

Summer Work

Incoming 7th Graders



Created by Katie Prohlik

6th-grade Review

Each section has a resource page and a practice page

1. The Number System
2. Rational Number Operations
3. Ratios and Proportions
4. Percents
5. Algebra
6. Expressions
7. Equations & Inequalities
8. The Coordinate Plane
9. Geometry
10. Data & Statistics

What to do first

1. [Click here](#) and join my google classroom.
Code: 43rtdbe
2. Watch the intro video.

How to use this packet

1. READ and review the RESOURCE page. These are just notes to help you solve the problems on the following page.
2. Complete the five practice problems in each section.

What to do on Google classroom

1. Watch the videos on Google classroom. There are 10 videos, one for each section.
2. After you've completed a section take the mini quiz.

The Number System

Resource Page

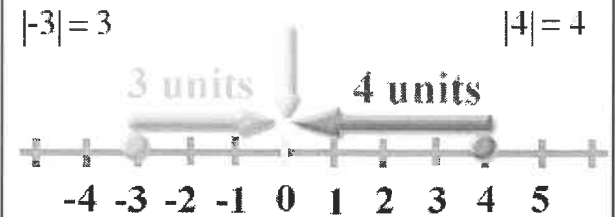
CCSS: 6.NS.5, 6.NS.6, 6.NS.7

Integer Vocabulary

NEGATIVE	ZERO	POSITIVE
debit decrease withdrawal loss expense below	neutral nothing	increase gain rise credit deposit above

6.NS.5

The **ABSOLUTE VALUE** of a number is its **DISTANCE AWAY FROM ZERO** on the number line.



Absolute Value

6.NS.6a

Ordering Rational Numbers

PUT THE NUMBERS IN THE SAME FORM FIRST!

- For example, convert all numbers to decimals before ordering.

EXAMPLE 1:

Order from greatest to least
-4, 3, -1, -7, 4



EXAMPLE 2:

Order from least to greatest
 5.2 , $5\frac{1}{4}$, 555% , 5.07



6.NS.7a

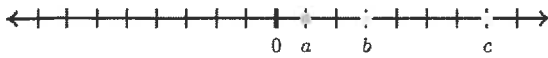
Real World Situations

INEQUALITY	INTERPRETATION
$-6 < -2$	-6 degrees is colder than -2 degrees
$7 > -1$	7 is located to the right of -1 on a number line
$-\$320 > -\500	Owing \$320 is better than owing \$500
$-432 < 200$	A town that is 432 feet below sea level is lower than a town that is 200 feet above sea level

6.NS.7b

Practice Page

1.



Which of the following inequalities is correct?

Choose 1 answer:

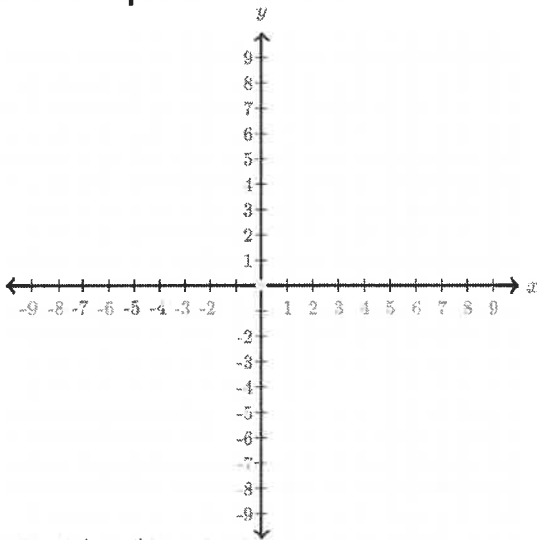
A $a > c$

B $-a > a$

C $-a > -b$

6.NS.7a

2. Plot the point (1,-5) on the plane. Which quadrant is it in?



6.NS.6b + 6.NS.6c

3. If $E = 3.5$ then what is $-(-E)$ on the number line?



6.NS.6a

4. A red bird is flying at an elevation of $17\frac{1}{9}$ meters. A bluebird is flying at an elevation of $10\frac{3}{5}$ meters.

a. Write an inequality that compares the elevations.

b. Who is flying at a higher elevation?

6.NS.7b

5. State whether the situation is referring to a positive number, a negative number, or a neutral number.

- A quarterback runs a play, but it results in a sack for a loss of 18 yards.
- Mr. Niles is predicting a cold front and a drop in temperature of 20 degrees on Sunday.
- Mrs. Prchlik deposits \$75 into her account.
- Death Valley is 279 ft below sea level.
- The beach ball is floating at sea level.

6.NS.5

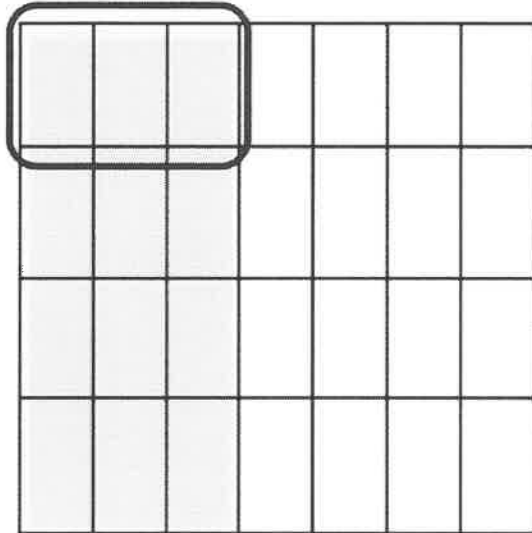
Rational Numbers Operations

Resource Page

CCSS: 6.NS.1, 6.NS.2, 6.NS.3, 6.NS.4

Dividing Fractions Models

$$\frac{3}{7} \div 4 = \frac{3}{28}$$



6.NS.1

• Leave the first fraction the SAME

$$\frac{5}{9} \div \frac{1}{4} =$$

• Multiply by the reciprocal -Keep Change Flip

$$\frac{5}{9} \cdot \frac{4}{1} =$$

• MULTIPLY the fractions

$$\frac{5 \cdot 4}{9 \cdot 1} = \frac{20}{9} =$$

• Simplify

$$2\frac{2}{9}$$

Absolute Value Algorithms

6.NS.2

GCF & LCM

Example 1

GCF of 12 and 6

1. Find all the Factors of each number
2. Circle the Common factors,
3. Choose the Greatest of those

Factors of 12: 1, 2, 3, 4, 6, 12

Factors of 16: 1, 2, 4, 8, 16

4 is the Greatest Common Factor

Example 2

LCM of 3 and 5:

List the multiples of each number,

The multiples of 3 are 3, 6, 9, 12, 15, 18, ... etc

The multiples of 5 are 5, 10, 15, 20, 25, ... etc

Find the first Common (same) value: 15

6.NS.4

ADD

1. Line up the decimals
2. Include place holders
3. Add

$$\begin{array}{r} 143.90 \\ + 38.26 \\ \hline 182.16 \end{array}$$

SUBTRACT

1. Line up the decimals
2. Include place holders
3. Subtract

$$\begin{array}{r} 143.90 \\ - 38.26 \\ \hline 105.64 \end{array}$$

MULTIPLY

1. Multiply; ignore decimals
2. Count the number of digits behind the decimals; then mark that many places in the product

$$\begin{array}{r} 20.84 \\ \times 1.5 \\ \hline 31.260 \end{array}$$

DIVIDE

1. Remove any decimals from the divisor
2. Move the same number of places in the dividend
3. Divide and bring the decimal up into the quotient

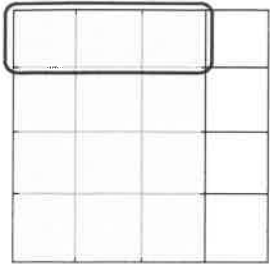
$$\begin{array}{r} 60 \\ 2.5 \overline{) 150} \\ \underline{150} \\ 0 \end{array}$$

Decimal Operations

6.NS.3

Practice Page

6. Which of the following equations does the model below represent?



F. $\frac{3}{4} - 4 = \frac{3}{16}$

G. $\frac{3}{4} - \frac{1}{4} = \frac{3}{16}$

H. $\frac{2}{3} - 4 = \frac{8}{3}$

J. $\frac{2}{3} + \frac{1}{4} = \frac{2}{12}$

6.NS.1

7. Find the GCF of the following

a. 110, 40, 120

b. 16, 27, 24

Find the LCM of the following

c. LCM(8,5)=

d. LCM(8, 6)=

6.NS.4

8. Use a standard algorithm to Add, subtract, multiply, or divide the following. Show ALL your work.

a. $0.422 + 7.41 =$

b. $6.168 - 0.432 =$

c. $0.703 \cdot 243 =$

d. $34 \div 5.7 =$

6.NS.3

9. Divide the following.

a. $\frac{7}{12} \div 2$

b. $12 \div \frac{2}{5}$

c. $\frac{2}{5} \div \frac{1}{6}$

d. $2\frac{3}{4} \div 3$

6.NS.2

10. Amira has

$\frac{3}{4}$ of a bag of cat food. Her cat eats $\frac{3}{8}$ of a bag per week.

How many weeks will the food last?

6.NS.2

Algebra

CCSS: 6.EE.9

Resource Page

Tables, Equations, & Graphs

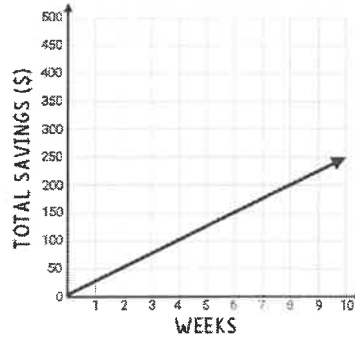
An equation, table, graph, or verbal description can describe the relationship between x and y.

$y = mx$

↗

RATE OF CHANGE

X	Y
0	0
1	25
2	50
3	75
4	100



- PASSES THROUGH THE ORIGIN (0, 0)
- FORMS A STRAIGHT LINE

6.EE.9

Independent & Dependent Variables

6.EE.9

INDEPENDENT QUANTITIES:

- the x-values in a relationship
- constant
- measured

DEPENDENT QUANTITIES:

- the y-values in a relationship
- varies
- depends on x

EQUATION	GRAPH	TABLE												
$c = 150s$		<p>IND ↙ ↘ DEP</p> <table border="1"> <thead> <tr> <th>S</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1.50</td> </tr> <tr> <td>2</td> <td>3.00</td> </tr> <tr> <td>3</td> <td>4.50</td> </tr> <tr> <td>4</td> <td>6.00</td> </tr> </tbody> </table>	S	C	0	0	1	1.50	2	3.00	3	4.50	4	6.00
S		C												
0		0												
1	1.50													
2	3.00													
3	4.50													
4	6.00													
DESCRIPTION														
The cost of a siamese cat is \$150.00. what is the total cost, c of s, number of siamese cats														

Practice Page

21. On your math quiz, you earn 5 points for each question that you answer correctly. In the equation below, x represents the number of questions that you answer correctly on your math quiz, and y represents the total number of points that you score on your quiz.

- The relationship between these two variables can be expressed by the following equation: $y=5x$
- Identify the dependent and independent variables.

6.EE.9

22. Complete the table for the given rule.
Rule: $y = 4x$

x	y
3	
4	
5	

What could this equation represent?

24. You and your brother are reading the same novel. You want to get ahead of him in the book, so you decide to read 30 minutes longer than your brother reads.

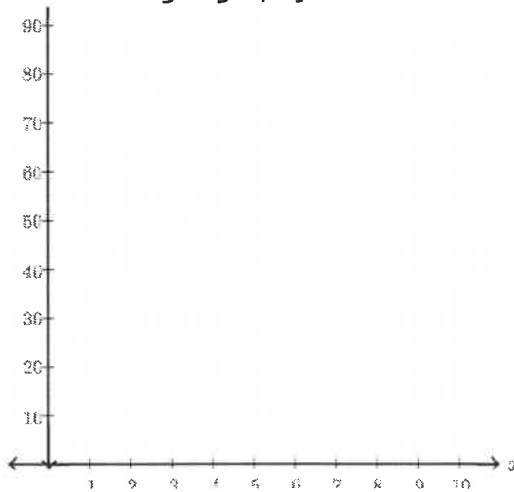
- Write an equation for the number of minutes you read, y , when your brother reads x number of minutes.
- How many minutes will you read if your brother reads for 15 minutes?

6.EE.9

23. Enrique earns 10 points for each question that he answers correctly on a geography test.

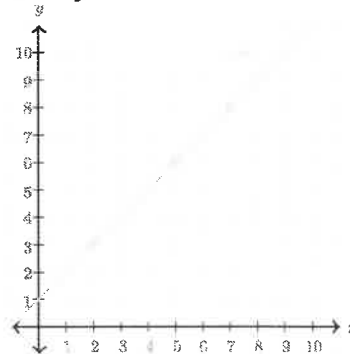
- Write an equation for the number of points, y Enrique scores on the test when he answers x -questions correctly.
- On his first geography test, Enrique answered 3 questions correctly. On his second test, Enrique answered 7 questions correctly.

Place points on the graph to show Enrique's first and second geography test.



6.EE.9

25. Which rule describes the relationship between the x and y coordinate on the line M ?



Choose 1 answer:

- $y = x - 1$
- $y = x + 1$

6.EE.9

Expressions

Resource Page

CCSS: 6.EE.1, 6.EE.2, 6.EE.3, 6.EE.4

Vocabulary

$$4x + 7^2 - 10$$

Term (there are three) $4x, 7^2, 10$

Variable x

Coefficient 4

Exponent 2

Constant 10

Operations $+, -$

Properties of Operations

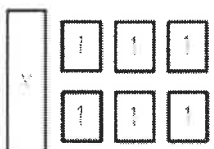
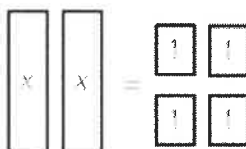
Properties of operations result in equivalent expressions

ORIGINAL EXPRESSION	PROPERTY	EQUIVALENT EXPRESSION
$8 + 0$	IDENTITY	8
$6 \cdot 3 \cdot 2$	COMMUTATIVE	$3 \cdot 2 \cdot 6$
$6 + (3 + 2)$	ASSOCIATIVE	$(6 + 3) + 2$
$8(x + 7)$	DISTRIBUTIVE	$8x + 56$

The **RECIPROCAL** of a number results in a **PRODUCT OF 1**.

$$\frac{5}{6} \cdot \frac{6}{5} = 1 \quad \leftarrow \text{FLIP}$$

Expressions

EXPRESSION	EQUATION
the difference between a number and 12	the difference between a number and 12 is 9
$x - 12$	$x - 12 = 9$
$4 + 13$	$4 + 13 = 17$
	

Order of Operations

PEMDAS

EXAMPLE 1:

$$6^2 - 9 \div 3 \cdot 4$$

$$36 - 9 \div 3 \cdot 4$$

$$36 - 3 \cdot 4$$

$$36 - 12$$

$$24$$

EXAMPLE 2:

$$14 + 6(8 \div 2) - 5$$

$$14 + 6 \cdot 4 - 5$$

$$14 + 24 - 5$$

$$38 - 5$$

$$33$$

Practice Page

26. Evaluate

a. $5^3 \cdot 2$

b. $2 \cdot 3^0$

c. $(4 - 2)^2$

d. $\frac{2^4}{4^2}$

6.EE.1

28. Jack had 3 bags of golf balls with b balls in each bag; then his friend gave him 6 more golf balls.

How many golf balls does Jack have now?

a. Write your answer as an expression.

b. Label the terms, constant, variable, coefficient, constant, and operation in their expression.

6.EE.2a + 6.EE.2b

29. Simplify to create an equivalent expression.

$$7(5 + 2c) + 3c$$

6.EE.3

27. Evaluate the following Expressions:

a. $8 + \frac{w}{4}$ when $w = 16$.

b. $5e \div g - f$ when $e = 6$, $f = 5$, and $g = 3$.

b.

c. $\frac{1}{3}m - 1 - \frac{1}{2}n$ when $m = 21$ and $n = 12$.

c.

6.EE.2c

30. Which expressions are equivalent to $4(2x + 3)$? Select all that apply.

a. $8x + 3$ b. $8x + 12$

c. $2(4x + 6)$ d. $4 + 2x + 3$

6.EE.4

Ratios & Proportions

Resource Page

CCSS: 6.RP.1, 6.RP.2, 6.RP.3

Ratios & Rates

Ratio: a comparison of TWO quantities. Can be part-to-part or part-to-whole

$\frac{3 \text{ tigers}}{4 \text{ lions}}$ 3 tigers: 4 lions or 4 lions to 3 tiger
or 3 tigers: 7 animals

Rate: A ratio with TWO DIFFERENT units.

$\frac{\$5.25}{6LB}$ $\frac{250 \text{ Mi}}{4HRS}$ $\frac{49ft}{5sec}$

6RP.1

Unit Rate: a ratio with a quantity of ONE.

$\frac{\text{Price}}{1 \text{ LB}}$

$\frac{\text{Miles}}{1 \text{ HR}}$

$\frac{\text{Feet}}{1 \text{ Sec}}$

unit Rate

6RP.2

Proportions

Proportions: two EQUAL ratios. Can be used to find a missing quantity.

$$\frac{\text{MILES}}{\text{HR}} = \frac{432}{6} = \frac{x}{8}$$

$$3,456 = 6x$$

$$576 = x$$

576 miles in 8 hours

6NS.3b

Measurements

Measurement Conversion: Converting units in one measurement system.

Example: Renee can run 15 kilometers in one hour. How many kilometers can Renee run per minute? *There are 60 minutes in 1 hour.*

1. Set up the units you want to find	$\frac{\text{kilometers}}{\text{min}}$
2. Use measurement chart if needed.	60 minutes in 1 hour.
3. Set up a proportion to solve.	$\frac{\text{kil}}{\text{min}} = \frac{15}{60} = \frac{x}{1}$ $x = 0.25 \frac{\text{kil}}{\text{min}}$

6NS.3d

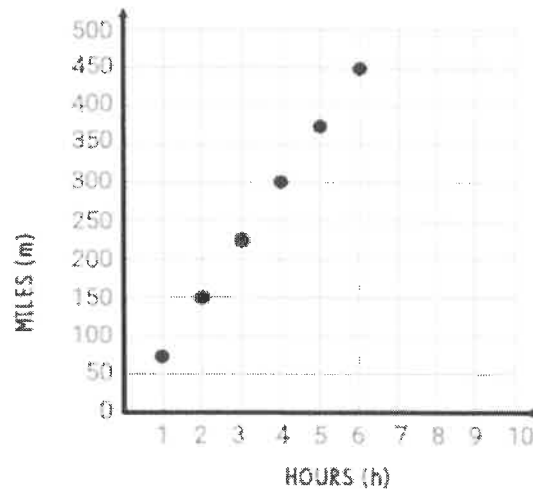
EQUATIONS

$$m = 75h$$

TABLES

HOURS (h)	MILES (m)
2	150
4	300
7	525
10	1500

GRAPHS



Equations Tables, Graphs of proportions

6NS.3a

Practice Page

11. Select two ratios that are equivalent to 3:12.

- a. 12: 48
- b. 6: 18
- c. 4: 12
- d. 3: 1
- e. 1: 4

6.RP.1

13. Vivi is a drummer for a band. She burns 756 calories while drumming for 3 hours. She burns the same number of calories per hour.

How many calories does Vivi burn per hour? Show your work.

6.RP.2

12. Yoda Soda is the intergalactic party drink that will have all your friends saying, "Mmmmmm, good this is!"

You are throwing a party, and you need 5 liters of Yoda Soda for every 12 guests.

If you have 36 guests, how many liters of Yoda Soda do you need?

6.RP.3b

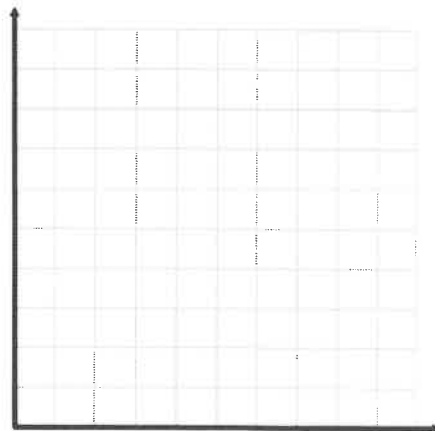
14. Set up a proportion to solve the following. There are 946 milliliters in a quart. There are 2 pints in a quart.

How many milliliters are in a pint?

6.RP.3d

15. Anna needs 28 strawberries for every 4 smoothies she makes. Complete the table using ratios, then plot the pairs of values on the coordinate plane. (Don't forget to label the graph).

Strawberries	Smoothies
28	4
	3
70	



6.RP.3a

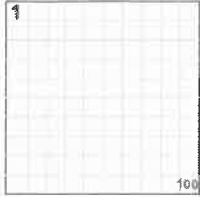
Percents

Resource Page

CCSS: 6.RP.3c

Percent is out of 100

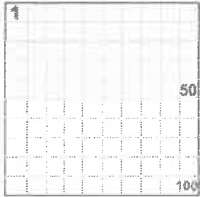
When we say "Percent" we are really saying "per 100"



100% means **all**.

Example:

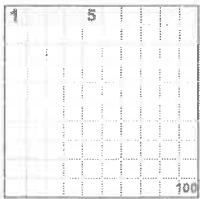
$$100\% \text{ of } 80 \text{ is } \frac{100}{100} \times 80 = 80$$



50% means **half**.

Example:

$$50\% \text{ of } 80 \text{ is } \frac{50}{100} \times 80 = 40$$



5% means $\frac{5}{100}$ ths.

Example:

$$5\% \text{ of } 80 \text{ is } \frac{5}{100} \times 80 = 4$$

6.RP.3c

$$\frac{\%}{100} = \frac{\text{PART}}{\text{WHOLE}}$$

Percent Proportions 6.RP.3c

Example 1

Seventy-two percent of students at CCLCS have CCLCS swag. Since there are 243 students at the school, how many of them have CCLCS clothing?

$$\frac{72}{100} = \frac{x}{243}$$

$$72(243) = 100x$$

$$17,496 = 100x$$

$$x = 175 \text{ students}$$

Example 2

12 students in Mrs. Prchlik's math class have cats. This is 60% of her class. How many students are in her class?

$$\frac{60}{100} = \frac{12}{x}$$

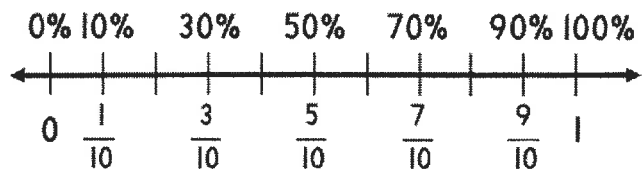
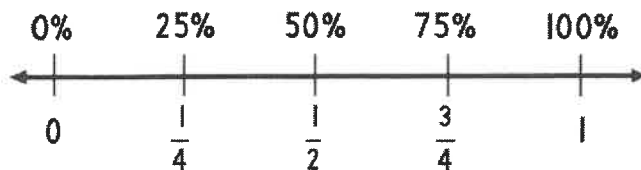
$$60x = 100(12)$$

$$60x = 1200$$

$$x = 20 \text{ students}$$

Percents 6.RP.3

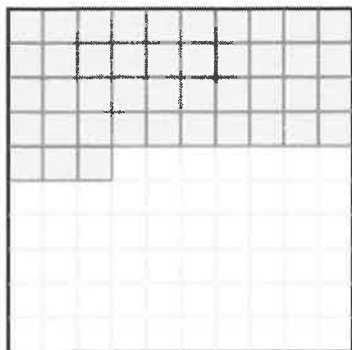
Percents on a Numberline



6.NS.3c

Practice Page

16. The square below represents one whole.

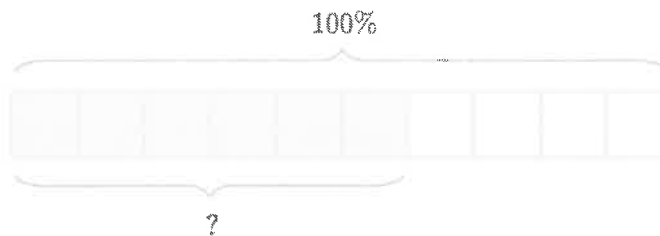


What fraction is represented by the shaded area?

What decimal is represented by the shaded area?

What percent is represented by the shaded area?

17. The tape diagram below represents 100%. What percent is represented by the shaded area?



19.
1 is 25% of what number?

Draw a model:

20. Find the part, whole, or percent.

a. What is 70% of 20?

b. 192 is what percent of 600?

18. When a grizzly bear hibernates, its heart rate drops to 10 beats per minute, which is 20% of its normal value.

What is a grizzly bear's normal heart rate when not hibernating?

c. 14 is 70% of what number?

Equations and Inequalities

Resource Page

CCSS: 6.EE.5, 6.EE.6, 6.EE.7, 6.EE.8

Solving Equations

Use **INVERSE OPERATIONS** to **UNDO** the equation.

- undo addition or subtraction
- undo multiplication or division
- isolate the variable
- check your work

$$\begin{aligned} 6x &= 36 \\ \frac{6x}{6} &= \frac{36}{6} \\ x &= 6 \\ 6(6) &= 36 \end{aligned}$$

Solving Inequalities

SAME STEPS as **SOLVING EQUATIONS!**

$$\begin{aligned} 2x &> 20 && \text{CHECK } \checkmark \\ x &> 10 && 2(11) > 20 \\ &&& 22 > 20 \end{aligned}$$

Graphing Inequalities

GRAPH the inequality statement on a number line to represent **THE POSSIBLE SOLUTIONS**.



VALUE IS INCLUDED



VALUE IS NOT INCLUDED

*Think of the open circle as a force field. It cannot be that value.

Remember this is a SOLUTION SET. x can be any number greater than ten.

For example:

$$x=10.5, x=11, x=12, x=20, x=20.25, x=100$$

Inequality vocab

Remember that each term can represent a different inequality symbol when writing inequalities.

<	≤	≥	>	=
<ul style="list-style-type: none"> • less than • is fewer than • is smaller than • below 	<ul style="list-style-type: none"> • less than or equal to • maximum • at most • is not more than • is not greater than 	<ul style="list-style-type: none"> • greater than or equal to • minimum • at least • is not less than • is not smaller than 	<ul style="list-style-type: none"> • greater than • is more than • is longer than • above 	<ul style="list-style-type: none"> • equal • is • same

Writing equations & Inequalities

- Determine what is being solved for and choose a variable (number of rides, number of feet, etc).
- Determine the result of the situation (total cost, total height, difference in weight, etc).

$$\begin{array}{|c|} \hline \$3 \text{ per} \\ \text{person} \\ \hline \end{array} = \begin{array}{|c|} \hline \text{total} \\ \text{cost} \\ \hline \end{array}$$

$3x \qquad 75$

$$\begin{array}{|c|} \hline 15 \text{ miles} \\ \hline \end{array} + \begin{array}{|c|} \hline x \text{ miles} \\ \hline \end{array} = \begin{array}{|c|} \hline \text{total} \\ \text{distance} \\ \hline \end{array}$$

$15 \qquad x \qquad 24$

Practice Page

31. ERROR: limitcheck, please confirm the OFFENDING COMMAND: Type42BuildGlyph
STACK: following inequality?
 $5m + 1 \leq 4$

- a. $m = 0$
- b. $m = 1$
- c. $m = 2$

6.EE.5

32. Solve each expression. You must **SHOW** the inverse operation.

- a. $p - 18 = 3$
- b. $25 = x + 12$
- c. $2.2 = z - 1.1$
- d. $k - 8 = 11.8$
- e. $2 = 3$