Unit 4

One-Step Equations & Inequalities

Direct Variation
Checking Solutions to Inequalities
Writing Inequalities
Graphing Inequalities on Number Lines
Checking Solutions to Equations
Solving Equations
Writing Equations

ANSWER KEY

Unit 4 IXL Log

	Required Skills	
	Skill	**Your Score**
Week of 12/9	**Z.1** (Does x satisfy an equation?)	
	BB.1 (Does (x, y) satisfy an equation?)	
	R.14 (Identify proportional relationships from graphs)	
	R.17 (Interpret graphs of proportional relationships)	
Week of 12/16	**AA.1** (Solutions to Inequalities)	
	AA.2 (Graph Inequalities on Number Lines)	
	AA.3 (Write Inequalities from Number Lines)	
WINTER BREAK! ☺		
Week of 1/6	**Z.2** (Which x satisfies an equation?)	
	Z.3 (Write an equation from words)	
	Z.4 (Model and solve equations with algebra tiles)	
	Z.NEW! (Solve One-Step Add/Sub Equations Wholes)	
Week of 1/13	**Z.NEW!** (Solve One-Step Mult/Div Equations Wholes)	
	Z.6 (Solve one-step equations with whole #s)	
	Z.8 (Solve one-step equation word problems)	

Unit 4: One-Step Equations and Inequalities
Standards, Checklist and Concept Map

Georgia Standards of Excellence (GSE):

GSE6.EE.5: Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine if a given number in a set makes an equation or inequality true.

GSE 6.EE.6: Use variables to represent numbers and write expression 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

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

GSE 6.EE.8 : Write an inequality of the form x > c or x < c to represent a constraint or condition in real-world problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

GSE 6.EE.9 : Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and use the equation d = 65t to show the relationship between distance and time.*

What Will I Need to Learn??

_____ Write expressions (from word problems) with a variable that represents a number

_____ To substitute to check the solution of an equation

_____ Write equations based on real-world problems

_____ Solve equations based on real-world problems

_____ To substitute to check the solution of an inequality

_____ Write inequalities to represent real-world problems and represent on number line

_____ Show relationships between two variables (independent and dependent) using an equation, a table, and a graph

Math 6

Unit 4 Calendar

12/9	12/10	12/11	12/12	12/13
Unit 4 Pre-test; Review of Units 1 - 3	Math Inventory	Intro to Equations: Checking Solutions	STEAM Direct Variation Intro	Direct Variation
12/16	**12/17**	**12/18**	**12/19**	**12/20**
Inequalities	Inequalities	Computer Lab: Finish MI, work on Touchstones and IXL	Early Release: Quiz on Direct Variation and Inequalities	Early Release: Holiday Graphing and Jingle Jam
❄ **Winter Break**				🎄
1/6	**1/7**	**1/8**	**1/9**	**1/10**
Computer Lab: Intro to Solving Equations	Solving Addition and Subtraction Equations	Solving Multiplication and Division Equations	Solving Equations	Quiz: Basic Solving Equations
1/13	**1/14**	**1/15**	**1/16**	**1/17**
Equations Word Problems	Equations Word Problems	Unit 4 Mini Post-Test and Review	Review	Unit 4 Test

Unit 4 - Vocabulary

Term	Definition
Constant of proportionality	The constant *k* in a direct variation equation; it is the ratio of $\frac{y}{x}$, or of $\frac{dependent\ variable}{independent\ variable}$. It is the same as unit rate.
Dependent Variable	The "output" or y value, which "depends" on the input (x value/independent variable)
Direct Variation (Direct Proportion)	A relationship between two variables, x (indpependent) and *y* (dependent) that can be written as $y = kx$, where $k \neq 0$
Equation	A mathematical sentence containing an equal sign, showing two equivalent values
Independent Variable	The "input" or x value, which determines the "output" or *y* value/dependent variable
Inequality	A statement showing that two values are NOT equal, using one of the following signs: $>, <, \geq, \leq$ or $\neq$
Inverse Operation	Opposite operations that "undo" each other
Variable	A symbol, usually a letter, that represents a number

Unit 4 – Vocabulary – <u>You Try</u>

Term	Definition and/or Example
Constant of proportionality	
Dependent Variable	
Direct Variation (Direct Proportion)	
Equation	
Independent Variable	
Inequality	
Inverse Operation	
Variable	

Math 6 – Unit 4: One-Step Equations and Inequalities Review #1

1) What are inverse operations? _____

_____

2) Write 3 key words that tell you to do addition and 3 key words that tell you to do subtraction in a word problem.

_____ _____ _____

_____ _____ _____

3) Jack's Candy Shop sold 8 lollipops today. He now has only 5 lollipops left to sell. How many lollipops did he have originally?

Draw a Picture:	Write your equation and ***SHOW ALL WORK!***
Solution:	
What does your variable represent?	Key Words:

4) Alex has some flowers and picks two more for her bouquet. She now has 11 flowers. How many flowers did she start out with?

Draw a Picture:	Write your equation and ***SHOW ALL WORK!***
Solution:	
What does your variable represent?	Key Words:

5) Mrs. Ledesma has x dollars. Amanda has 3 times more dollars than Mrs. Ledesma. If Amanda has $90, write an equation and solve for the number of dollars Mrs. Ledesma has.

Equation: _____ Solution: _____

Work:

6) Daneya spends half as many hours doing homework as her older brother, Dejon. If Daneya spends 4 hours doing her homework, write an equation and solve for the number of hours, x, that Dejon does homework.

Equation: _____ Solution: _____

Work:

Solve each equation. Show all steps. Include the "check".

7) $m + 25 = 39$

8) $12x = 138$

9) $m - 2.8 = 5.2$

10) $\frac{y}{7} = 21$

11) $3.5x = 70$

12) $\frac{m}{2} = 7.2$

Math 6 – Unit 4: One-Step Equations and Inequalities Review #2

1) When solving equations, why is it important to substitute your solution into the equation at the end? _____

_____

2) What is the difference between an open circle and a closed circle in an inequality? _____

_____

_____

Solve each equation. Remember to show all work!

3) $t - 1 = 11\frac{1}{2}$

4) $\frac{n}{5} = 10$

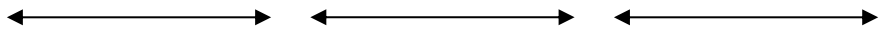
5) $x + \frac{1}{4} = 3\frac{1}{2}$

Graph the solution to each inequality.

6) $k \leq 7$

7) $a > 120$

8) $x \neq 3$



9) A quarterback threw a ball x total yards over 10 games. If he averaged 90 yards per game, write an equation that represents this situation and solve for x, the total number of yards thrown.

Equation: _____

Solution: _____

10) Janiah had x dollars in her bank account. After spending $182 on Christmas gifts, she has $200 left in her account. Write an equation and solve for x, the amount she originally had in her account.

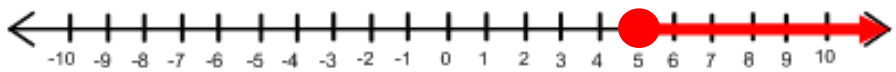
Equation: _____

Solution: _____

11) The weight limit on a cargo plane is 55 tons. Write an inequality to represent the weight limit, *w*, and graph it.

Inequality: _____ 

12) What inequality is graphed on the number line? _____



13) Maggie needs at least 15 lbs. of chocolate to make her chocolate fountain work. Write an inequality and graph it.

Inequality: _____ 

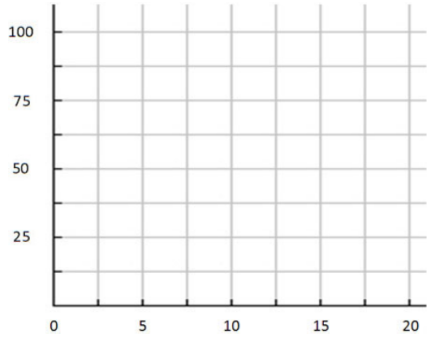
14) Which problem situation matches the equation 12x = 240?

a) Jamie sold 240 newspaper subscriptions each month for 12 months. What is x, the total number of newspaper subscriptions that Jamie sold in 1 year?
b) Brenna cycled a total of 240 miles this month. She cycled 12 miles less this month than last month. What is x, the number of miles Brenna cycled last month?
c) Mary charges $12 per hour for labor to paint houses. What is x, the number of hours Mary worked if she charged $240 for labor?
d) Sara bought 12 ride tickets and x game tickets. How many game tickets did she buy if she bought 240 tickets in all?

15) Andy makes $2.50 per chore he does on the weekends. Write a direct variation equation: _____

Fill in the (x,y) table of values and graph it.

x	y
0	
5	
	25
20	



16) Draw an example of a graph of direct variation. Then draw an example of a graph that is NOT a direct variation.

Equations & Parts of Equations

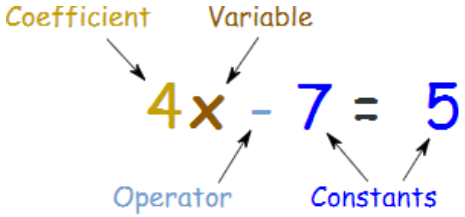
An _____ is a mathematical sentence containing an equal sign that shows two equivalent values.

$$x + 2 = 6$$

The equation says: **what is on the left (x + 2) is equal to what is on the right (6)**

So an equation is like a **statement** "*this* equals *that*".

Here we have an equation that says 4x − 7 equals 5, and all its parts:



A **Variable** is a symbol for a number we don't know yet. It is usually a letter like x or y.

A number on its own is called a **Constant**.

A **Coefficient** is a number used to multiply a variable (**4x** means **4** times **x**, so **4** is a coefficient)

An **Operator** is a symbol that shows an operation, ex: +, -, x, ÷.

Variables on their own (without a number next to them) actually have a coefficient of 1 (**x** is really the same as **1x**)

Solutions to Equations

Solutions to equations are values for the variables that make the **two sides equal**.

Think of a correct equation as a balanced scale.

If an equation has a variable you can check to see if a number is a solution to an equation by substituting the number in for the variable. If you get the same number on both sides, you have found a solution to the equation.

Example: EQUATION: $x + 15 = 27$

Is x=12 a solution?

x=12 is a solution because 12 + 15 = 27

Is x=10 a solution?

x=10 is NOT a solution because 10 + 15 ≠ 27

You Try:

1) Is x = 3 a solution to the equation, $x + 5 = 10$?
2) Is y = 5 a solution to the equation, $\frac{30}{y} = 6$??
3) Is z = 12 a solution to the equation, $8z = 95$?

You Try:

Determine if the following value for the variable is a solution to the equation. Write yes or no.

1) $9 + x = 21,\ for\ x = 11$

2) $n - 12 = 5,\ for\ n = 17$

3) $25r = 75,\ for\ r = 3$

4) $72 \div q = 8,\ for\ q = 9$

5) $28 + c = 43,\ for\ c = 15$

6) $u \div 11 = 10,\ for\ u = 111$

7) $\frac{k}{8} = 4,\ for\ k = 24$

8) $16x = 48,\ for\ x = 3$

9) $73 - f = 29,\ for\ f = 54$

10) $67 - j = 25,\ for\ j = 42$

11) $39 \div v = 13,\ for\ v = 3$

12) $88 + d = 100,\ for\ d = 2$

13) $14p = 20,\ for\ p = 5$

14) $6w = 30,\ for\ w = 5$

15) $7 + x = 70,\ for\ x = 10$

16) $6n = 174,\ for\ n = 29$

Replace each ◈ with a number that makes the equation correct.

17) $5 + 1 = 2 + ◈$

18) $10 - ◈ = 12 - 7$

19) $◈ \bullet 3 = 2 \bullet 9$

20) $28 \div 4 = 14 \div ◈$

21) $◈ + 8 = 6 + 3$

22) $12 \bullet 0 = ◈ \bullet 15$

Solving Equations

There are many different ways to solve equations, but in general, the best way to solve an equation is to use **inverse operations**!

Inverse operations are opposite operations that "**undo**" each other.

Addition is the inverse operation of _____ and **subtraction** is the inverse operation of _____.

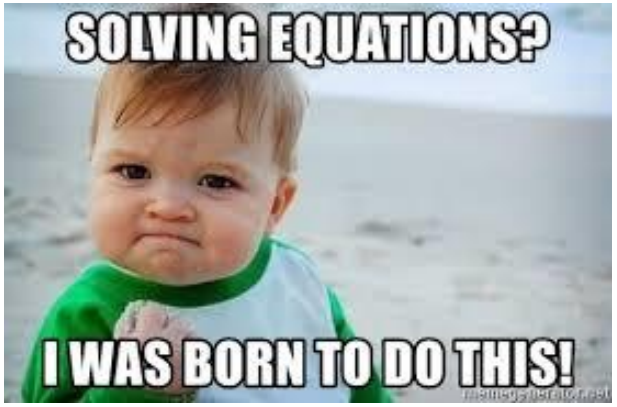
Multiplication is the inverse operation of _____ and **division** is the inverse operation of _____.

Steps to Solving Equations:

1st **Identify** the _____ _____.

2nd **Apply** the **inverse operation** to _____ sides of the equation to keep it balanced.

3rd **Check** your solution by substituting it back into the equation.



Subtraction Property of Equality

Words If you subtract the same number from each side of an equation, the two sides remain equal.

Examples

Numbers	Algebra
$5 = 5$	$x + 2 = 3$
$-3 = -3$	$-2 = -2$
$2 = 2$	$x = 1$

When you solve an equation by subtracting the same number from each side of the equation, you are using the **Subtraction Property of Equality**.

You Try:

1) $c + 2 = 5$ 2) $6 = x + 5$ 3) $3.5 + y = 12.75$

Division Property of Equality

Words If you divide each side of an equation by the same nonzero number, the two sides remain equal.

Examples

Numbers	Algebra
$18 = 18$	$3x = 12$
$\frac{18}{6} = \frac{18}{6}$	$\frac{3x}{3} = \frac{12}{3}$
$3 = 3$	$x = 4$

When you solve an equation by dividing both sides of the equation by the same number, you are using the **Division Property of Equality**.

You Try:

1) $3x = 15$ 2) $8 = 4x$ 3) $2x = 14$

Addition Property of Equality

Words If you add the same number to each side of an equation, the two sides remain equal.

Examples

Numbers	Algebra
$5 = 5$	$x - 2 = 3$
$+3 = +3$	$+2 = +2$
$8 = 8$	$x = 5$

When you solve an equation by adding the same number to each side of the equation, you are using the **Addition Property of Equality**.

You Try:

1) $x - 7 = 4$ 2) $y - 6 = 8$ 3) $9 = a - 5$

Multiplication Property of Equality

Words If you multiply each side of an equation by the same nonzero number, the two sides remain equal.

Examples

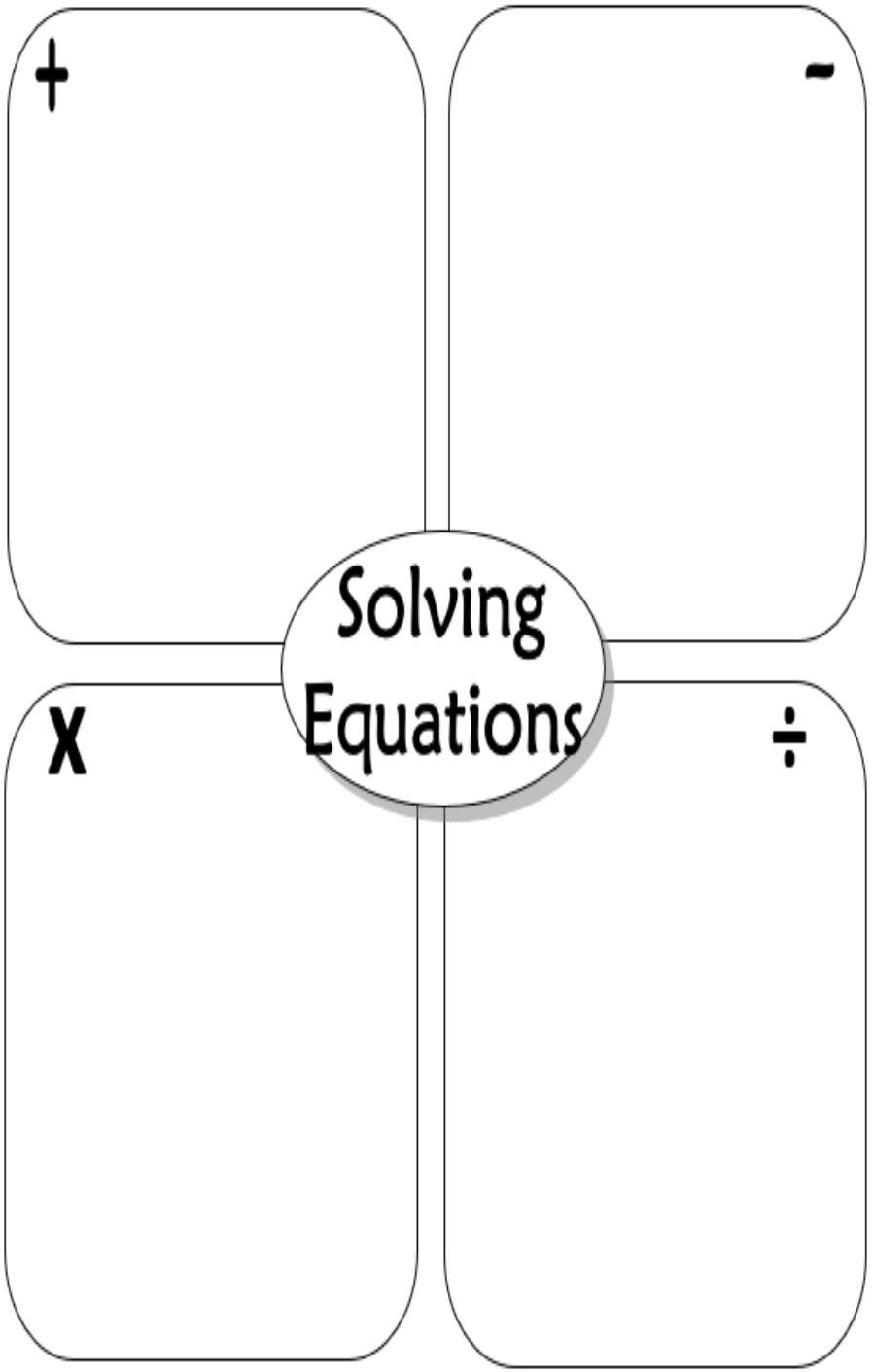
Numbers	Algebra
$3 = 3$	$\frac{x}{4} = 7$
$3(6) = 3(6)$	$\frac{x}{4}(4) = 7(4)$
$18 = 18$	$x = 28$

When you solve an equation by multiplying each side of the equation by the same number, you are using the **Multiplication Property of Equality**.

You Try:

1) $\frac{x}{8} = 9$ 2) $\frac{y}{4} = 8$ 3) $\frac{m}{5} = 9$

How to Solve Equations



Scaffolded Equation Solving

Use the organizer below to practice solving one-step-equations.

1	Problem	4x=48	Problem	
	Inverse Operation *(On **BOTH** Sides)*		Substitution	
	Solution		Check	

2	Problem	x – 8 = 11	Problem	
	Inverse Operation *(On **BOTH** Sides)*		Substitution	
	Solution		Check	

3	Problem	x + 13 = 42	Problem	
	Inverse Operation *(On **BOTH** Sides)*		Substitution	
	Solution		Check	

4	Problem	$\frac{x}{8} = 15$	Problem	
	Inverse Operation *(On **BOTH** Sides)*		Substitution	
	Solution		Check	

5	Problem	18x = 45	Problem	
	Inverse Operation *(On **BOTH** Sides)*		Substitution	
	Solution		Check	

6	Problem	x + 52 = 100	Problem	
	Inverse Operation *(On **BOTH** Sides)*		Substitution	
	Solution		Check	

More Equation Solving (+/-)

Solve each equation. Show <u>ALL</u> your work.

1) x + 4 = 5	2) x – 1 = 3
3) y – 3 = 4	4) y + 5 = 5
5) s + 8 = 9	6) s – 7 = 0
7) n – 6 = 3	8) n + 9 = 11

More Equation Solving (x/÷)

Solve each equation. Show <u>ALL</u> your work.

1) 5x = 250	2) $\frac{y}{14} = 7$
3) $\frac{n}{2} = 19$	4) $\frac{1}{6}$g = 54
5) 8.5b = 68	6) $\frac{h}{6} = 1.01$
7) $\frac{f}{4} = 9.25$	8) 7s = 4.9

More Equation Solving (Mixed)

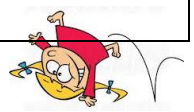
Solve each equation. Show <u>ALL</u> your work.

1) 6x = 96	2) $\frac{y}{18} = 5$
3) y – 84 = 212	4) y + 19 = 30
5) 4b = 48.8	6) $\frac{h}{3.2} = 10$
7) n – 5.7 = 12	8) n + 8 = 13.4

Equations Error Analysis

Sally is a silly little girl who makes mistakes! She would find them if she showed the "check," but she doesn't. ☹ In Column #1, analyze her work and *circle her mistake*. In Column #2, explain what she did wrong. In Column #3, show how Silly Sally should work out the problem correctly. Show ALL work… including the "check!"

Silly Sally's Work (Circle her mistake):	**What did Silly Sally do wrong?**	**Show Silly Sally how it's done! (Show ALL steps!)**
$x + 5 = 28$ $+5 \quad +5$ $x = 33$		
$\frac{12a}{12} = \frac{108}{12}$ $a = 8$		
$w - 42 = 18$ $+18 \quad +18$ $w = 36$		
$\frac{y}{15} = 3$ $\div 15 \quad \div 15$ $y = 5$		
$x + 23.45 = 32$ $-23.45 \quad -23.45$ $x = 9.45$		
$4\frac{1}{2}b = 36$ $\cdot 4\frac{1}{2} \quad \cdot 4\frac{1}{2}$ $b = 162$		



Equation Chains

Complete each equation chain:

1)	5 + a = 12	so a = _____
	ab = 14	so b = _____
	16 ÷ b = c	so c = _____
	14 – d = c	so d = _____
	e ÷ d = 3	so e = _____
	a + e = 25	***check***

2)	9f = 36	so f = _____
	g = 13 - f	so g = _____
	63 ÷ g = h	so h = _____
	h + i = 18	so i = _____
	j – i =9	so j = _____
	j ÷ f = 5	***Check***

3)	m ÷ 4 = 8	so m = _____
	m – n = 12	so n = _____
	np = 100	so p = _____
	q = 40 + p	so q = _____
	p + q -10 = r	so r = _____
	r – m = 8	***check***

2)	18 = v - 12	so v = _____
	v ÷ w = 3	so w = _____
	80 = wx	so x = _____
	w + x = 2y	so y = _____
	xy – z = 40	so z = _____
	z - v = 2	***Check***

Challenge: Create your own equation chain using these numbers for the variables: a = 10, b = 6, c = 18 and d = 3

Solving One-Step Equations Problems

You can solve a word problem using one-step equations.

1) Figure out **what you know** and **what you want to know**. What you want to know will be represented by a **variable**.
2) Set up an **equation** to solve for the unknown (variable).
3) Use **inverse operations** to solve.
4) Don't forget to **label** your solution and write it as statement.

Example:

Edgar jogs for 20 minutes. He stretched then jogs some more. Altogether, he jogs for 35 minutes. How far does he jog after he stretches?

What does your variable represent? _____

What operation is used in the equation? _____

What inverse operation will you use to solve? _____

Write the one-step equation to solve. _____

Solution: _____

Solution as a statement: _____

You Try:

1) Jan used 22 gallons of water in the shower. This amount is 7 gallons less than the amount she used for washing clothes. How much water does Jan use to wash clothes?

What does your variable represent? _____

What operation is used in the equation? _____

What inverse operation will you use to solve? _____

Write the one-step equation to solve. _____

Solution: _____

Solution as a statement: _____

2) While training for a sports event, Oliver hiked 5.3 miles each day. If he hiked for a total of 42.4 miles, how many days did Oliver hike?

What does your variable represent? _____

What operation is used in the equation? _____

What inverse operation will you use to solve? _____

Write the one-step equation to solve. _____

Solution: _____

Solution as a statement: _____

One-Step Equation Word Problems

For each problem, **write the equation**. **Show ALL steps** to solve.

1) Robyn had some video games, and then bought 13 more games. If she now has a total of 31 games, how many did she start out with?

2) Three friends found some money on the playground. They split the money evenly, and each person got $14. How much money did they find on the playground?

3) Josh sent 574 text messages over the last 7 days. On average, how many text messages did he send each day?

4) In a recent presidential election, Ohio had 18 electoral votes. This is 20 votes less than Texas had, how many electoral votes did Texas have?

5) Angelica spent $1.60 per mile in an Uber. If she paid a total of $8.80, how many miles did she travel?

6) Laiyanna gave 3/4 of her scrunchies to Lizzy. If she gave Lizzy 30 scrunchies, how many did Laiyanna begin with?

7) Do the equations $\frac{1}{5}y = 25$ and $\frac{y}{5} = 25$ have the same solutions? Show your work and explain your findings.

Inequalities

An **inequality** is a mathematical sentence that compares two quantities. We use the symbols and wording below to write inequalities.

Symbol	Meaning/Word Phrases	Example
$<$	is less than is fewer than is below	$3 < 5$
$>$	is greater than is more than is above	$8 > 4$
$\leq$	is less than or equal to at most no more than	$7 \leq 10$ $10 \leq 10$
$\geq$	is greater than or equal to at least no less than	$12 \geq 9$ $12 \geq 12$

Determining if a number is a solution to an inequality requires you to substitute the value into the inequality and check to see if the value makes the inequality true.

Example:

The "Dollar Savers" store sells everything less than $5. Would you be able to buy the following items at the "Dollar Savers" store? Use the inequality $x < 5$ to substitute. Circle Yes or No.

$2

Yes No

$5

Yes **No**

$4.50

Yes No

$5.25

Yes **No**

You Try:

1) To ride a roller coaster, you must be at least 48" tall. Write an inequality and substitute to determine who can ride the roller coaster. Circle Yes or No. **$x \geq 48$**

Silly Steve

40"

Yes **No**

Cool Carl

36"

Yes **No**

Laughing Lou

48"

Yes No

Toothy Tim

52"

Yes No

Circle all of the values that will satisfy each of the given inequalities.

2) $y > 8$	6	8	**9**	**15**
3) $m \leq 525$	**525**	**510**	**500**	650
4) $c < 22$	**12**	25	30	22
5) $f \geq 80$	**81**	0	75	**80**
6) $g \geq 27$	**27**	26	25	20
7) $n < 16$	**15**	**10**	**0**	16
8) $a > 48$	36	48	24	**64**
9) $z \leq 100$	**55**	**3**	110	**100**

Writing Inequalities

Inequalities can be written to represent many situations.

Examples:

There are at least 25 students in the auditorium.

$n \geq 25$ "at least" means greater than or equal to

n represents the number of students in the auditorium

No more than 150 people can occupy the room.

$r \leq 150$ "no more than" means less than or equal to

r represents the possible room capacity

You Try:

Write an inequality for each given situation.

1) You cannot eat more than 2 pieces of your Halloween candy per day. **X ≤ 2**

2) There are less than 15 people in the room. **X < 2**

3) There are at most 12 books on a shelf. **X ≤ 12**

4) There are fewer than 200 people at the game. **X < 200**

5) You must get at least 30 minutes of exercise each day. **X≥ 30**

6) You must be at least 15 to get your driver's permit. **X ≥ 15**

7) A pony is less than 14.2 hands tall. **X < 14.2**

8) You must be over 12 years old to ride the go karts. **X > 12**

9) The pig weighs at most 220 pounds. **X ≤ 220**

10) Every candy bar costs at least $2.20. **X ≥ 2.20**

11) You must complete at least 90% of your homework to attend the Homework Stars Celebration. **X ≥ 90**

12) There are no more than seven people on the boat. **X ≤ 7**

13) More than 40 people attended the movie last night. **X > 40**

14) You must be under 54" to ride the kiddie rides at Six Flags. **X < 54**

15) Getting at least 8 hours of sleep at night keeps you healthy. **X ≥ 8**

Graphing Inequalities

Inequalities can be graphed on a number line to illustrate all of the possible solutions.

1st draw a number line and include the number in your inequality.

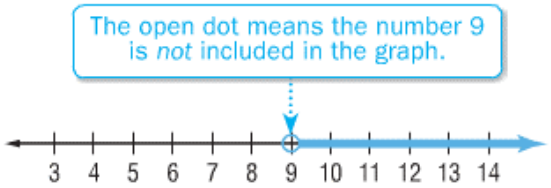
2nd draw an open or closed dot on the number (depending on which inequality symbol is in the inequality. Use an open dot (○) if the inequality has the greater than (>) or less than (<) symbol. Use a solid dot (•) if the inequality has the greater than or equal to (≥) or less than or equal to (≤) symbol.

3rd draw a line and an arrow that shows all of the possible solutions.

Examples:

***n* > 9**

Place an open dot at 9. Then draw a line and an arrow to the right.

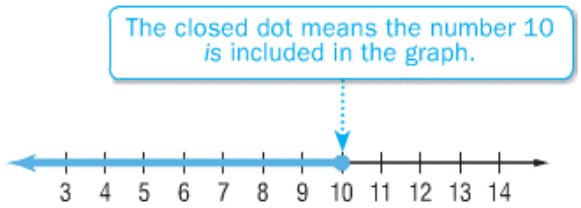


The values that lie on the line make the sentence true. All numbers greater than 9 make the sentence true.

equal to means included

***n* ≤ 10**

Place a closed dot at 10. Then draw a line and an arrow to the left.



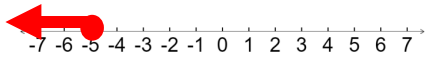
All numbers 10 and less make the sentence true.

TIP: If you keep the variable on the LEFT, the arrow at the end of your number line looks just like your inequality symbol.

You Try:

Graph the following inequalities on a number line. Then write a word phrase to describe each inequality.

1) n ≤ -5



N is less than or equal to -5

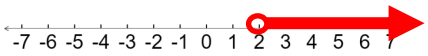
2) n ≤ 5

n is less than or equal to 5

3) n < 1

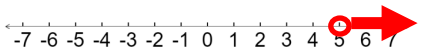
N is less than 1

4) r > 2



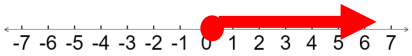
r is greater than 2

5) n > 5



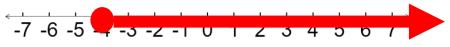
N is greater than 5

6) n ≥ 0



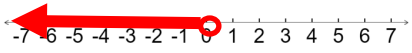
n is at least 0

7) n ≥ -4



N is no less than -4

8) n < 0

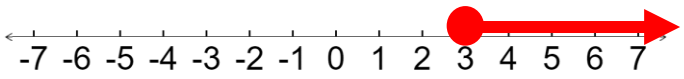


n is below 0

Write the inequality AND graph for each problem below in 7 - 10

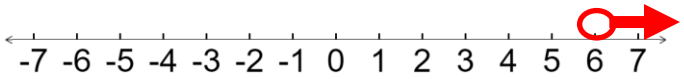
7) Post Malone has **at least 3 fans** in Mrs. Bothers's 3rd period math class.

Inequality: **f ≥ 3**

Graph: 

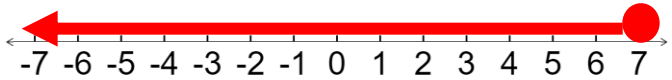
8) Mr. Shaw should send Mrs. Shaw **more than 6 roses per day**.

Inequality: **r > 6**

Graph: 

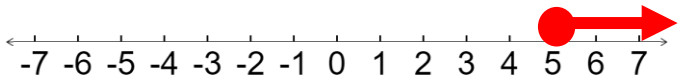
9) Shawn snuck into a G Rated movie because he thought you had to be **at most 7 years old**.

Inequality: **y ≤ 7**

Graph: 

10) When trick or treating, Daniella's dream came true. A lady told her she could take **no less than 5 pieces of candy**.

Inequality: **c ≥ 5**

Graph: 

More Practice with Inequalities

Write an inequality for each problem & graph on a number line.

1) Students must score at least 800 to pass the CRCT. _____

2) You must be shorter than 48" to ride the kiddie train. _____

3) You should brush your teeth at least twice a day. _____

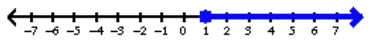
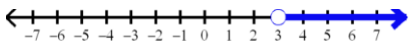
4) A good credit score is higher than 699. _____

5) Classes can have no more than 34 students. _____

6) AJ needs to save more than $500. _____

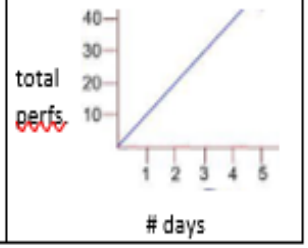
7) A book costs less than $20. _____

More Inequalities Practice

1) Which number is a solution to the inequality below? **x > 4** a) 1 b) 2 c) 4 d) 5	2) Which number is NOT a solution to the inequality below? **x ≤ 8** a) 6 b) 7 c) 8 d) 9
3) Which statement describes "a number more than 22"? a) x < 22 b) x > 22 c) x ≤ 22 d) x ≥ 22	4) Which statement describes "a number less than or equal to 43"? a) x < 43 b) x > 43 c) x ≤ 43 d) x ≥ 43
5) Which statement describes " a number no more than 17"? a) x < 17 b) x > 17 c) x ≤ 17 d) x ≥ 17	6) Which statement describes "at least 32"? a) x < 32 b) x > 32 c) x ≤ 32 d) x ≥ 32
7) Which number is a solution to x + 4 > 12 a) 3 b) 5 c) 7 d) 9	8) Which number is **NOT** a solution to **x – 3 < 10** a) 7 b) 8 c) 10 d) 14
9) Which number is a solution to **3x > 12** a) 4 b) 5 c) 2 d) 3	10) Which number is **NOT** a solution to **2x ≤ 10** a) 3 b) 4 c) 5 d) 6
11) Which inequality matches the graph below?  a) n > 1 b) n ≤ 1 c) n ≥ 1 d) n ≥ -1	12) Which inequality matches the graph below?  a) v > -3 b) v > 3 c) v ≤ -3 d) v < 3

Putting It All Together...

What exactly IS Direct Variation??

What?	Meaning...	Example:
1: The Situation	You have a problem or situation with a _____ variable; in other words, one number, the "k", will stay the same.	Bozo performs in 10 circus acts per day. *(10 is the constant, k, because it stays the same)*
2. The Rule	An equation written as _____, where k is the constant.	y = 10x *(x represents the # days y represents the total # of circus acts)*
3. The Table of Ordered Pairs (x,y)	For every _____, x, there is one _____, y. Each (x,y) pair gives you an ordered pair you can graph on a coordinate plane. FYI: The x value is the _____ variable, and the y value is the _____ variable.	Plug in input values for x. In 0 days, Bozo performs 0 times. In 1 day, he performs 10 times, and so on. Write the data in a table: X | Y 0 | 0 1 | 10 2 | 20 3 | 30 *Each set is an ordered pair to be graphed, such as (0,0), (1,10), etc.*
4. The Graph	The ordered pairs can be _____. Because x and y vary proportionally, they will ALWAYS: 1) start at (0,0) 2) form a straight line	Bozo's Performances 

Practice with Functions and Tables

Just the Basics ~

_____ represents the "constant of proportionality," or unit rate. As x and y values change, this stays the same.

_____ _____ is the relation between 2 quantities that are proportional (they have the same unit rate).

When one variable increases, the other variable _____.

If your y values are smaller than your x values, this means that k must be a _____ or a _____.

Using the given rules, find the missing **x** and ***y*** values.

1) ***y* = 9x**

x	0	2	3	5	8
y					

2) ***y* = 12x**

x	1		6		12
y		48		120	

3) ***y* = 1.25x**

x	0	2	4	6	8
y					

4) $y = \frac{2}{5}x$

x	0	4	9		20
y				4	

Using the given values, determine the equations in terms of *y=kx*

5) Rule: _____

x	0	1	2	3	4
y	0	5	10	15	20

How do you know this rule works?

_____

_____

6) Rule: _____

x	1		6		12
y		48		120	

How do you know this rule works?

_____

_____

Direct Variation Problem Solving

1) Vanessa is purchasing tickets to a Bebe Rexha concert. Tickets cost $35 apiece.

What is the constant of variation, ***k***? _____

x, the input/ind. variable represents: _____

y, the output/dep. variable represents: _____

What direct variation equation represents this situation?

_____

Complete the chart below using your equation.

x	0	2	3	4	6
y					

2) TJ is saving up for a new Fortnite skin. He earns $7.50 for each chore he does.

What is the constant of variation, ***k***? _____

x, the input/ind. variable represents: _____

y, the output/dep. variable represents: _____

What direct variation equation represents this situation?

_____

Complete the chart below using your equation.

x	0	2	10	15	50
y					

3) There are 37 boys in the drama club. They want to buy new props, so they are all going to pitch in some money. They all want to pitch in the same amount.

What is the constant of variation, ***k***? _____

x, the input/ind. variable represents: _____

y, the output/dep. variable represents: _____

What direct variation equation represents this situation?

_____

Complete the chart below using your equation.

x	0	2	3	5	10
y					

4) The students in math class earn one Jolly Rancher for every 3 homework assignments that they complete.

What is the constant of variation, ***k***? _____

x, the input/ind. variable represents: _____

y, the output/dep. variable represents: _____

What direct variation equation represents this situation?

_____

Complete the chart below using your equation.

x	0	3	9	18	27
y					

5) The direct variation ALWAYS uses the formula ***y = kx***

Therefore, when x = 0, y always equals _____.

Graphing Direct Variation

In direct variation, your (x,y) data creates ordered pairs that can be graphed.

A direct variation graph will **ALWAYS** begin at the point (____,____).

A direct variation graph will **ALWAYS** be a _____ _____.

Example:

Anthony is selling lemonade for $2 per cup. Write an equation.

$y = 2x$

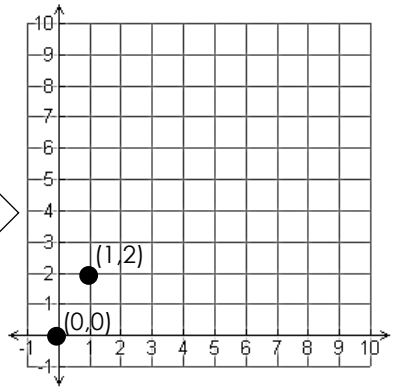
y represents the total $ made; this is the *output*, or dependent variable

2 is the constant (k)

x represents how many cups are sold; this is the *input*, or the *independent* variable

x (cups sold)	y ($)
0	0
1	2
2	
4	

Graph the ordered pairs.

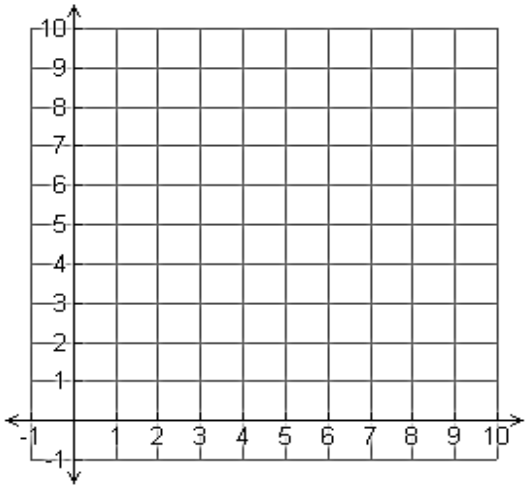


You Try:

Use the direct variation equation to complete the table and then graph the ordered pairs.

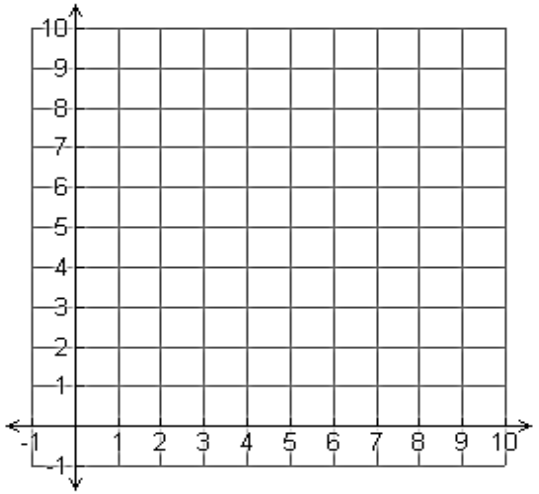
1)

$y = 3x$	**x**	0	1	2	3
	y				



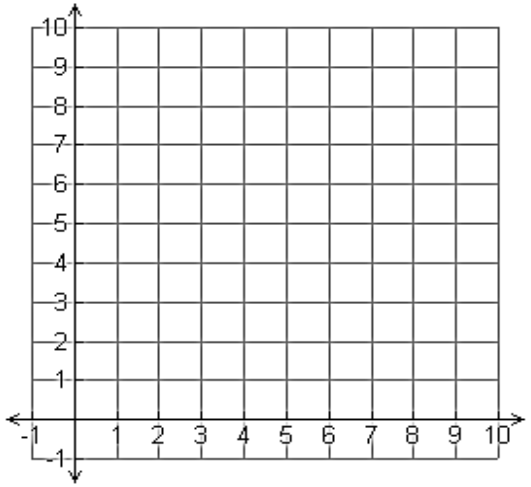
2)

$y = \frac{1}{2}x$	**x**		2	6	8	
	y	0				5



3)

$y = 0.8x$	**x**	0	1	4		
	y				4.8	8



4)

$y = 2x$	**x**	0	2	3	4	
	y					10