

UNIT 5

INEQUALITIES

2015 - 2016

CCM6+/7+

Name: _____

Math Teacher: _____

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Projected Test Date: _____

Definitions of Critical Vocabulary and Underlying Concepts	
rational numbers	A number expressible in the form a/b or $-a/b$ for some fraction a/b . The rational numbers include the integers.
integers	A number expressible in the form a or $-a$ for some whole number a .
constant	A number that does not change.
expression	A mathematical phrase that contains operations, numbers, and/or variables.
additive inverses	Two numbers whose sum is 0 are additive inverses of one another.
additive identity property of zero	The property that states the sum of zero and any number is that number.
addition property of opposites	The property that states that the sum of a number and its opposite equals zero.
addition property of equality	The property that states that if you add the same number to both sides of an equation, the new equation will have the same solution.
subtraction property of equality	The property that states that if you subtract the same number from both sides of an equation, the new equation will have the same solution.
multiplication property of equality	The property that states that if you multiply both sides of an equation by the same number, the new equation will have the same solution.
division property of equality	The property that states that if you divide both sides of an equation by the same nonzero number, the new equation will have the same solution.
Inequality	A mathematical sentence that shows the relationship between quantities that are not equivalent.
algebraic inequality	An inequality that contains at least one variable.
solution set	The set of values that make a statement true.

Writing and Graphing Inequalities

Key Vocabulary:

Inequality: _____

Algebraic

Inequality: _____

Solution

Set: _____

Part I: Inequality Key Words and Phrases

Symbol	Phrases	Symbol	Phrases
$<$		$>$	
\leq		\geq	

Using the key words and phrases, write an inequality.

1. There are fewer than 25 students (s) in the class.	2. Above 18 people (p) in the room had brown hair.
3. There are at least 15 dogs (d) in the park.	4. No more than 50 people (p) were on the bus.
5. There are at most 31 days (d) in a month.	6. There is more than \$282 (d) in the bank.

Part II: Graphing Inequalities:

An Open Circle: _____ on the number line means the inequality sign is _____ or _____.

A Closed Circle: _____ on the number line means the inequality sign is _____ or _____.

Graph the following inequalities.

$$x < -2$$



$$g > 7$$



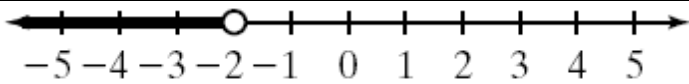
$$-3 \geq y$$



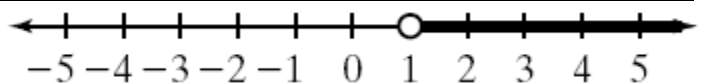
$$m \leq 0$$



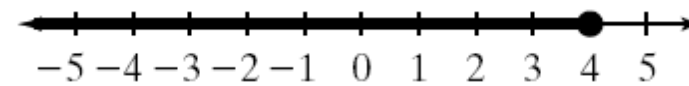
Looking at the graphs, write an inequality.



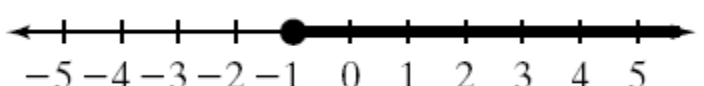
Inequality:



Inequality:



Inequality:



Inequality:

Using the inequalities you wrote in Part I, graph each inequality.

1. There are fewer than 25 students (s) in the class.



2. Above 18 people (p) in the room had brown hair.



3. There are at least 15 dogs (d) in the park.



4. No more than 50 people (p) were on the bus.



5. There are at most 31 days (d) in a month.



6. There is more than \$282 (d) in the bank.

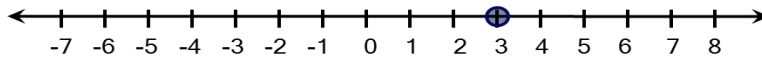


INEQUALITIES

Understanding and Graphing Inequalities

A simple equation has just one answer. For the equation $x = 3$, the only number that makes the equation true is the number 3. The equation $x = 3$ can be shown on the number line by using a dot.

Graph of $x = 3$

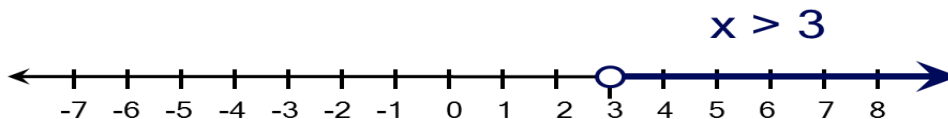


An *inequality* is a mathematical sentence that shows the relationship between quantities that are not equal.

An inequality may contain a variable, as in the inequality $x > 3$. Values of the variable that make the inequality true are solutions of the inequality.

x	$x > 3$	Solution?
0	$0 > 3 ?$	No; 0 is not greater than 3, so 0 is not a solution.
3	$3 > 3 ?$	No; 3 is not greater than 3, so 3 is not a solution.
4	$4 > 3 ?$	Yes; 4 is greater than 3, so 4 is a solution.
12	$12 > 3 ?$	Yes; 12 is greater than 3, so 12 is a solution

This table shows that an inequality may have more than one solution. You can use a number line to show all of the solutions.



There are an infinite number of points that can be drawn on the number line that are greater than 3. Numbers such as 4, 5, 6, and 7 are all greater than three as are decimals like 4.78, 5.2, 8.4, and 11.9745. It would take an eternity to draw each point individually, so the accepted method of showing all the answers is starting from the number 3 and shading over all the numbers greater than 3.

The graph above has an open circle on the 3 and is shaded on all the numbers to the right of the 3. The numbers that have been shaded are solutions to $x > 3$. The number line appears to end at 8, so the arrow to the right can be shaded to show that the solutions continue indefinitely for numbers larger than 8.

Symbols and Their Meanings

$<$ means **less than** and is represented with an **open circle** on the number line.

$>$ means **greater than** and is represented with an **open circle** on the number line.

\leq means **less than or equal to** and is represented with a **closed circle** on the number line.

\geq means **greater than or equal to** and is represented with a **closed circle** on the number line.

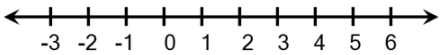
**** An open circle on the critical point shows that the critical point is not a solution. ****

**** A closed circle on the critical point shows that the critical point is a solution. ****

The process of drawing the graph of an inequality can be broken down into three steps. The three steps for the inequality $b \leq 5$ are shown below.


3 Steps to Graphing an Inequality (Example: $b \leq 5$)

Step 1: Draw a number line



Step 2: Place a dot on the critical point

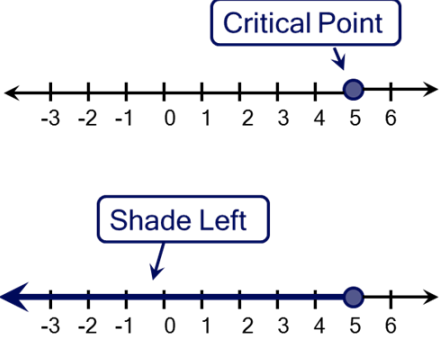
Open circle for $>$ and $<$ Closed circle for \geq and \leq



Step 3: Shade right or left

Shade left if the solutions are smaller than critical number

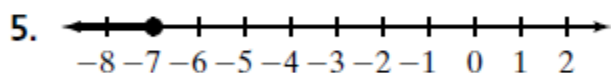
Shade right if the solutions are larger than critical number

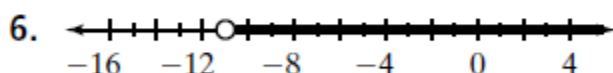


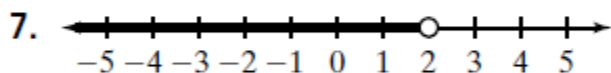
Write an inequality for each sentence.

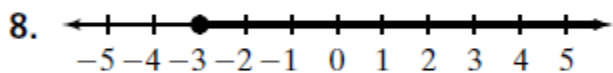
1. The total t is less than sixteen. _____
2. A number h is not less than 7. _____
3. The price p is less than or equal to \$25. _____
4. A number n is negative. _____

Write an inequality for each graph.

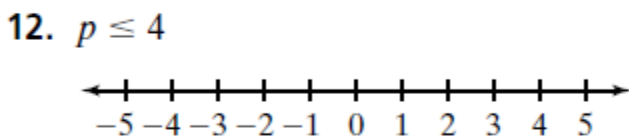
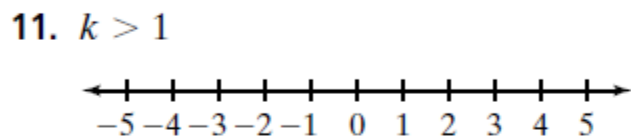
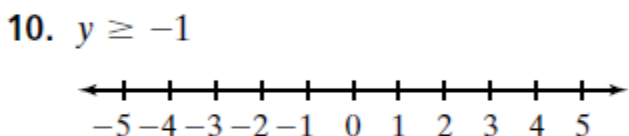
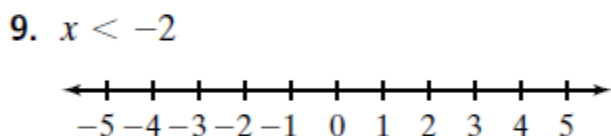








Graph the solutions of each inequality on a number line.



Write an inequality for each situation.

13. Everyone in the class is under 13 years old. Let x be the age of a person in the class.

14. The speed limit is 60 miles per hour. Let s be the speed of a car driving within the limit.

15. You have \$4.50 to spend on lunch. Let c be the cost of your lunch.

Two statements connected by the word “and” form a *conjunction*. Two statements connected by the word “or” form a *disjunction*. You can use inequality symbols to write conjunctions and disjunctions.

Conjunction: x is greater than 5 *and* x is less than 8.

Symbols: $5 < x < 8$

Disjunction: p is less than -3 *or* p is greater than or equal to 4.

Symbols: $-3 > p$ or $p \geq 4$

Use symbols to write each statement.

1. The number n is greater than 7 and it is less than 10.

2. k is less than -2 or k is greater than 0.

3. y is greater than or equal to -6 and less than or equal to 5.

List the integers that satisfy each statement.

4. $1 < m \leq 6$

5. $13 < e < 15$

6. $p > 6$ and $p \leq 9$

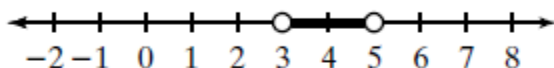
7. $h > -3$ and $h < -4$

You can graph conjunctions and disjunctions on a number line

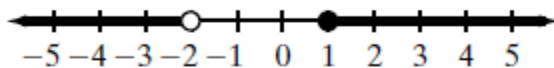
Statement

$x < 5$ and $x > 3$

Graph

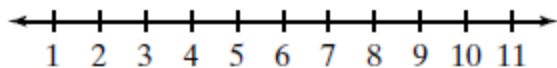


$p < -2$ or $p \geq 1$

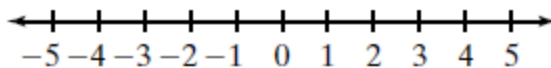


Graph each statement.

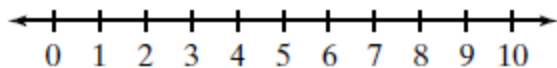
8. $x > 7$ or $x \leq 4$



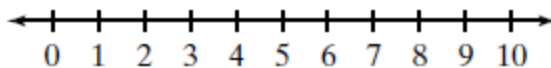
9. $x > -2$ and $x \leq 3$



10. $x \leq 3$ or $x > 5$



11. $x < 9$ and $x > 6$



Solving One-Step Inequalities Notes

Review: Solving One-Step EQUATIONS

Ex. 1) $c - (-3) = 4$	Ex. 2) $n + 14 = -5$
Ex. 3) $-8m = -32$	Ex. 4) $\frac{r}{3} = -7$

Use addition or subtraction to solve each inequality. Graph the solutions.

Ex 1. $n + (-8) \geq -19$

Ex 2. $t - (-6) > 44$



Ex 3. $-26 > y + 14$

Ex 4. $486 \leq -80 + k$



Use multiplication or division to solve each inequality. Graph the solutions.

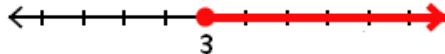
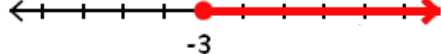

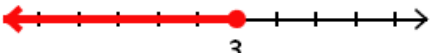
KEY RULE:

Ex 1. $8x > -112$	Ex 2. $-21 > 3m$	Ex 3. $-9t \leq 36$
Ex 4. $\frac{m}{-4} \geq 12$	Ex 5. $\frac{-r}{14} \leq 13$	Ex 6. $-\frac{t}{4} > 7$

Identify the accurate simplified inequality.

$-45 \geq n - 12$	A. $n \geq -33$ B. $n \leq -33$ C. $n \geq -57$ D. $n \leq -57$	$-3n > 18$	A. $n > 6$ B. $n < 6$ C. $n > -6$ D. $n < -6$
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Match the inequality to the graph:

____ 1. $x - (-3) \geq 0$	A. 	B. 
____ 2. $-x \geq -3$	C. 	D. 
____ 3. $\frac{x}{-3} \geq 1$		
____ 4. $-2x \leq -6$		

Skills Check: Solving One-Step Inequalities

Solve each inequality, show the steps of your work.

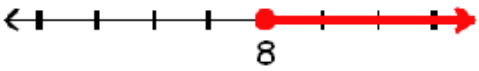

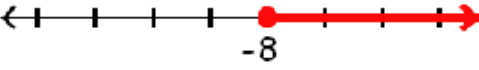
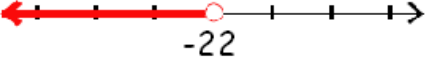
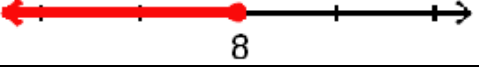
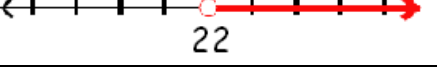
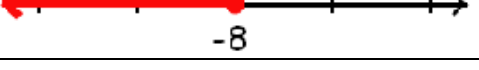
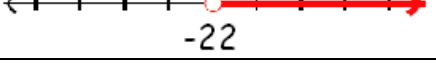
1. $5 + k < -10$	2. $\frac{x}{-7} \geq 7$
3. $-3y < 15$	4. $4 \geq k - (-15)$

Skills Check: Writing and Graphing Inequalities

Write an inequality for each situation described.

1. A city had more than 2 feet of snow in one snowfall. (Let f = feet of snow) _____
2. There are less than 35 students in a class. (Let x = students) _____
3. A student's grade on a test is at least 85. (Let g = grade) _____
4. The number of minutes for a cell phone plan is at most 500. (Let m = minutes) _____

Identify the graph that matches the simplified inequality.

5. $3a \leq -24$	6. $-k < -22$
A. 	A. 
B. 	B. 
C. 	C. 
D. 	D. 

Solving Inequality Rules

$\begin{array}{r} 8 > 4 \\ +2 \quad +2 \\ 10 > 6 \end{array}$ <p>*When adding a positive value to both sides, the inequality symbol remains unchanged.</p>	$\begin{array}{r} 8 > 4 \\ +(-2) \quad +(-2) \\ 6 > 2 \end{array}$ <p>*When adding a negative value to both sides, the inequality symbol remains unchanged. Extend this idea to subtraction as well.</p>	$\begin{array}{r} 8 > 4 \\ \bullet 2 \quad \bullet 2 \\ 16 > 8 \end{array}$ <p>*When multiplying a positive value to both sides, the inequality symbol remains unchanged.</p>
$\begin{array}{r} 8 > 4 \\ \bullet (-2) \quad \bullet (-2) \\ -16 < -8 \end{array}$ <p>*When multiplying a negative value to both sides, the inequality symbol must be flipped to keep the statement true.</p>	$\begin{array}{r} 8 > 4 \\ \div 2 \quad \div 2 \\ 4 > 2 \end{array}$ <p>*When dividing by a positive value on both sides, the inequality symbol remains unchanged.</p>	$\begin{array}{r} 8 > 4 \\ \div (-2) \quad \div (-2) \\ -4 < -2 \end{array}$ <p>*When dividing by a negative value on both sides, the inequality symbol must be flipped to keep the statement true.</p>

Solve $5x < -40$.

$$5x < -40$$

Since 5 and x are multiplied, use a division property of inequality and divide both sides by 5.

$$5x < -40$$

$$\frac{5x}{5} < \frac{-40}{5}$$

$$x < -8$$

Solve $\frac{x}{4} \geq 3$.

Since x is divided by -4 , use a multiplication property of inequality and multiply both sides by -4 .

When you multiply both sides of an inequality by a negative number, you must reverse the direction of the inequality symbol.

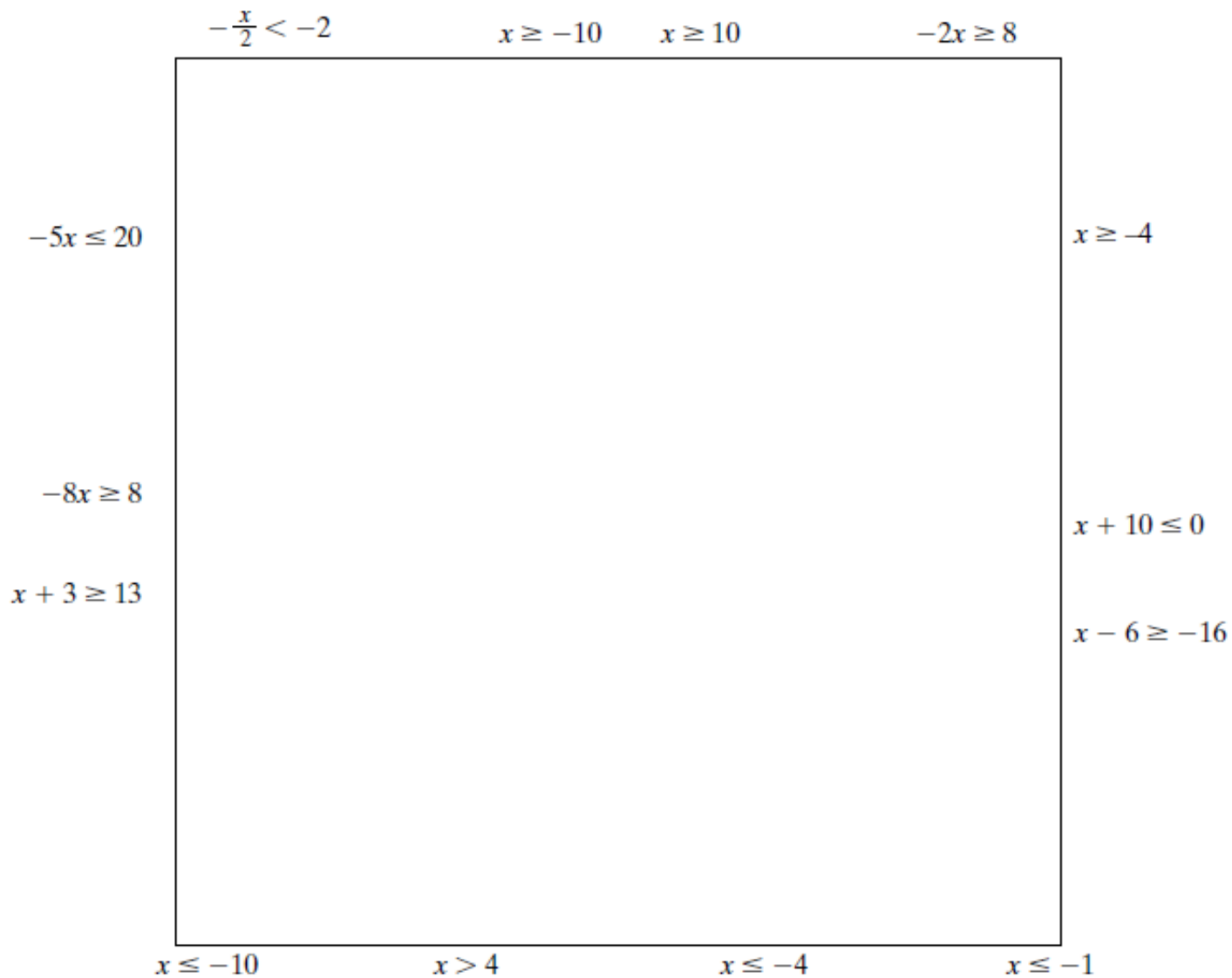
$$\frac{x}{4} \geq 3$$

$$(-4)\frac{x}{4} \leq (-4)3$$

$$x \leq -12$$

What is a heptagon?

To find out, solve each inequality in the diagram below. Use a ruler to connect each inequality with its solution. When you have finished, you will have drawn a heptagon in the center of the square. Shade the heptagon and tell what it is in the space below the drawing.



A heptagon is _____

Why Did Farmer Jones Keep The Chickens Away From The Other Animals?

Solve any inequality below. CIRCLE the letter next to the correct answer. Write this letter in the box at the bottom of the page that contains the number of that exercise. Keep working and you will discover the answer to the title question. Two of the numbers will not be used.

<p>① $x + 5 > 9$ (N) $x > 4$ (R) $x < 4$</p>	<p>⑥ $-6x < 12$ (S) $x > -2$ (D) $x < -2$</p>	<p>⑪ $-5x > -20$ (T) $x > 4$ (F) $x < 4$</p>	<p>⑫ $x - 10 < -1$ (F) $x > 9$ (N) $x < 9$</p>	<p>⑬ $\frac{1}{2}n \geq 15$ (H) $n \geq 30$ (I) $n \leq 30$</p>	<p>⑭ $\frac{1}{2}n \geq -15$ (E) $n \geq -30$ (M) $n \leq -30$</p>	<p>⑮ $-\frac{1}{2}n \geq 15$ (R) $n \geq -30$ (U) $n \leq -30$</p>	<p>⑯ $d - 7 \leq -16$ (T) $d \geq -9$ (A) $d \leq -9$</p>	<p>⑰ $x + 15 < 4$ (E) $x > -11$ (A) $x < -11$</p>	<p>⑱ $d - 7 \leq -16$ (T) $d \geq -9$ (A) $d \leq -9$</p>	<p>⑲ $d - 7 \leq -16$ (T) $d \geq -9$ (A) $d \leq -9$</p>	<p>⑳ $\frac{2}{3}x > 8$ (I) $x > 12$ (T) $x < 12$</p>	<p>㉑ $-\frac{2}{3}x > 8$ (D) $x > -12$ (G) $x < -12$</p>	<p>㉒ $-2x \leq -42$ (P) $x \geq 21$ (X) $x \leq 21$</p>	<p>㉓ $t + 13 \geq 30$ (E) $t \geq 17$ (P) $t \leq 17$</p>	<p>㉔ $4a \leq -20$ (F) $a \geq -5$ (L) $a \leq -5$</p>	<p>㉕ $-\frac{1}{8}k > -1$ (P) $k > 8$ (C) $k < 8$</p>
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5	13	20	25	9	23	12	6	15	18	7	11	3	10	2	24	19	1	21	4	17	8	14
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Notes: Solving Multi-Step Inequalities

Solve each two-step inequality.

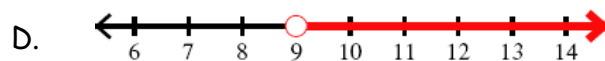
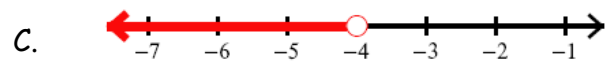
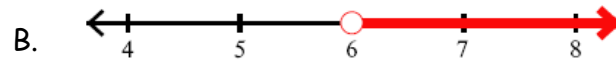
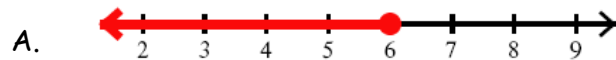
1.) $-9x - 8 > 28$	2.) $12 - 3x < 9$	3.) $\frac{r}{3} + 5 \geq 9$
4.) $-4 \geq 4(-x + 2)$	5.) $\frac{w}{-5} + 4 \geq 9$	6.) $-15 + \frac{c}{6} \leq -12$

Identify the accurate simplified inequality.

7. $-67 \geq 3n - 16$	A. $n \geq -17$ B. $n \leq -17$ C. $n \geq 17$ D. $n \leq 17$	8. $-4n - 7 > -19$	A. $n > 3$ B. $n < 3$ C. $n > -3$ D. $n < -3$
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Solve each inequality. Match it to the appropriate graph in the final column.

9. $-4 + \frac{r}{3} > -2$	10. $-1 + 4x \leq 23$
11. $49 < -5 + 6x$	12. $-3n - 3 > 9$



Notes: Solving Two-Step Inequalities including Combining Like Terms and Distributive Property

Solve each inequality.

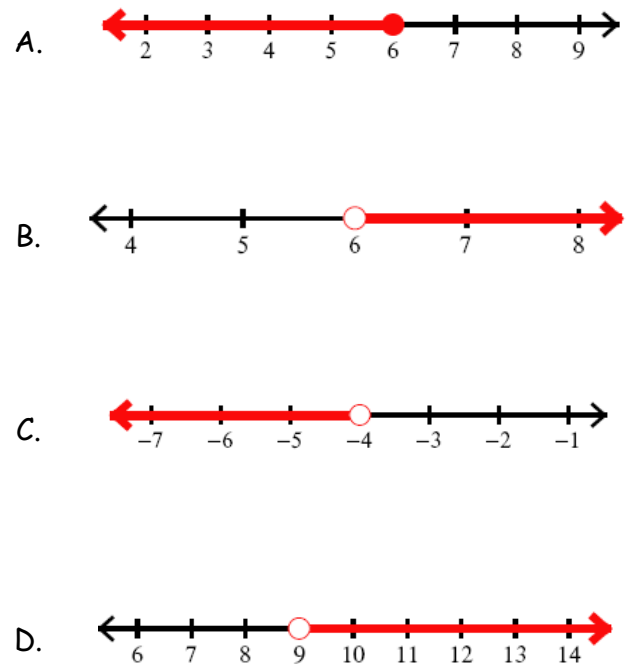
1.) $-9x - 8 > 28$	2.) $3(4 - x) < 9$	3.) $3 + \frac{r}{3} + 5 \geq 9$
4.) $-4 \geq 4(-2x + 3)$	5.) $\frac{w}{-5} + 4 \geq 9$	6.) $-4c - 15 + 6c \leq -29$

Identify the accurate simplified inequality.

<p>7. $-67 \geq 5 + 3n - 21$</p>	<p>A. $n \geq -17$ B. $n \leq -17$ C. $n \geq 17$ D. $n \leq 17$</p>	<p>8. $-4n - 7 > -19$</p>	<p>A. $n > 3$ B. $n < 3$ C. $n > -3$ D. $n < -3$</p>
---	---	---	---

Solve each inequality. Match it to the appropriate graph in the final column.

<p>9. $-4 + \frac{r}{3} > -2$</p>	<p>10. $-1 + 4x \leq 23$</p>
<p>11. $49 < -15 + 6x + 10$</p>	<p>12. $14n - 3 - 17n > 9$</p>



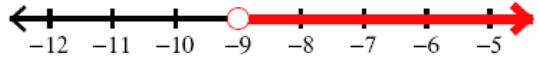
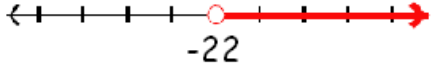
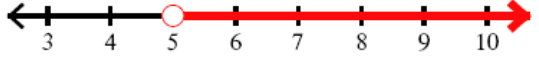
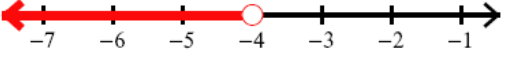
Skills Check: Multi-Step Inequalities

Write an inequality for each situation described.

1. A city had at least 10 inches of snow in one snowfall. (Let i = inches of snow) _____
2. There are at most 240 students in the cafeteria. (Let x = students) _____
3. A student's grade on a test is greater than an 85. (Let g = grade) _____
4. The number of minutes for taking a test is fewer than 60. (Let m = minutes) _____

Identify the graph that matches each simplified inequality.

<p>5. Letter Answer: _____</p> $\frac{m}{2} + 5 > -6$	<p>6. Letter Answer: _____</p> $-13n - 3 + 10n > 9$
<p>7. Letter Answer: _____</p> $40 < 5(-7 + 3x)$	<p>8. Letter Answer: _____</p> $-1 > \frac{m}{-3} - 4$

A.		B.	
C.		D.	

Identify the simplified inequality.

<p>9. Letter Answer: _____</p> $-45 \geq -2n - 16 + 3n$	<p>A. $n \geq -29$</p>
	<p>B. $n \leq -29$</p>
	<p>C. $n \leq 29$</p>
	<p>D. $n \leq -31$</p>

Why Did They Try To Build A House On Orgo's Head?

Solve any inequality below and draw a straight line connecting it to the inequality that describes the solution set. The line will cross a number and a letter. The number tells you where to put the letter in the boxes at the bottom of the page. Keep working and you will discover the answer to the title question.

<p>① $3x + 8 > 2$ ■</p> <p>② $7x - 1 < 20$ ■</p> <p>③ $8 - 4x > -12$ ■</p> <p>④ $-5x - 9 \geq -4$ ■</p> <p>⑤ $63 + 12x < 15$ ■</p> <p>⑥ $-8x + 25 \leq -31$ ■</p> <p>⑦ $-10 + 2x \geq -52$ ■</p> <p>⑧ $15 > 6x - 9$ ■</p> <p>⑨ $48 < 20 - 14x$ ■</p> <p>⑩ $-60 \geq 9x + 3$ ■</p> <p>⑪ $18 - 10x < -22$ ■</p> <p>⑫ $7 < 3x - 8$ ■</p> <p>⑬ $-12x - 8 \leq 64$ ■</p> <p>⑭ $-17 > -7x - 45$ ■</p> <p>⑮ $3x - 42 < 0$ ■</p> <p>⑯ $44 \geq -8x - 44$ ■</p> <p>⑰ $4x + 12 > -24$ ■</p> <p>⑱ $-17 \leq -6x + 25$ ■</p>		<p>■ $x \geq -21$</p> <p>■ $x > 5$</p> <p>■ $x > -2$</p> <p>■ $x > -4$</p> <p>■ $x \leq 7$</p> <p>■ $x < 3$</p> <p>■ $x \leq -1$</p> <p>■ $x < 14$</p> <p>■ $x \geq 7$</p> <p>■ $x \leq -7$</p> <p>■ $x > -9$</p> <p>■ $x < 5$</p> <p>■ $x < 4$</p> <p>■ $x > 4$</p> <p>■ $x \geq -11$</p> <p>■ $x \geq -6$</p> <p>■ $x < -4$</p> <p>■ $x < -2$</p>
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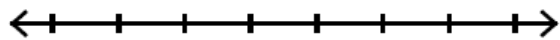
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
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Extension: Inequalities with Variables on Both Sides Notes

Solve and graph the inequalities that contain variables on both sides.

Example 1:

$$15b + 6 > 9b - 36$$



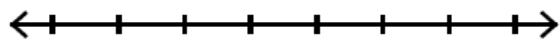
Example 2:

$$-12k + 28 < 18k + 88$$



Example 3:

$$11 + 2c \leq 6 - 3c$$



Example 4:

$$2(n - 5) \geq 30 - 8n$$



Did you hear about...

A	B	C	D	E
F	G	H	I	J
K	L	M	N	O ?

DIRECTIONS:

Solve any inequality below. In the answer column, find the inequality that describes the solution set and notice the word next to it. Write this word in the box that has the same letter as that exercise.

KEEP WORKING AND YOU WILL HEAR ABOUT A COLLEGE EYE DEAL.

- (A) $2(3x - 5) > 2x + 6$
 (B) $8(2 + x) \leq 3x - 9$
 (C) $-3(4x - 6) < 7 - x$
 (D) $13x - 7(-2 + x) \geq 4x - 10$
 (E) $5(-3x - 1) + 7 \leq -x + 30$
 (F) $12 + 5x > 2(8x - 6) - 7x$
 (G) $9x - 2x \geq 14 - 9(-x - 4)$
 (H) $-4(3 - 5x) - 11x < 3x + 6$
 (I) $10(x + 2) > -2(6 - 9x)$
 (J) $7(2 + 2x) \geq 4(-x - 10)$
 (K) $11 + 3(-8 + 5x) < 16x - 5$
 (L) $-6(7x - 1) < -8x + 9(-3x - 4)$
 (M) $-9x + 2(4x + 12) \leq 4(1 - 3x) - 13$
 (N) $7(-x + 4) + 16 \geq 5x - (10x - 6) - 6$
 (O) $12(2x + 3) - 3(8 + 7x) > 0$

- $x < 6$ —WHO
 $x \leq -3$ —OVER
 $x < 4$ —HAVE
 $x \geq 22$ —STUDENTS
 $x \leq -5$ —CROSS
 $x \geq -12$ —COLLEGE
 $x \leq -2$ —EYES
 $x > 6$ —CONTROL
 $x > 4$ —THE
 $x < 1$ —KNOW
 $x < 3$ —TO
 $x \leq 22$ —HIS
 $x \geq -2$ —PROFESSOR
 $x \leq -25$ —SEEMED
 $x \geq -3$ —ABSOLUTELY
 $x \geq -25$ —SUBJECT
 $x > -8$ —NO
 $x > 1$ —EYED
 $x < -8$ —HELP
 $x > -4$ —PUPILS
 $x < -4$ —TEACH

Notes: One and Two-Step Inequality Word Problems with Integers

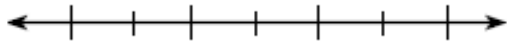
Define a variable (V), write an inequality (I), and solve (S) & graph the inequality that represents the solution set.

1. A store makes a profit of \$25 on each watch it sells. What solution set will represent how many watches the store must sell to make a profit of at least \$375?

V: _____

I: _____

S: _____

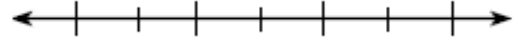


2. The sum of three integers is at most -57. If one integer is 33 and another is -23, what is the solution set for the third integer?

V: _____

I: _____

S: _____

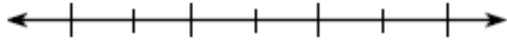


3. The difference of four times a number and -8 is greater than -120. What is the solution set for the number?

V: _____

I: _____

S: _____

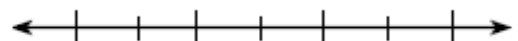


4. 3 times the difference of a number and 8 is no more than -93. What is the solution set for the number?

V: _____

I: _____

S: _____

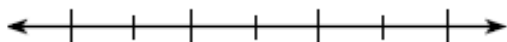


5. Working at Burger in a Box, you are paid \$25 each week plus \$6 per hour. This week, you want your pay to be at least \$133. What solution set represents the amount of hours that you must work to earn enough?

V: _____

I: _____

S: _____

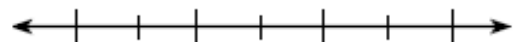


6. The 12 members of the Filmmaking Club need to raise at least \$1400 to make a short film. They already have raised \$650. What solution set represents the amount that each member must raise to reach their team goal?

V: _____

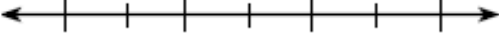
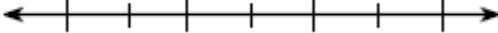

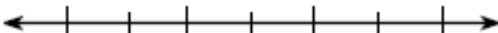
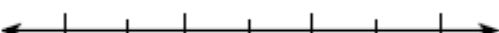
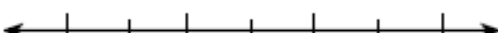
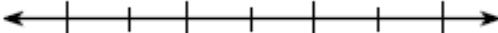
I: _____

S: _____



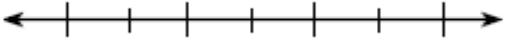
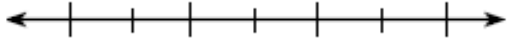
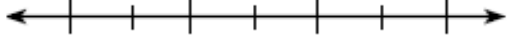
Practice - Inequalities Word Problems

Define a variable (V), write an inequality (I), solve (S) the inequality, and graph the solution set.

<p>1. The perimeter of the Jacob's square backyard is no more than 72 meters. What is the solution set for the length that his backyard can be?</p> <p>V: _____</p> <p>I: _____</p> <p>S: _____</p> 	<p>2. To get an A, you need more than 200 points on a two-part test. You score 109 points on the first part. What solution set represents how many more points you need?</p> <p>V: _____</p> <p>I: _____</p> <p>S: _____</p> 
<p>3. Marcus wants to buy 4 baseballs. He has \$68. What solution set represents what each baseball can cost?</p> <p>V: _____</p> <p>I: _____</p> <p>S: _____</p> 	<p>4. 3 times a number, plus 5, is at most -28. What solution set represents what the number can be?</p> <p>V: _____</p> <p>I: _____</p> <p>S: _____</p> 
<p>5. -4 times a number, minus 6, is at least 22. What solution set represents what the number can be?</p> <p>V: _____</p> <p>I: _____</p> <p>S: _____</p> 	<p>6. You buy want to buy several candy bars for \$2 each and one newspaper for \$3. What solution set would represent the number of candy bars can you buy if you only have \$19?</p> <p>V: _____</p> <p>I: _____</p> <p>S: _____</p> 
<p>7. A telephone company charges a \$27 monthly service, plus \$2 for each long-distance call that you make. If you budget \$65 for your telephone bill each month, what solution set represents how many long distance phone calls you can make during the month without going over your budget?</p> <p>V: _____</p> <p>I: _____</p> <p>S: _____</p> 	

Extension: Inequality Word Problems with Variables on Both Sides

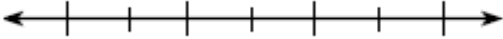
Define a variable (V), write an inequality (I), and solve (S) & graph the inequality to represent the solution set.

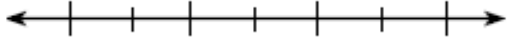
<p>14 times a number, plus 5 is less than 11 times the same number, minus 19. What is the solution set for the number?</p> <p>V: _____</p> <p>I: _____</p> <p>S: _____</p> 	<p>5 times a number is greater than 8 times the same number plus 120. What is the solution set for the number?</p> <p>V: _____</p> <p>I: _____</p> <p>S: _____</p> 
<p>Create your own!!!</p>	<p>V: _____</p> <p>I: _____</p> <p>S: _____</p> 

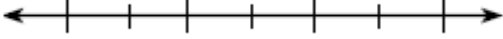
1. Admission to the state fair costs \$7. In addition, each ride costs \$2. If Ahmed wants to spend no more than \$63 at the fair, what is the solution set for the number of rides he can take?	1. Admission to the state fair costs \$7. In addition, each ride costs \$2. If Ahmed wants to spend no more than \$63 at the fair, what is the solution set for the number of rides he can take?
2. Gabrielle went to the movie theatre with her friends. She had \$25.00 to spend. The movie ticket cost \$6. What solution set represents how much money she had to spend on snacks?	2. Gabrielle went to the movie theatre with her friends. She had \$25.00 to spend. The movie ticket cost \$6. What solution set represents how much money she had to spend on snacks?
3. Pet Mart purchases dog food from PureFresh for \$15 per bag. They sell the bags to their customers for \$22 per bag. If the store wants to make a profit of no less than \$4,410 on this dog food, what solution set represents how many bags of dog food that it needs to sell?	3. Pet Mart purchases dog food from PureFresh for \$15 per bag. They sell the bags to their customers for \$22 per bag. If the store wants to make a profit of no less than \$4,410 on this dog food, what solution set represents how many bags of dog food that it needs to sell?
4. Negative eight plus four times a number is greater than negative 64. What is the solution set for this number?	4. Negative eight plus four times a number is greater than negative 64. What is the solution set for this number?
5. Sondra has \$207 to spend on new school clothes. First, she purchased a pair of shoes for \$45. The store was charging \$18 for all shirts, pants, and other items of clothing. What solution represents the number of items of clothing that she can purchase?	5. Sondra has \$207 to spend on new school clothes. First, she purchased a pair of shoes for \$45. The store was charging \$18 for all shirts, pants, and other items of clothing. What solution represents the number of items of clothing that she can purchase?
6. 20 less than the quotient of a number and -6 is greater than or equal to 17. What is the solution set for this number?	6. 20 less than the quotient of a number and -6 is greater than or equal to 17. What is the solution set for this number?
7. *Challenge* Negative four times the sum of a number and negative 12 is at least 212. What is the solution set for this number?	7. *Challenge* Negative four times the sum of a number and negative 12 is at least 212. What is the solution set for this number?
8. *Challenge* Two times the difference of a number and four is no more than -198. What is the solution set for this number?	8. *Challenge* Two times the difference of a number and four is no more than -198. What is the solution set for this number?

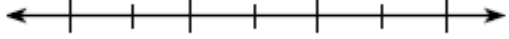
Pass the Card: Inequalities

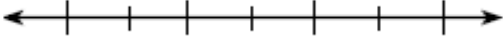
Define a variable (*V*), write an inequality (*I*), and solve (*S*) & graph the inequality to represent the solution set.

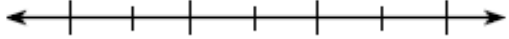
1.
V: _____
I: _____
S: _____


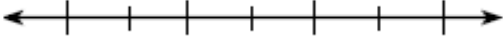
2.
V: _____
I: _____
S: _____


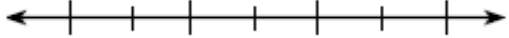
3.
V: _____
I: _____
S: _____


4.
V: _____
I: _____
S: _____


5.
V: _____
I: _____
S: _____


6.
V: _____
I: _____
S: _____


7.
V: _____
I: _____
S: _____


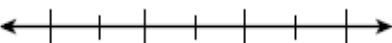
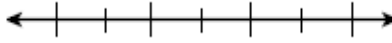
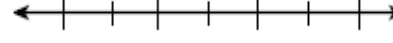
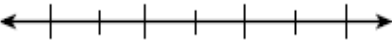
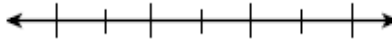
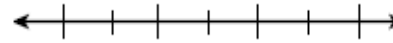
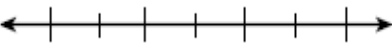
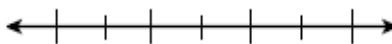
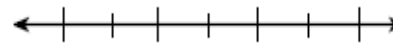
8.
V: _____
I: _____
S: _____


Study Guide: Inequalities

Write an inequality for each situation described below.

1. Today's attendance (a) will be at least 250 people. _____
2. Tomorrow's attendance (a) will be less than 200 people. _____
3. Last weekend, there were more than 75 birds (b) in the sanctuary. _____
4. Next weekend, there will be at most 90 birds (b) in the sanctuary. _____
5. Each prize (p) is worth over \$150. _____
6. You can walk there in 20 minutes (m) or less. _____

Solve and graph each of the following inequalities.

<p>7. $k - (-178) > -231$</p> 	<p>8. $\frac{k}{-8} < 13$</p> 	<p>9. $-87 \leq g + (-49)$</p> 
<p>10. $5x - 8 < 17$</p> 	<p>11. $-10 \geq -18 + \frac{m}{6}$</p> 	<p>12. $-6 + -4g + (-12) \leq -2$</p> 
<p>13. $50 \geq -2(7g + 10)$</p> 	<p>14. $12 + \frac{a}{-4} - 19 > -2$</p> 	<p>15. $-3(k - 5) \leq -42$</p> 

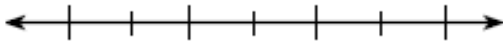
Define a variable (V), write an inequality (I), and solve (S) & graph the inequality to represent the solution set.

16. The school record for the most points scored in a football season is 85. Lawrence has 44 points so far this season. What is the solution set for how many more points he needs to break the record?

V: _____

I: _____

S: _____

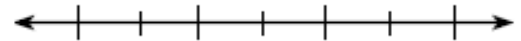


17. A ride at an amusement park requires a height of at least 48 inches. Your little brother is 37 inches tall. What is the solution set for how many more inches must he grow in order to go on the ride?

V: _____

I: _____

S: _____

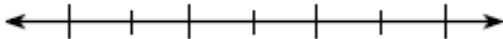


18. Each month, Marnie pays a service fee of \$12 plus \$0.06 per kilowatt-hour for electricity. This month, she has budgeted \$84 for her electricity. What is the solution set for the number of kilowatt-hours Marnie can use and stay within budget?

V: _____

I: _____

S: _____

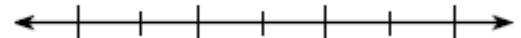


19. Your mom gave you \$25 to go to the movies. You spend \$8 on your ticket and \$5 on a small bag of popcorn. You want to spend the rest of your money on boxes of candy to share with your friends. If each box of candy costs \$3, what solution set represents the number of boxes of candy you can buy?

V: _____

I: _____

S: _____

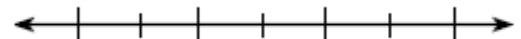


20. Five times the difference of a number and 8 is at most 105. What solution set represents what the number can be?

V: _____

I: _____

S: _____

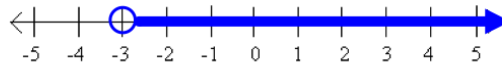


**You need to be careful to _____ when you _____ or _____ by a negative number.

21) A number is no less than -3.

22) Graph the solution to $-8 < x$.

23) What inequality is graphed?



24) $3x + 8 \leq -4$

25) $7(x - 8) - 3x + 4 > 10x - 40$

Short Answer

26) When should you put an open circle on a graph?

27) When should you put a solid/closed circle on a graph?

28) Make up and solve a problem where you have to reverse the inequality to solve the problem. Graph your solution.

9) Two times the difference of a number and four is no more than -198. What is the solution set for this number?

V: _____

I: _____

S: _____

