UNIT **7**

Equations and Inequalities

CCM6 and CCM6+ 2016-17

Name: _____

Math Teacher:_____

Projected Quiz Date:_____

Projected Test Date:_____

CCM6 and CCM6+ Unit 7 Vocabulary: One-step Equations and Inequalities

Expression	A mathematical phrase that contains operations and numbers and/or variables
Equation	A mathematical sentence that states two expressions are equivalent, separating the two expressions with an equal sign
Inequality	A mathematical sentence that states one expression is greater or less in value than another expression, separating the two expressions with an inequality symbol
Solution	The value or values that make an equation or inequality true
Isolate the variable	Moving "pieces" of an equation around to get the variable on one side of the equal sign by itself.
Inverse operations	Two operations are inverse operations if one operation "undoes" the effect of the other.
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.

NOTES

Expressions, Equations, & Inequalities

I. Expression

- a mathematical phrase containing numbers, operations ($+, -, \times, \div$), and/or variables
- Expressions can be *evaluated* or *simplified* but they cannot be *"solved"*

Examples:

$9 \div 3 + 2^2 - 1$	$\frac{12}{4} + 4(3)$
$5x - 2$	$9m - 12$
$3 + x + 2$	$3 + 5$
9	$5w - 3w$

Numerical expressions can be simplified to one number

$9 \div 3 + 2^2 - 1$ $\quad$ $\frac{12}{4} + 4(3)$ $\quad$ $3 + 5$

Algebraic expressions can be simplified

$3 + x + 2$ $\quad$ $5w - 3w$

Algebraic expressions can be evaluated for given variables

$5x - 2$ when x=3 $\quad$ $9m - 12$ when m=4

NOTES (continued)

II. Equation

- a mathematical sentence that states two expressions are equivalent
- has an equal sign in between
- Equations can be *solved* and usually have one solution
- Like a balanced scale

Examples:

$3 + x + 2 = 9$

$3 + 5 = 5x - 2$

$5w - 3w = 9 \div 3 + 2^2 - 1$

$\frac{12}{4} + 4(3) = 9m - 12$

Expressions, Equations, & Inequalities

NOTES (continued)

III. Inequality

- a mathematical sentence that states one expressions is greater than or less than another expression
- has inequality signs $>, <, \geq, \leq$
- Inequalities can be *solved* but have many solutions
- Like an unbalanced scale

Examples:

$3+5 \leq 5x-2$

$\frac{12}{4}+4(3) > 9m-12$

$5w-3w \geq 9 \div 3+2^2-1$

$3+x+2<9$

Write EX if it is an expression, EQ if it is an equation, and I if it is an inequality.

$3+5=5x-2$	$5w-3w=9\div 3+2^2-1$	$3+x+2=9$
$\frac{12}{4}+4(3)>9m-12$	$3+x+2<9$	$5w-3w$
$5x-2$	$7+9$	$9\div 3+2^2-1$
$3+5\leq 5x-2$	$\frac{12}{4}+4(3)$	9

Determine if each statement/item applies to Expressions, Equations, and/or Inequalities. Some statements may apply to more than one. Put a check in the correct column(s).

	Expression	Equation	Inequality
1) Contains an equal sign			
2) Cannot be 'solved'			
3) $3x + 4$			
4) $10 < 21$			
5) Has multiple solutions			
6) $12 = 3 + x$			
7) **Can contain numbers**			
8) **A mathematical sentence**			
9) $7w$			
10) $4 = 12 \div 3$			
11) Can contain variables			
12) Can be compared to a scale			
13) A mathematical phrase			
14) $x \geq 9$			
15) $x + 8 < 37 - 2$			
16) Like a balanced scale			
17) $7 + 1$			
18) $7 + 1 = 8$			
19) $7 + 1 \geq 8$			
20) Can contain operation symbols (+,-,x,÷)			
21) $\frac{3}{4} + 7(2) - 12 + 3^0$			
22) $5 - x = 12$			
23) $5 - x$			
24) Usually has one solution			
25) Like an unbalanced scale			

Solutions to Equations and Inequalities

Solution - the value or values that make an equation or inequality true

Is $m = 4$ a solution to $5m + 10 > 7m - 2$?

To determine if a given value is a solution:

1. Substitute the given value into the equation or inequality

$$5m + 10 > 7m - 2$$

Is $m = 4$ a solution?

$$5(4) + 10 > 7(4) - 2$$

2. Simplify the expression on either side of the equation or inequality

NOTE: the >,<, or = sign ***seperates*** the 2 sides (2 expressions)

$$\boxed{5(4) + 10} > \boxed{7(4) - 2}$$

$$5(4) + 10 \qquad 7(4) - 2$$

$$20 + 10 \qquad 28 - 2$$

$$30 > 26$$

3. Determine if the simplified expressions satisfy the equal sign or inequality symbol

$$30 > 26$$

30 is greater than 26

Partner/Group Activity

- Decide who goes first.
- Write statement a) on your group's whiteboard.
- Explain whether or not that particular statement is true or false when w = 1
- Ask your group members if they agree or disagree with you.
- Discuss the problem until you all come to an agreement.
- Record your decision. Be prepared to share your group's thoughts with the class.
- Give the whiteboard to another group member.
- Repeat this process until you are finished with all eight statements below.

If $w = 1$ which of the following statements would be true?

a) $w + 2 = 3$ b) $w + 2 > 3$ c) $w + 2 \geq 3$

d) $w + 2 \leq 3$ e) $w + 2 < 3$

f) $w + 2 = 4$ g) $w + 2 < 4$ h) $w + 2 > 4$

Determine whether or not the given value is a solution to the equation or inequality. Write YES or NO. **Show work to prove your answer.**

1) $2x + 7 = 17;\quad x = 5$	2) $5w < 3w + 6\,;\quad w = 2$	3) $35 = 7h - 8\,;\quad h = 6$
4) $63 < 3 + 6r\,;\quad r = 10$	5) $63 \leq 3 + 6r\,;\quad r = 10$	6) $50 - 3x = 4^2\,;\quad x = 12$
7) $9 + 6a = 57\,;\quad a = 8$	8) $9k + 3 < 8 \cdot 3\,;\quad k = 2$	9) $10 + 4 > 20 - 3v\,; v = 4$
10) $5g - 15 \geq 60\,;\quad g = 15$	11) $9h = 20 + 6h\,;\quad h = 7$	12) $79 - 8p = 34 + p\,; p = 5$
13) $8 + 6c \leq 9c - 30\,;\ c = 4$	14) $8r + 1 = 5r + 10;\quad r = 3$	15) $2u + 3 = 18 - 3u\,;\ u = 4$

Identifying Solutions to Equations and Inequalities

Part2

Worksheet 2

State whether the given value is a solution to the equation or inequality. Write YES or NO.

CHALLENGE: If the value is not a solution, can you determine which value(s) would be a solution?

1. $5x - 8 = 18 + 4$, for $x = 6$

2. $4x^2 - 5(5) = 12$, for $x = 3$

3. $(8 - n)^2 + 13 \geq 23$, for $n = 3$

4. $17x - 8(2x - 4) > 32$, for $x = 3$

5. $2x + 12 + 8x > 32$, for $x = 2$

6. $6(3x - 2) + 5 < 50$, for $x = 3$

Test each value in the 'Replacement Set' column to determine if the values are solution(s) to the given equation/inequality. Be sure to list all numbers that work to make the statement true. There may be 1, more than one, or no solutions to each. ** Show your work.

	Equation	Replacement Set	Solution(s)
7.	$5x + 2 = 17$	{1, 2, 3, 4}	
8.	$3x - 2 > 4$	{2, 3, 4, 5}	
9.	$2x^2 + 4 = 54$	{1, 3, 5, 7}	
10.	$7x - 7 < 30$	{2, 4, 6, 8}	
11.	$2(2x + 4) > 20$	{3, 5, 6, 9}	
12.	$5x - 6 = 24$	{1, 2, 3, 4}	

Using Substitutions to Solve Problems.

Name:

Determine which option(s) the variable 'e' could be. If none of the options could be the variable write 'none'.

Ex) $10e + 3 < 92$
A. 10
B. 4
C. 6
D. 2

1) $2 < 17 \div e$
A. 3
B. 1
C. 7
D. 4

2) $7e + 10 < 82$
A. 1
B. 10
C. 9
D. 5

3) $6e + 3 < 30$
A. 7
B. 6
C. 4
D. 2

4) $8 \times e > 71$
A. 10
B. 3
C. 8
D. 4

5) $107 \div e > 3$
A. 5
B. 8
C. 10
D. 1

6) $e \times 2 < 5$
A. 9
B. 1
C. 8
D. 7

7) $2 \times e > 26$
A. 7
B. 9
C. 1
D. 3

8) $7e - 6 > 53$
A. 7
B. 8
C. 6
D. 9

9) $8 + 4e < 47$
A. 5
B. 3
C. 10
D. 7

10) $6e + 5 > 45$
A. 6
B. 1
C. 5
D. 7

11) $10 \times e > 29$
A. 2
B. 9
C. 1
D. 4

Answers

Ex. B,C,D
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____

Solving One-step EQUATIONS

To solve equations, you have to do the INVERSE OPERATION.

For each operation below, name the inverse operation:

1. + 45 _____
2. – 8.2 _____
3. • 8 _____
4. ÷ 17 _____

Look at the equations below and write the inverse operation you would use to solve.

5. x + 82 = 197 _____
6. $\frac{x}{18} = 4$ _____
7. 4x = 39 _____
8. x – 8.2 = 4.8 _____
9. a + 42 = 83.75 _____
10. 7b = 24.5 _____
11. $\frac{n}{5} = 10$ _____
12. $z - 8 = 9\frac{1}{3}$ _____
13. 8.2m = 82 _____
14. $\frac{b}{6} = 18$ _____
15. 9 + c = 92 _____

Linear Equations in one variable ~ WHOLE NUMBERS

1. Solve and Check: $x + 23 = 41$	2. Solve and Check: $x - 15 = 72$
3. Solve and Check: $6x = 84$	4. Solve and Check: $\frac{x}{6} = 12$
5. Solve and Check: $x - 26 = 90$	6. Solve and Check: $3x = 63$
7. Solve and Check: $\frac{x}{12} = 24$	8. Solve and Check: $x + 19 = 92$

Independent Practice…Use a CALCULATOR! It doesn't matter if you have rational numbers!

1. Solve and Check: $x - 18 = 53.1$	2. Solve and Check: $x + 15 = 92$
3. Solve and Check: $\frac{2}{3}x = 84$	4. Solve and Check: $\frac{x}{4} = 8$
5. Solve and Check: $x - 13 = 15.7$	6. Solve and Check: $\frac{2}{3}x = 16$
7. Solve and Check: $\frac{x}{1.2} = 24$	8. Solve and Check: $x + 5\frac{3}{4} = 92.4$

Equations with Fractions…do the inverse as always! (Use Calculator!)

1) $x + 8\frac{2}{3} = 5\frac{3}{5}$

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

3) $\frac{3}{7}x = 6$

4) $x + 5\frac{7}{8} = 9\frac{3}{4}$

5) $x - \frac{3}{5} = 1\frac{3}{10}$

6) $1\frac{1}{2}x = 8$

7) $x + 3\frac{2}{3} = 5\frac{7}{9}$

8) $x - 3\frac{4}{5} = 11\frac{1}{10}$

9) $\frac{x}{8} = 1\frac{1}{2}$

Equations with Decimals…do the inverse as always! (Use Calculator!)

Solve and check the equations. BOX YOUR WORK! Check it!

1) $2.23 + x = 6.5$

2) $x - 4.75 = 9.2$

3) $0.06 + y = 3.6$

4) $2.3x = 1.38$

5) $\frac{x}{0.7} = 3.5$

6) $\frac{x}{0.25} = 12.15 - 2.15$

Mixing Expressions and Equations…EOG Practice!

1. If $x + 19 = 58$, then what is the value of $2(x + 3)$?

2. If $\frac{x}{4} = 8$, then what is the value of $x^2 + 7$?

3. If $3x = 54$, then what is the value of $x - 9 + 2x$?

4. If $x - 8.75 = 15.2$, then what is the value of $\frac{1}{2}x$?

5. If $\frac{2}{3}x = 90$, then what is the value of $3(x + 5)$?

CHALLENGE EQUATIONS…Simplify first then use Calculator!

Simplify the expression by combining like terms or completing calculations. Then **USE A BOX** to solve the equation.

1. $3(22) = x - 4$

Simplified:_____

x	

2. $2k + 3k = 2 + 13$

Simplified: _____

k	

3. $\frac{m}{4} = 2 \cdot 2$

Simplified: _____

m	

4. $39 - 3 = 6t + 6t$

Simplified: _____

5. $a - 6 = \frac{38}{2}$

Simplified:_____

6. $10 - 4 = x + x + x$

Simplified: _____

7. $4x - 2x = 15 - 9$

Simplified: _____

8. $\frac{w}{3} = 30 - 4^2 + 6$

Simplified: _____

9. $33 + 7 = 4x$

Simplified:_____

10. $2n = 27 - 5$

Simplified:_____

11. $a + 8a - 3a = 2 + 80 \div 2$

Simplified: _____

12. $3b + 17 - 1 + b - 4^2 = 100 - 4$

Simplified: _____

13. $3(10) = 2x + 9 - x + 2$

Simplified: _____

14. 5 + x = 90 ÷ 9 + 4

Simplified: _____

15. $\frac{w}{6}$ =15 - 3^2

Simplified: _____

16. 12(4) – 18 = x + 3x + 2x

Simplified: _____

REVIEW of "English" to "Mathish"

Fill in the boxes to name phrases that indicate that operation.

+	-
●	÷

What words or phrases mean "="?

Write the equation and solve for w.

1) 35 less than w equals 20

2) w divided by 7 is 3

3) 10 increased by w is 14

4) 8 multiplied by w equals 24

5) w decreased by 15 is 11

6) the product of 3 and w is 36

7) 78 equals w plus 34

8) 36 divided by w equals 6

9) The sum of 40 and w is 100

10) 45 divided by w is 9

For the problems below, choose which equation best matches the situation.

1. Diana can use the equation y = 7x to calculate her pay, where y represents the amount of pay, and x represents the number of hours worked. How many hours did Diana work if she was paid $45.50?

   A) 5.5 hours B) 6 hours C) 6.5 hours D) 7 hours

2. Karen recorded her walking pace in the table below. What equation best represents this relationship?

Hours Walked (h)	Miles Walked (m)
2.5	8.75
4	14

   A) h = m + 10
   B) h = 3.5m
   C) m = h + 10
   D) m = 3.5h

3. Twice a number is twenty-eight.

   A) x + 2 = 28 B) 28 = $\frac{x}{2}$ C) 2x = 28 D) x^2 = 28

4. The quotient of thirty-nine and a number is three.

   A) $\frac{39}{w}$ = 3 B) $39w = 3$ C) 39 – w = 3 D) $\frac{w}{39}$ = 3

5. Five less than three times a number is forty-six.

   A) 5 – 3t = 46 B) 3t – 5 = 46 C) $\frac{5}{3t}$ = 46 D) (5 – 3)t = 46

6. Eric had $197 in his savings account before he was paid his weekly salary. His current savings balance is $429. If Eric deposits all of his earnings, then how much money does he earn each week?

   A) 197 + 429 = n B) 197 + n = 429 C) 197n = 429

7. Jack throws a birthday party in his garden. He needs 260 ice cubes for the party. He arranged the ice trays into two rows in the fridge. Each tray contains 26 ice cubes. How many ice trays (***t***) will Jack need?

   A) 260 + 26 = t B) 260 – 26 = t C) 26t = 260 D) $\frac{26}{t}$ = 260

8. On Christmas, a shopkeeper needs 820 candles. If each packet contains 20 candles, how many packets he should buy?

   A) 20 + c = 820 B) c – 20 = 820 C) 20c = 820 D) $\frac{20}{c}$ = 820

9. Last Saturday, Jenny went to the market. She spent $35 on fruits, $25 on vegetables and $10 on chocolates. After the purchase, she had $286 left. What is the total amount she had before she went to the market?

   A) 35 + 25 + 10 + x = 286 B) 286 + x = 35 + 25 + 10

10. There are 3,500 books in a college library. 1,635 books are already allotted to the students. How many books are currently available in the library?

    A) b = 3500 + 1635 B) b = 3500 – 1635 C) 1635b = 3500

11. There are 4,500 apples which are packed in 15 boxes. How many apples are there in each box?

    A) b + 15 = 4500 B) b – 15 = 4500 C) 15b = 4500 D) $\frac{15}{b}$ = 4500

12. James wrote 665 poems in his entire life. 430 poems are very prominent and they also became very famous. How many of his poems were not that popular?

    A) p = 665 + 430 B) p + 430 = 665 C) p + 665 = 430

13. Amy and her three friends went out to dinner. The total bill was $84. If the friends equally split the bill, how much will each friend pay?

    A) 3f = 84 B) 3 + f = 84 C) 4f = 84 D) 4 + f = 84

14. The distance to the mountains (m) is twice the distance to the beach (b).

    A) 2b = d B) 2d = b C) b^2 = d D) d^2 = b

WRITING EQUATIONS

Problems	**Answers**
Rewrite each sentence in mathematical form as an equation. Then solve.	
1) X minus five is equal to two.	Equation: _____ Solution: _____
2) Three times a number is the same as 7 minus 1.	Equation: _____ Solution: _____
3) 5 less than m is 9.	Equation: _____ Solution: _____
4) the sum of three and x is equal to fifty-four	Equation: _____ Solution: _____
5) The sum of w and 8 is less than 5 times 7.	Equation: _____ Solution: _____
6) the product of 9 and w is equal to the difference of 41 and 5.	Equation: _____ Solution: _____

7) Larry mows lawns in his neighborhood. He mowed *l* lawns today. He charges $15 per lawn. If Larry made $90 today, how many lawns did he mow?	Variable: _____ Equation: _____ Solution: _____
8) Sam gave each of his *f* friends 5 cookies. He gave away a total of 35 cookies. How many friends did he give cookies to?	Variable: _____ Equation: _____ Solution: _____

Notes: Writing Equations from Word Problems

1.) Karter had $14 in his bank account before putting in his birthday earnings. He now has $98. How much money did he earn at his birthday?	Try to solve by defining a variable, setting-up an equation, and solving for the variable! Variable :_____ Equation : _____ Solution: _____
2.) Larsen spent $78 on three pairs of sandals for the summer. If each pair of sandals cost the same amount, write an equation that represents this situation and solve to find the cost of one pair of sandals.	Variable :_____ Equation : _____ Solution: _____
3.) Pamela earns $18 for vacuuming and dusting her house. She spends $4 on lunch and $9 on a new dress. Write and solve an equation to show how much money Pamela has left.	Variable :_____ Equation : _____ Solution: _____
4.) Thomas had a bag of gum drops that he divided equally among his four friends. If each friend receives 56 gum drops, how many gum drops did he start with? (Thomas gave all the gum drops away.)	Variable :_____ Equation : _____ Solution: _____

Problem:	Variable and Equation Set-Up	Solution and Check
1.) Harper went to the mall and spent $21. He purchased 3 t-shirts that all cost the same amount. How much did each shirt cost?		
2.) John and Sally each bought lunch. Together, they spent a total of $19. If Sally's lunch cost $8, how much did John's lunch cost?		
3.) Lauren earned $60 babysitting last Saturday. If she makes $7.50 per hour, how many hours did she work?		
4.) Susan had $895 in her bank account. She withdrew $92. How much does she have left?		

1. **An auto repair shop charges $75 an hour to fix your car. If your total labor bill is $375, write an equation that we can use to determine the number of hours, *h,* in labor it took to fix your car?**

2. **At the amusement park a roller coaster ride lasts 50 seconds. Suppose the roller coaster ride last 40 seconds less than ferris wheel ride, write an equation and solve it to determine the number of seconds the ferris wheel ride lasts.**

3. **Thomas earns $15 each week on his paper route. Thus far he has earned $165. How many weeks has he been delivering papers? Write an equation to help you solve the problem.**

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Name_____

One-Step Equation Word Problems

Date_____ Period____

1) Lisa is cooking muffins. The recipe calls for 7 cups of sugar. She has already put in 2 cups. How many more cups does she need to put in?

2) At a restaurant, Mike and his three friends decided to divide the bill evenly. If each person paid $13 then what was the total bill?

3) How many packages of diapers can you buy with $40 if one package costs $8?

4) Last Friday Trevon had $29. Over the weekend he received some money for cleaning the attic. He now has $41. How much money did he receive?

5) Last week Julia ran 30 miles more than Pranav. Julia ran 47 miles. How many miles did Pranav run?

6) How many boxes of envelopes can you buy with $12 if one box costs $3?

7) Amanda and her best friend found some money buried in a field. They split the money evenly, each getting $24.28. How much money did they find?

8) Jenny wants to buy an MP3 player that costs $30.98. How much change does she receive if she gives the cashier $40?

9) Last Friday Adam had \$22.33. Over the weekend he received some money for cleaning the attic. He now has \$32. How much money did he receive?

10) After paying \$5.12 for a salad, Norachai has \$27.10. How much money did he have before buying the salad?

11) A recipe for cookies calls for $3\frac{1}{4}$ cups of sugar. Amy has already put in $3\frac{1}{9}$ cups. How many more cups does she need to put in?

12) Your mother gave you \$13.32 with which to buy a present. This covered $\frac{3}{5}$ of the cost. How much did the present cost?

13) If the weight of a package is multiplied by $\frac{5}{7}$ the result is 40.5 pounds. Find the weight of the package.

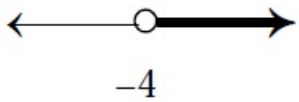
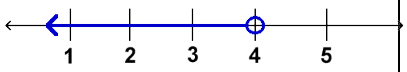
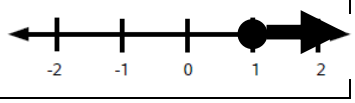
14) A stray dog ate 12 of your muffins. That was $\frac{3}{10}$ of all of them! With how many did you start?

INEQUALITIES NOTES

Below each symbol write the word phrases that correspond.

<	>	≤	≥
Phrases:	**Phrases:**	**Phrases:**	**Phrases:**
Graphing <	**Graphing >**	**Graphing ≤**	**Graphing ≥**

Write an inequality for the following phrases and graph it on the number line provided.

That lady is at least 90!	But Mommy, I want more than 2 cookies!	The speed limit says 55mph.	She won the UNO game no fewer than 3 times!
Write an Inequality for the graphs shown below.			
			

Inequalities Practice

1. Write inequalities for the following:

   (a) Numbers less than or equal to 6

   (b) A number is at least 12.

   (c) A number is at most 12.

2. Which of the numbers indicated satisfy the accompanying inequality?

   (a) $x \geq 3$ -1, 2, 3, 3 ½, 4 ¼

   (b) $x < -4$ -2, -7, -8 ½, 0

   (c) $-5 \leq x$ -6, -4, 0, ½, 3

   (d) $x \leq 5\frac{1}{2}$ 1 ½, 2 ½, 4, 5 ¼, 5.5, 7

3. Graph the following inequalities on number lines:

   (a) $x \leq 1$

   b) $x > -4$

   c) $5 \geq x$ **Be careful!

4. Write and graph each inequality on a number line.

   (a) Mrs. Townsend has at least 100 gray hairs.

   (b) The speed limit is 35mph.

   (c) To ride the Super Duper Looper you must be at least 45 inches tall.

   (d) Grandma says you can have at most two cookies after dinner.

Matching Inequalities to Numberlines

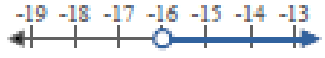
Name:

Solve each problem.

1) Which option best shows X > -16

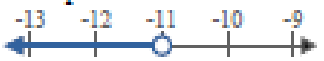
A. 

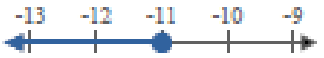
B. 

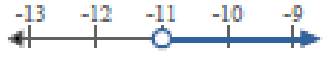
C. 

D. 

2) Which option best shows X ≥ -11

A. 

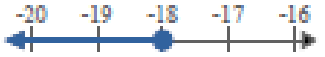
B. 

C. 

D. 

3) Which option best shows X ≤ -18

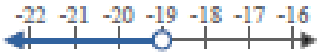
A. 

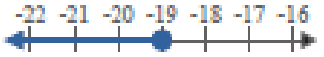
B. 

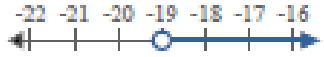
C. 

D. 

4) Which option best shows X > -19

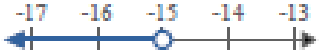
A. 

B. 

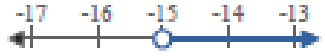
C. 

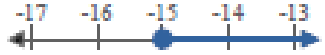
D. 

5) Which option best shows X < -15

A. 

B. 

C. 

D. 

6) Which option best shows X ≤ 13

A. 

B. 

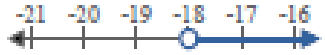
C. 

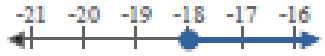
D. 

7) Which option best shows X > -18

A. 

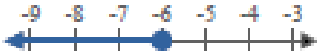
B. 

C. 

D. 

8) Which option best shows X < -6

A. 

B. 

C. 

D. 

Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

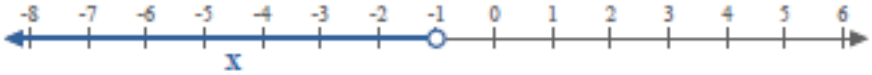
Writing Inequalities from a Numberline

Name:

Write an inequality to express the numberline.

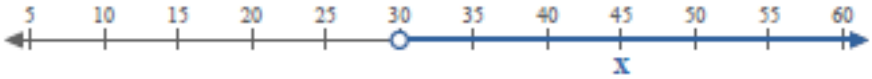
Ex)

1)

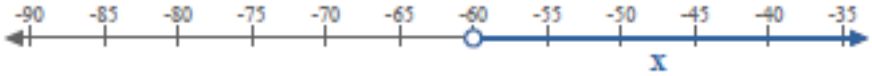


2)

3)



4)

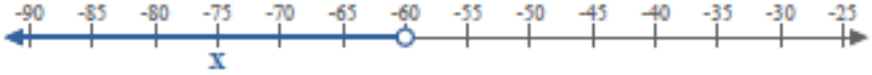


5)

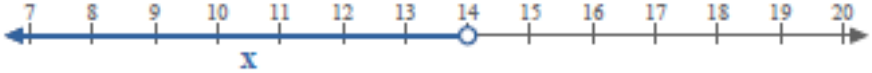
6)

7)

8)

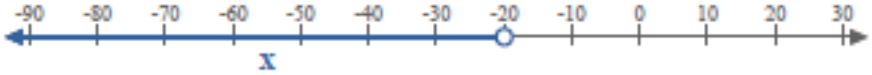


9)

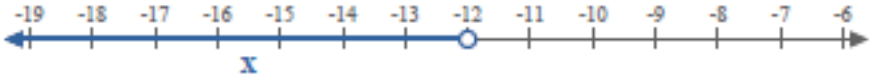


10)

11)



12)



13)

Answers

Ex. $X \leq 19$

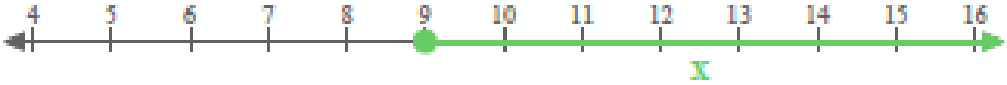
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____

Expressing Inequalities on a Numberline

Name:

Use the numberline to express the inequality.

Ex) $X \geq 9$



1) $X \geq 195$

2) $X > 16$

3) $X \geq -40$

4) $X \geq 120$

5) $X \geq 18$

6) $X \geq 60$

7) $X > 75$

8) $X \geq -100$

9) $X \leq -15$

10) $X < 170$

11) $X > -7$

12) $X > -5$

13) $X \leq 11$

Inequality Practice

For each example, graph the solution set for each inequality on the number line.

1. $x > 6$	5. $x > 48$
2. $x \leq 10$	6. $x \leq 15$
3. $x \geq 4$	7. $x \geq 16$
4. $x < 7$	8. $x < 25$

Read each problem, then write and graph the inequality.

1. In order to ride the roller coaster at the fair, John must be at least 42 inches tall.	2. Jamal can buy at most 10 songs for his iPod.
3. Tina has less than 14 dollars.	4. The price of a DVD is more than 11 dollars.
5. Sherry wants to spend less than 24 dollars on her new shoes.	6. David has to play his instrument for at least 10 minutes a night.

7. 4 more than a number is less than 16.	8. A bag of assorted chocolates has at least 16 Hershey bars in it.
9. On average the temperature in the winter is at most 45 degrees.	10. 5 more than twice a number is greater than 10. No graphing necessary

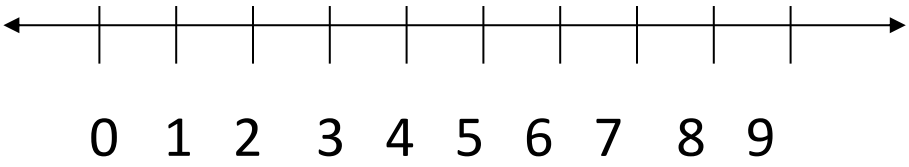
Read each problem, then write an inequality to match the verbal word problem. Use mental math to find the solution set for the example and graph the solution.

John must earn at least $25 to purchase a DVD. So far, he has collected $18. Write an inequality to represent the amount of money, m, that John still needs to earn. Represent the final solution set on a number line. Original Inequality Set-Up: _____ Final Inequality Solution: _____ Graph:	Sammy bought seven pens, each cost the same amount, at the beginning of the school year. She spent at least $14 on all of the pens. Write an inequality to represent the amount of money, m, that each pen cost. Represent the final solution set on a number line. Original Inequality Set-Up: _____ Final Inequality Solution: _____ Graph:

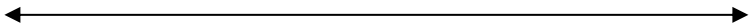
WARMUP:

Write the inequality and graph it on a number line.

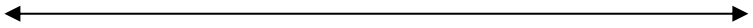
1. My practice time for the race was greater than 5 hours.



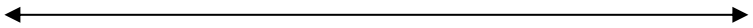
2. A number is less than 5.



3. The temperature is less than or equal to 32◦.



4. The calories in a mint candy are greater than or equal to 25.



Writing Inequalities

Name:

Write each number sentence as an equation / inequality.

Ex) x is less than or equal to -91.

1) 57 is greater than x.

2) x is less than or equal to -24.

3) 6 is greater than x.

4) -99 is less than x.

5) x is less than or equal to -15.

6) x is less than or equal to -99.

7) -38 is greater than x.

8) x is greater than 98.

9) 7 is greater than x.

10) x is greater than or equal to -93.

11) x is greater than 87.

12) x is greater than 49.

13) x is equal to -58.

14) -48 is equal to x.

15) x is less than or equal to -77.

16) x is less than -26.

17) x is greater than or equal to 14.

18) 45 is greater than or equal to x.

19) -87 is less than x.

20) x is less than 60.

Answers

Ex. $x \leq -91$

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

Inequalities with Fractions and Decimals

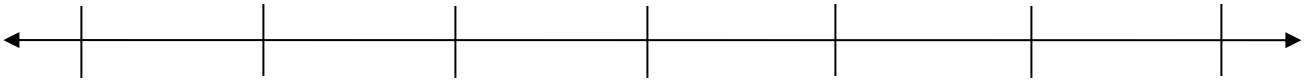
Use the following words to fill in the chart below.

is more than	maximum	minimum
at most	not more than	is less than
below	is not less than	above
not smaller than	at least	is larger than
is greater than	is not greater than	is smaller than

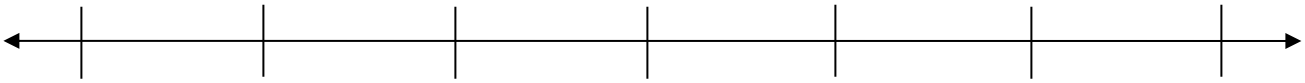
$<$	$>$	$\leq$	$\geq$

Write and graph each inequality.

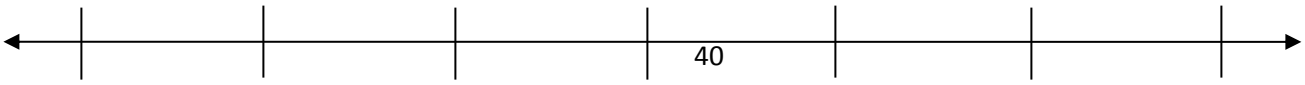
1. All numbers less than 8.5 inequality: _____



2. The maximum score she can earn on this event is 15.1 inequality: _____

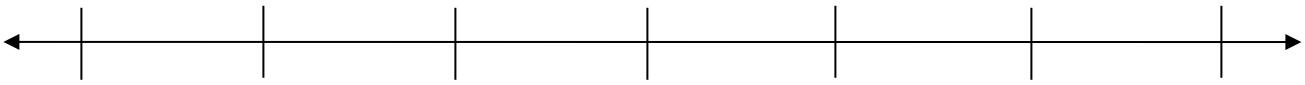


3. His change will be less than $5.25 inequality: _____

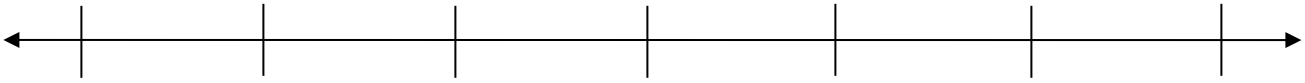


4. Kyle will get at least $3\frac{1}{2}$ stars for his performance. inequality: _____

5. A number that is greater than or equal to $2\frac{1}{3}$. inequality: _____

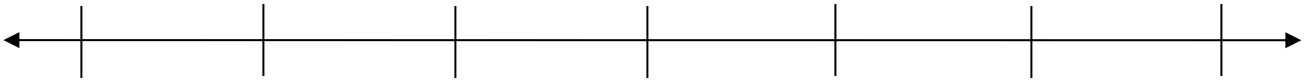


6. At least $6\frac{1}{2}$ pizzas were eaten after the party was over. inequality: _____



7. My bank account contains more than $20.50, where b is the amount in my bank account. Graph the inequality on the number line.

   inequality: _____



8. The class must raise at least $100.50 to go on the field trip. They have collected $20.50. Write an inequality to represent the amount of money, m, the class still needs to raise. Represent this inequality on a number line.

   inequality: _____

 Number 8 was adapted from the 6th grade unpacked document.

Unit 7 Study Guide: Equations and Inequalities ***(USE CALC!)*** CCM6 and CCM6+

1) Define *expressions*, *equations*, and *inequalities OR* explain the similarities and differences between the three items.

2) Give an example of each:

Expression: _____ Equation:_____ Inequality:_____

Circle the values that provide a solution or solutions to the given equation or inequality.

3) $m - 3 = 13$ $\{10, 39, 14, 16\}$

4) $4x > 20$ $\{3, 4, 5, 6\}$

5) $4x = 30 + 6$ $\{10, 32, 6, 9\}$

6) $3w + 2w \geq 30$ $\{5, 6, 15, 30\}$

7) $505 < 3g + 1$ $\{3, 4, 5, 6\}$

Solve for the variable. Show your work and don't forget to check your answer!

8) $4x = 20$

9) $w - 5 = 10$

10) $412 = m + 3$

11) $\frac{k}{5} = 10$

12) $x - 3.75 = 8.2$

13) $0.5x = 11$

14) $\frac{2}{3}x = 16$

15) $\frac{a}{2.1} = 6.4$

16) $\frac{3}{5} + x = 6\frac{1}{5}$

Solve the problems. Be sure you ANSWER THE QUESTION!

17) Stephanie had $100 yesterday. Today she earns d dollars for babysitting. She now has $148.

Circle the equation or equations that accurately represent Stephanie's situation.

$100 - d = 148$ $\quad 100 + d = 148$ $\quad 148 = d + 100$ $\quad 148 = 100d$ $\quad d - 100 = 148$ $\quad 100 = 148 - d$

18) Jonah used to ride the bus for *m* minutes. He moved to a house closer to school and now his ride is 9 minutes shorter. He now rides the bus for 19 minutes. Write ***two different equations*** that can represents Jonah's situation.

19) If 14 + x = 48, then what is the value of 2(x + 10)?

20) Write the inequality based on each graph.

21) Graph the inequality on the number line provided.

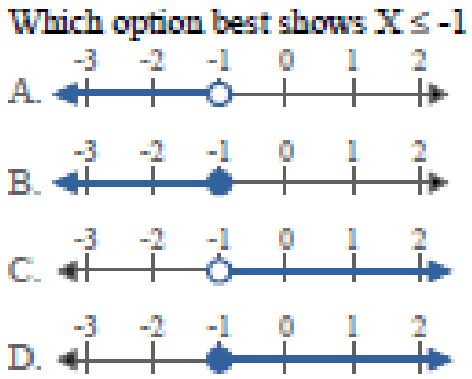
$x < 15$

$x \geq -40$

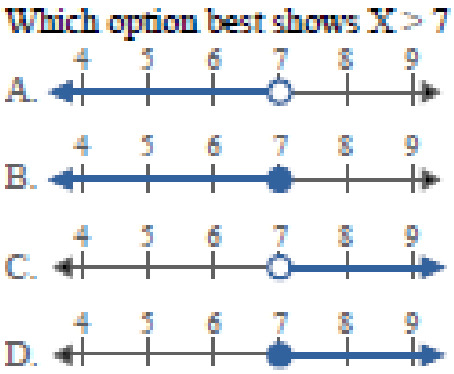
$x \leq -10$

$x > -170$

22) Choose the best graph.



23) Choose the graph that matches the inequality.



Choose the best inequality for the situation.

24) Evan's family can fit no more than 25 people at their Thanksgiving dinner table.

A) $p > 25$ B) $p \geq 25$ C) $p < 25$ D) $p \leq 25$

25) In order to make a profit, the Student Government must sell more than 200 lollipops.

A) $x > 200$ B) $x \geq 200$ C) $x < 200$ D) $x \leq 200$

26) That fat cat eats at least 3.5 cans of food daily!

A) $c > 3.5$ B) $c \geq 3.5$ C) $c < 3.5$ D) $c \leq 3.5$

27) The speed limit is 55 mph.

A) $s > 55$ B) $s \geq 55$ C) $s < 55$ D) $s \leq 55$

28) You must be at most 38 inches tall to ride the kiddie ride.

A) $x > 38$ B) $x \geq 38$ C) $x < 38$ D) $x \leq 38$