $-3x - 5 = 28$

$+5 \quad +5$

$\frac{-3x}{-3} = \frac{33}{-3}$

$x = -11$

D) $\frac{1}{2}x + 7 = -3$

$-7 \quad -7$

$2 \cdot \frac{1x}{2} = -10 \cdot 2$

$1x = -20$

Graphing Inequalities

Inequality Signs

$>$ → Greater than

$<$ → Less than

$\geq$ → Greater than or equal

$\leq$ → Less than or equal

When graphing an inequality on a number line there are two parts.

1) Circle (open or closed)

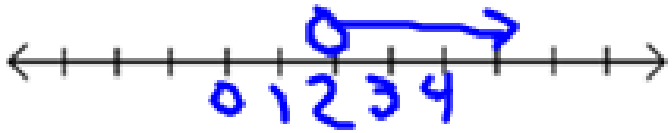
Open → > or <

Closed → ≥ or ≤

2) Arrow drawn towards the direction of possible answers

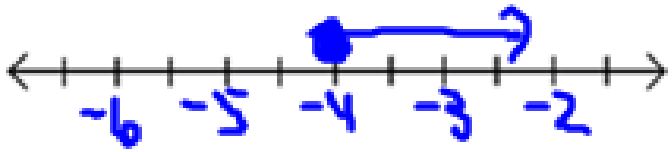
Graph the following inequalities to show what values x could possibly be. **Show at least 5 #s on the number line.**

$x > 2$

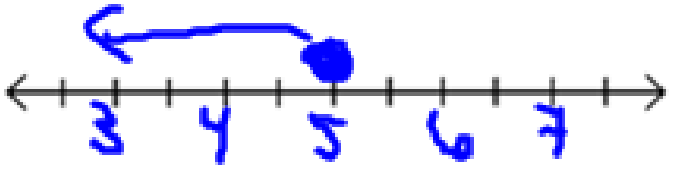


$x < -3$

$x \geq -4$



$x \leq 5$



Checking Inequality Solutions

1) Is $x = 5$ a solution for the inequalities below? (YES or NO) **Show your work to prove your answer.**

A) $x + 8 < 13$ B) $4x \geq 20$ C) $15 - x > 8$ D) $3x \leq 30$

2) Is $x = 8$ a solution for the inequalities below? (YES or NO) **Show your work to prove your answer.**

A) $2x + 4 < 22$ B) $\frac{x}{4} - 2 \geq -4$ C) $30 - x > 15$ D) $4x + 10 \leq 44$

Solving Inequalities

3) Solving inequalities very similar to solving equations. The main difference is that instead finding one solution, we are finding all possible solutions.

A) $x + 8 < 12$

$-8 \quad -8$

$x < 4$

$3 + 8 < 12$

$11 < 12$

✓

B) $\frac{x}{9} \geq -2$

C) $4x > 36$

D) $x - 12 \leq -9$

E) $2x - 4 < 16$

F) $\frac{x}{3} + 5 \geq -2$

G) $3x - 6 > -27$

H) $19 < 3x + 4$

Multiplying and Dividing by a Negative

***Whenever you are multiplying or dividing by a NEGATIVE number to solve inequalities, you MUST FLIP THE INEQUALITY SYMBOL.

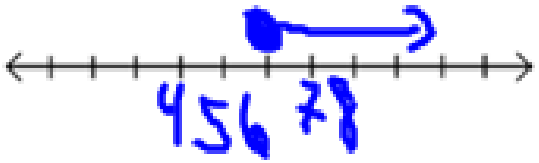
Example: A) $-4x + 9 \leq -15$

$-9 \quad -9$

$-4x \leq -24$

Flip * $\frac{-4x}{-4} \leq \frac{-24}{-4}$

$x \geq 6$



B) $-\frac{x}{3} + 5 > 2$

$-5 \quad -5$

$3 \cdot -\frac{x}{3} > -3 \cdot 3$

$-1x > -9$

Flip * $\frac{-1x}{-1} < \frac{-9}{-1}$

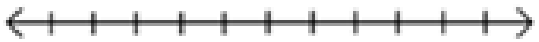
$x < 9$

4) Solve and graph the following inequalities. Remember the rule we discussed above. SHOW WORK

A) $-5x - 13 < -3$

B) $\frac{x}{2} - 8 \geq -6$

C) $15x - 6 > -15$



D) $-\frac{1}{4}x + 7 \leq 5$