Section 4.1: Graphing and Writing Inequalities TEACHER NOTES

POD: Solve each equation.

1.) -4 – 2m = 12 **2.) 3 - $\frac{x}{5}$ = 7**

m = -8 **x = -20**

Objective: To graph and write inequalities.

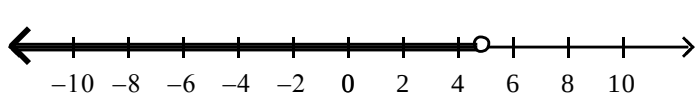
Vocabulary:

1. inequality – a mathematical sentence that contains >, <, ≥ , ≤ , ≠
2. solution of an inequality – any value that make the inequality true

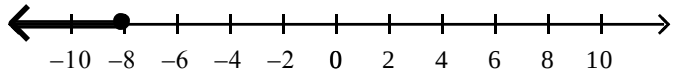
Symbol	How to Read It	Circle's Appearance
>	greater than	open (not a solution)
<	less than	open (not a solution)
≥	greater than or equal to	closed (is a solution)
≤	less than or equal to	closed (is a solution)

Graph the solutions of each inequality.

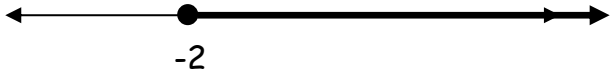
1.) x < 5



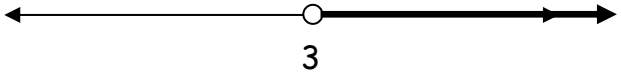
2.) -8 ≥ c



3.) -2 ≤ x

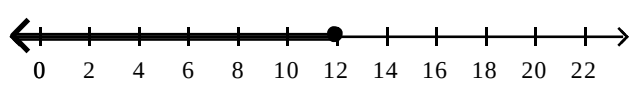


4.) y > 3



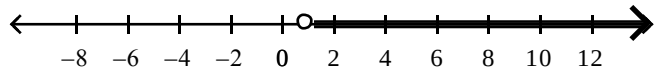
Write an inequality for each graph.

5.)



$x \leq 12$

6.)



$w > 1$

Write an inequality for each statement.

7.) To qualify for the race, your time cannot be over 62 seconds.

$x \leq 62$

8.) The car ride to the park will take at least 30 minutes.

$x \geq 30$

Section 4.2: Solving Inequalities by Adding or Subtracting Teacher Notes

POD: Solve the equations.

1.) $-7 + x = 15$

$x = 22$

2.) $x + 5 = 11$

$x = 6$

Objective: To solve inequalities by adding or subtracting.

Steps for Solving One-Step Inequalities Involving Addition or Subtraction:

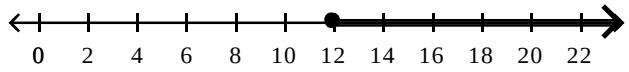
1. Solve for the variable the same way you solve when it's an equation (you want to get the variable alone on one side of the inequality).
2. Graph your solution.

Examples: Solve each inequality. Graph your solution.

1. $n + 7 \geq 19$

$-7 \quad -7$

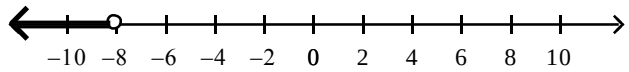
$n \geq 12$



2. $x - 4 < -12$

$+4 \quad +4$

$x < -8$



3.) $-3 + x < 10$

$x < 13$

4.) $4 + x > 11$

$x > 7$

5.) $-8 < 3 + x$

$x > -11$

6.) The drama club can spend no more than $120 for costumes. They spent $79, how much more can they spend?

$x + 79 \leq 120$

$-79 \quad -79$

$x \leq \$41$

4.3 Solving Inequalities by Multiplying or Dividing Teacher Notes

POD:

1.) $-5 + x < 10$

$x < 5$

2.) $-12 \leq 4 + x$

$x \geq -16$

Objective: Students will be able to solve inequalities by multiplying or dividing. Students will write down the steps to solving a one-step inequality on a white board.

Steps for Solving One-Step Inequalities Involving Multiplication or Division:

1. Solve for the variable the same way you solve when it's an equation (you want to get the variable alone on one side of the inequality).
2. Graph your solution if required.

*******__**SPECIAL RULE**__: If you multiply or divide each side of an inequality by a **NEGATIVE** number, you **FLIP** the inequality symbol.*******

Examples:

1.) $\frac{5x}{5} < \frac{-15}{5}$ **$x < -3$**	**2.)** $\frac{-6w}{-6} \leq \frac{12}{-6}$ **$w \geq -2$**
3.) $\frac{x}{-4} < 4$ $(-4)\frac{x}{-4} < 4(-4)$ **$x > -16$**	**4.)** $\frac{3}{4}x < -6$ $(\frac{4}{3})\frac{3}{4}x < -6(\frac{4}{3})$ **$x < -8$**
5.) $\frac{-3.6x}{-3.6} \geq \frac{-18.36}{-3.6}$ **$x \leq 5.1$**	**6.)** $-5 > -\frac{x}{6}$ $(-6)\,-5 > -\frac{x}{6}(-6)$ **$30 < x$ or $x > 30$**

7.) A recipe for an apple pie calls for 6 apples per pie. You have 27 apples. At most how many apple pies can you make?

$$\frac{6p}{6} \leq \frac{27}{6}$$

$$p \leq 4.5$$

$p \leq 4$; Can't make a half of a pie

Section 4.4: Solving Two-Step Inequalities Teacher Notes

POD: Solve.

1.) $3 - \frac{x}{2} = -6$ 2.) $3 - 4x = -9$

$x = 18$ $x = 3$

Objective: To solve and graph two-step inequalities.

Steps for Solving Two-Step Inequalities:

1.) Use the same steps for solving two-step equations.

2.) Flip the inequality symbol when you multiply or divide by a negative number.

Symbol	How to Read It	Circle's Appearance
$>$	greater than	open (not a solution)
$<$	less than	open (not a solution)
$\geq$	greater than or equal to	closed (is a solution)
$\leq$	less than or equal to	closed (is a solution)

Examples:

Solve each inequality.

1. $3m + 9 \geq 18$

$-9 \quad -9$

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

$m \geq 3$

2. $14 - 2x > 18$

$-14 \quad -14$

$\frac{-2x}{-2} > \frac{4}{-2}$

$x < -2$ (Flip the inequality!)

3. $-4 - x \leq 0$

$+4 \quad +4$

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

$x \geq -4$ (Flip the inequality!)

4. $-9 - \frac{y}{5} < -12$

$+9 \quad +9$

$-5 \cdot -\frac{y}{5} < -3 \cdot -5$ $\qquad y > 15$

5. $3 \geq \frac{x}{2} - 11$

$\frac{x}{2} - 11 \leq 3$

$+11 \quad +11$

$(2)\frac{x}{2} \leq 14(2)$ $\qquad x \leq 28$

6. $15 < 6 - 3x$

$-3x + 6 > 15$

$-6 \quad -6$

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

$x < -3$

7.) Yellow Cab taxi charges a $1.75 flat rate in addition to $0.65 per mile. Katie only has $10 for her ride. How many miles can Katie travel without exceeding her limit?

$1.75 + 0.25x \leq 10,\ x \leq 33$ miles

Section 4.4E: Inequality Word Problems Teacher Notes

POD: Solve.

1.) $-8 < 2x - 4$ $\qquad$ **2.) $3 - \frac{x}{5} \geq 9$**

$x > -2$ $\qquad$ **$x \leq -30$**

Examples: Decide whether the question is an inequality or equation. Set up an initial problem and then solve.

1.) It costs $2.50 to rent bowling shoes. Each game costs $2.25. You have $10.00. At least how many games did you bowl if you had $10.00?

Equation:

$2.50 + 2.25x \leq 10.00$

$-2.50 \quad -2.50$

$\frac{2.25x}{2.25} \leq \frac{7.50}{2.25}$

Answer: $x \leq 3.3333$

$x \leq 3$; At least 3 games

2.) A theater charges $9.50 per ticket. The theater has already sold 70 tickets. How many more tickets does the theater need to sell to earn at least $1000?

Inequality:

$9.50(70) + 9.50x \geq 1000$

$665 + 9.50x \geq 1000$

$-665 \quad -665$

$\frac{9.50x}{9.50} \geq \frac{335}{9.50}$

Answer:

$x \geq 35.3$

$x \geq 36$ tickets

3.) Kent has $500 in his savings account at the beginning of the summer. He wants to have at least $200 by the end of the summer. He takes out $25 every week. At most, how many weeks can Kent withdraw money from his account?

Inequality: **Answer:**

$500 - 25x \geq 200$

$-500 \quad -500$

$\frac{-25x}{-25} \geq \frac{-300}{-25}$

$x \leq 12$ weeks

4.) Write and solve an inequality that represents the values of x for which the area of the rectangle will be at least 50 square feet.

Inequality: **Answer:**

$5(x - 2) \geq 50$

$5x - 10 \geq 50$

$+10 \quad +10$

$\frac{5x}{5} \geq \frac{60}{5}$

$x \geq 12$