

6<sup>TH</sup> GRADE MATH

# Unit 6

Equations and Inequalities

Date:

### Extra! Extra! Read all about it!

We are going to start Unit 6 (Equations and Inequalities). Here is a list of IXL topics, for every topic you complete you will earn some extra credit. Here are the possible points you can earn on each topic. The extra credit will be due by \_\_\_\_\_.

#### Smart Score on IXL

- 100% - 5 extra points
- 95% - 4 extra points
- 90% - 3 extra points
- 85% - 2 extra points
- 80% - 1 extra point

#### Unit 6 Topics – You can earn up to 100 extra credit points! You got this 😊

6.EE.B.5 Understand solving an equation or inequality is carried out by determining if any of the values from a given set make the equation or inequality true. Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

1. Solutions to inequalities (6-AA.1)
2. Does  $x$  satisfy an equation? (6-Z.1)
3. Which  $x$  satisfies an equation? (6-Z.2)

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

4. Write variable expressions: word problems (6-Y.3)

6.EE.B.7 Solve real-world and mathematical problems by writing and solving one-step equations of the form  $x + p = q$  and  $px = q$  for cases in which  $p$ ,  $q$ , and  $x$  are all nonnegative rational numbers.

5. Model and solve equations using algebra tiles (6-Z.4)
6. Write and solve equations that represent diagrams (6-Z.5)
7. Solve one-step equations with whole numbers (6-Z.6)
8. Solve one-step multiplication and division equations with decimals, fractions, and whole numbers (6-Z.7)
9. Solve one-step addition and subtraction equations with whole numbers (6-Z.)
10. Solve one-step multiplication and division equations with whole numbers (6-Z.)
11. Solve one-step equations: word problems (6-Z.8)
12. Solve one-step addition and subtraction equations: word problems (6-Z.)
13. Solve one-step multiplication and division equations: word problems (6-Z.)
14. Write a one-step equation: word problems (6-Z.)

6.EE.B.8 Interpret and write an inequality of the form  $x > c$  or  $x < c$  which represents a condition or constraint in a real-world or mathematical problem. Recognize that inequalities have infinitely many solutions; represent solutions of inequalities on number line diagrams.

15. Graph inequalities on number lines (6-AA.2)
16. Write inequalities from number lines (6-AA.3)
17. Solve and graph one-step addition and subtraction inequalities (6)
18. Solve and graph one-step multiplication and division inequalities with positive numbers (6)
19. Solve and graph one-step multiplication and division inequalities with rational numbers (6)
20. One-step inequalities: word problems (6-AA.)

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

### Translating Words to Algebraic Expressions #2

**Directions:** Translate the following phrases into algebraic expressions or equations.

10. Five times the sum of number and four.

11. Ten divided by a number.

12. The quotient of 124 and a number, decreased by 8.

13. Eight times a number is 48.

14. The product of fourteen and a number.

15. Twice a number minus eight.

16. The quotient of a number and seven is two.

17. Three-fourths of a number.

18. The product of a number and ten is eighty.

## Writing Equations

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Daily Target:** I can write an algebraic equation from a given word problem.

### Discussion Question

What is an algebraic expression? Give an example:

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Find the value for each algebraic expression if  $x = 3$

- 1)  $9 - x$                       2)  $9 + x$                       3)  $\frac{9}{x}$                       4)  $9x$

How did you find the answer for the expressions?

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### Let's try with two steps!!

- 1)  $5y + 2$  when  $y = 2$                       3)  $\frac{15}{m} - 2$  when  $m = 3$
- 2)  $6x - 12.3$  when  $x = 2$                       4)  $3xy$  when  $x = 2$  and  $y = 3$

### Writing Expressions!

Ina wants to serve salad at her party. She will need one head of lettuce for every 6 guests that attend.

- Write an expression she could use for deciding how much lettuce she needs.
- Ina finds out that 18 guests will attend. Evaluate the expression for this amount of guests.

At her last party, Ina decorated with window stickers. For this party, she wants to use 4 times as many stickers.

- Write an expression for the number of stickers Ina will use. (Use the last variable  $s$  to represent the number of stickers she used at her last party.)
- Use the expression to find the new number of stickers if she used 14 stickers for her last party.

## Operations With Equations

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Daily Target:** I can find the solution to an equation & inequality using the inverse operation.

### Discussion Questions:

Look at the following:  $2+3 = 4+1$

Is this a true statement? Why?

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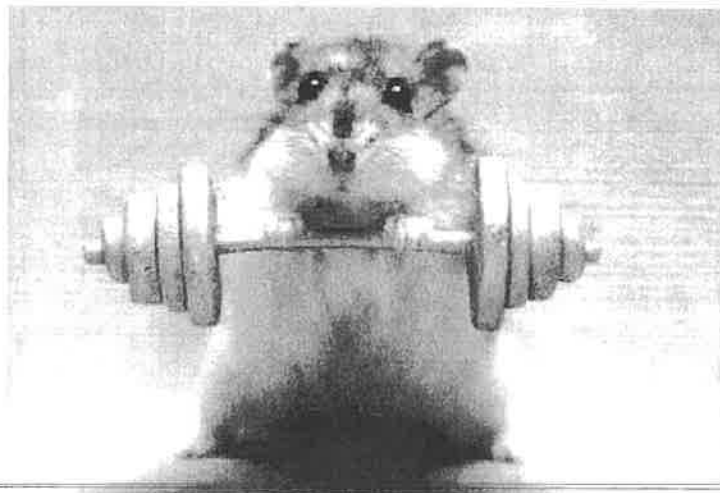
Look at the next statement:  $5 = 5$   
 $+1 +1$

We added 1 to both sides of the equation. Why would we need to do this?

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Think of solving an equation like lifting weights. If you add or subtract weight from one side of the barbell, you must add or subtract the same amount of weight from the other side of the barbell to keep it balanced.



1. What is the inverse operation of addition?

2. What is the inverse operation of subtraction?

3. What is the inverse operation of multiplication?

4. What is the inverse operation of division?

**Adding/Subtracting Equations**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Daily Target:** I can find the solution to an equation & inequality using the inverse for addition & subtraction.**Step One:**

Identify the \_\_\_\_\_ being used and identify its \_\_\_\_\_ operation.

$$21 = r - 5$$

**Step Two:**

Using the \_\_\_\_\_ operation, \_\_\_\_\_ the variable so it is the only one left!

$$6 + m = 17$$

**Step Three:**

\_\_\_\_\_! That is your answer!

**Practice!**

1.  $x + 4 = 6$

5.  $b - 12 = 49$

2.  $y - 5 = 12$

6.  $p - 30 = 42$

3.  $d + 1 = 5$

7.  $17 = y + 6.5$

4.  $x + 11 = 13$

8.  $8.8 = m + 8$

**Challenge!**

Solve for x:

$$2x + 12 = 5x$$

Solve for y:

$$3y - 2 = 10$$

**Multiplying/Dividing Equations**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Daily Target:** I can find the solution to an equation & inequality using the inverse for multiplication & division.**Step One:**

Write the \_\_\_\_\_ and identify the operation being used.

**Step Two:**

Using the \_\_\_\_\_ operation, isolate the \_\_\_\_\_ so it is the only one left!

**Step Three:**

\_\_\_\_\_! That is your answer!

$$2p = 18$$

**Practice!**

1.  $4x = 8$

2.  $\frac{z}{14} = 2$

3.  $16 = 4b$

4.  $20 = 5c$

5.  $5 = \frac{d}{8}$

6.  $11 = \frac{s}{2}$

7.  $\frac{t}{4} = 4$

**Challenge!**

Solve for y:

$$5m = 42$$

Solve for x:

$$5x + 20 = 9x$$

**Writing Equations & Inequalities**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Daily Target:** I can write different equations and inequalities from a given word problem**Remember** → **Circle your numbers and underline your key words!!****Example:**

Ms. Burkhart is buying school supplies for her students. She cannot spend more than \$50 this month but needs to buy dry erase makers. One pack of markers costs \$2.75. If  $m$  represents the amount of markers she bought, write an equation that could be used to find  $m$  the amount of markers she can buy.

**Practice! Write the equation or inequality**

1) Billy's age is 2 years less than 5 times Marie's age. If Marie is  $m$  years old, write an expression that represents Billy's age.

2) Randal bought a game pack for \$35.00. He found the same game pack at a different store for  $n$  dollars less. Write an expression for finding the price of the game pack at the other store.

3) On a middle school basketball team, each of the player's height is greater than 135 cm. Write an inequality showing the heights of the players.

4) Sam has 36 books. His sister gave him  $y$  new ones. How many books does Sam have now? Write the equation to represent the situation?

5) A box contains 30 packages of notebooks. The price of the box is \$85.50. Each of the packages of notebooks costs the same amount. Write an equation that could be used to find  $p$ , the price of a package of notebooks.



# Graphing inequalities

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Daily Target:** I can graph and write different equations and inequalities.

Less than	More than	Not equal to	Less than or equal to	More than or equal to	Equal to

Open Circle	Closed Circle

## Writing Equations & Inequalities

### Step One:

\_\_\_\_\_ and write the \_\_\_\_\_ to represent the unknown number.

### Step Two:

Look where the \_\_\_\_\_ is on the number line - that is your \_\_\_\_\_.

### Step Three:

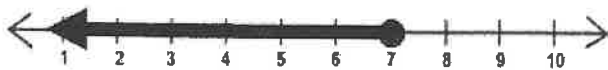
Look at whether or not the circle is \_\_\_\_\_ or \_\_\_\_\_ and what direction the arrow is going. That determines the inequality you use.



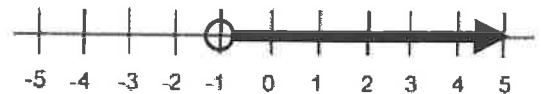
What are two ways you can write the inequality?

**Practice!** Write the Inequality that matched the graph.

1)

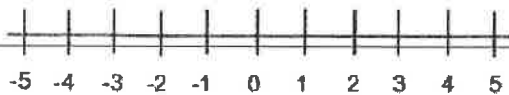


2)

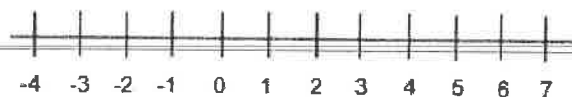


## Graphing Inequalities & Equations

$$n > 2$$



$$n \leq -3$$



$$-5 > n$$



$$n = 16$$



**Solving & graphing inequalities**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Daily Target:** I can solve and graph different equations and inequalities.**Inequality:**An \_\_\_\_\_ that uses **less than** ( $<$ ), **greater than** ( $>$ ), **less than or equal to** ( $\leq$ ), or **greater than or equal to** ( $\geq$ ) symbols**Step One:**

$$x - 4 > 2$$

**Step Two:****Step Three:**

Check:

**Step Four:****Practice!**

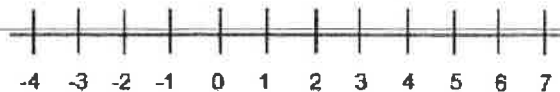
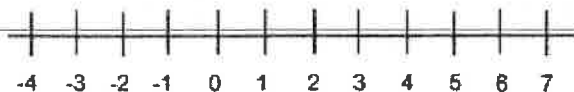
1)

$$x + 5 \geq 11$$

Check:

$$x - 2 < 3$$

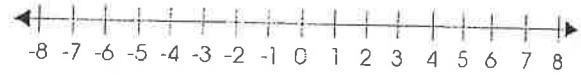
Check:



**Review!!** On the volleyball team, each of the player's heights is less than 6 feet tall. Write and graph the inequality to represent the situation.

$x - 3 > 1$	Check:

$x + 4 \leq 5$	Check:



$x - 4 \geq 2$	Check:

$12 < x + 9$	Check:



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$x - 3 > 1$	Check:

$x + 4 \leq 5$	Check:



$x - 4 \geq 2$	Check:

$12 < x + 9$	Check:



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Name \_\_\_\_\_

Solving Equations and Inequalities



$$2x = 16$$

$$x = 8$$



$$14 > 8 + x$$

$$x < 6$$



$$x - 6 \leq 5$$

$$x \leq 11$$



$$\frac{x}{4} \geq 5$$

$$x \geq 20$$



$$5 < x - 10$$

$$x > 15$$



$$7x < 49$$

$$x < 7$$



$$16 \leq x + 15$$

$$x \geq 1$$



$$5x = 10$$

$$x = 2$$



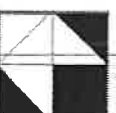
$$6 \geq x - 10$$

$$x \leq 16$$



$$x + 3 > 6$$

$$x > 3$$



$$x + 1 > 5$$

$$x > 4$$



$$x - 15 = 20$$

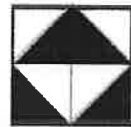
$$x = 35$$



$$2x \geq 48$$

$$x \geq 24$$

$x \leq 11$	$x < 10$	$x = 13$	$x \leq 16$	$x = 16$
$x \geq 11$	$x > 4$	$x < 18$	$x = 8$	$x \geq 20$
$x < 6$	$x > 7$	$x > 15$	$x \geq 22$	$x < 7$
$x = 2$	$x > 26$	$x = 6$	$x > 17$	$x < 28$
$x \geq 24$	$x = 35$	$x > 3$	$x = 72$	$x \geq 1$



$$3x = 39$$

$$x = 13$$



$$8x > 56$$

$$x > 7$$



$$x + 4 \geq 15$$

$$x \geq 11$$



$$x - 4 < 24$$

$$x < 28$$



$$x - 3 > 23$$

$$x > 26$$



$$8 + x = 14$$

$$x = 6$$



$$x \div 4 = 4$$

$$x = 16$$



$$\frac{x}{6} = 12$$

$$x = 72$$



$$x - 17 \geq 5$$

$$x \geq 22$$



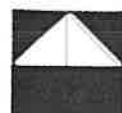
$$x - 12.3 > 4.7$$

$$x > 17$$



$$6x < 60$$

$$x < 10$$



$$x + 12.6 < 5.4$$

$$x < 18$$







