

ALGEBRA 1 SUMMER ASSIGNMENT

This assignment will help you to prepare for Algebra 1 by reviewing some of the things you learned in Middle School. If you cannot remember how to solve certain problems, look at the examples at the top of the page. You may also use the links below for more assistance:

<http://www.purplemath.com/modules/index.htm>

www.khanacademy.com

<http://regentsprep.org/Regents/math/ALGEBRA/math-ALGEBRA.htm>

NAME: _____

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Variables and Expressions

Phrase	Symbol
Sum	+
Difference	-
Product	X
Quotient	÷
Less than	-
More than	+

Example: Write an algebraic expression for *5 minus a number d*.

$$5 - d$$

Exercises: Write an algebraic expression for the following word phrases:

1. 5 plus a number h 2. 11 fewer than a number k

3. The product of 5 and g 4. The quotient of 17 and b

Write a word phrase for each algebraic expression:

5. $a + 6$ 6. $y - 5$ 7. $j * 10$

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Order of Operations and Evaluating

***Remember: Order of Operations**

P.E.M.D.A.S

Parenthesis, Exponents, Multiplication, Division, Addition and Subtraction

Example: Evaluate $3 + 8 - 10 \div 5$

$$\begin{aligned} &= 3 + 8 - 2 && \text{Do any multiplication or division from left to right} \\ &= 11 - 2 && \text{Do any addition or subtraction from left to right.} \\ &= 9 \end{aligned}$$

Exercises: Simplify each expression. Be sure to follow order of operations!

1. $(4 + 7)^2$

2. $(8 - 2)(5 - 6)$

3. $(31 - 3) \div 4$

4. $\left(\frac{27+3}{5}\right)$

5. $30 - 15 \div 3$

6. $20 + 16 \div 2 - 5$

7. $(2^2 + 6)^2$

8. $4 * 6 - 2^2 * 2 \div 4$

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Distributive Property

The distributive property requires you to multiply (distribute) a number or variable to everything inside the parenthesis it is attached to.

Example: Simplify the following using the Distributive Property: $7(x + 2)$

$7(x + 2)$ Take number in front and “distribute” to terms in parenthesis

$7(x) + 7(2)$ Instead of writing it like this, **most draw arcs** to show distributing

$7x + 14$ Simplify

Exercises: Simplify the following using Distributive Property:

1. $8(b + 3)$

2. $3(-4 - x)$

3. $6(2d + 1)$

4. $-10(9 - 8x)$

Simplify each expression (Remember negative times a negative is a)

5. $-(n + 5)$

6. $-(-12a - 3)$

7. $-(y - 2)$

8. $-(-m + 1)$

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Combining Like Terms

Sometimes simplifying is more than just using order of operations. Sometimes, you may need to combine like terms. Remember, like terms have **the same variable and exponents!** If they are not the same, they are not like terms and therefore cannot be combined.

Examples: A) $4x + 9x$

B) $5x^2 - 12x^2$

Answer: $13x$

Answer: $-7x^2$

Exercises: Simplify the following expressions by combining like terms:

1. $13x + 7x$

2. $18g - 14g$

3. $-8j + 4j$

4. $-23c - 12c$

5. $10s^2 + 16s^2$

6. $-19b^2 - 2b^2$

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One Step Equations

To solve one step equations, you must use the **inverse** (opposite) operation!

Remember your end goal is to get the variable **by itself**.

Addition $\leftarrow \rightarrow$ Subtraction

Multiplication $\leftarrow \rightarrow$ Division

Example: a. $x - 7 = 14$

b. $6b = 36$

c. $\frac{f}{3} = 4$

(Add 7 to both sides)

(Divide by 6 both sides)

(Multiply by 3 both sides)

Answer: $x = 21$

Answer: $b = 6$

Answer: $f = 12$

Exercises: Solve the following equations using addition or subtraction.

1. $n - 2 = 3$

2. $h + 7 = -7$

3. $k - 12 = -12$

4. $d + 5 = 15$

5. $b - 9 = -26$

6. $y + 9 = 3$

Exercises: Solve the following equations using multiplication or division.

7. $\frac{v}{2} = 8$

8. $5x = -25$

9. $10 = \frac{c}{8}$

10. $-4g = -24$

11. $\frac{p}{-3} = -3$

12. $28 = -7z$

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Two Step Equations

To solve two step equations, you must use the inverse (opposite) operation more than once! Remember your end goal is to get the variable by itself.

Example: $4x - 9 = 27$

$$4x = 36 \quad \text{Add 9 to both sides}$$

$$x = 9 \quad \text{Divide both sides by 4}$$

Example: $18 = \frac{h}{2} + 3$

$$15 = \frac{h}{2} \quad \text{Subtract 3 from both sides first}$$

$$30 = h \quad \text{Multiply both sides by 2}$$

Exercises: Solve each equation

1. $5x - 8 = 32$

2. $13 - 2k = 37$

3. $-a + 8 = -7$

4. $\frac{r}{4} + 18 = 20$

5. $14 = -6 + \frac{y}{-2}$

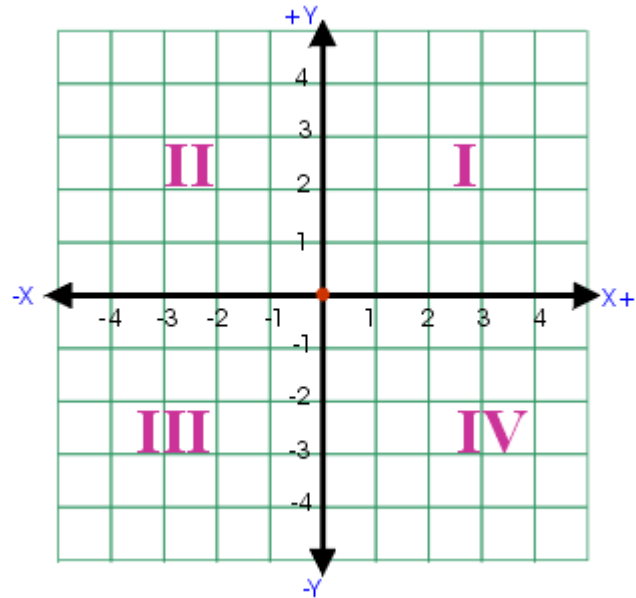
6. $\frac{f+2}{5} = -5$

The Coordinate Plane

This is a **coordinate plane**. It has two axes and four quadrants. The two number lines form the axes. The horizontal number line is called the **x-axis** and the vertical number line is called the **y-axis**.

The center of the coordinate plane is called the **origin**. It has the coordinates of (0,0).

Locations of points on the plane can be plotted when one coordinate from each of the axes are used. This set of x and y values are called **ordered pairs**.

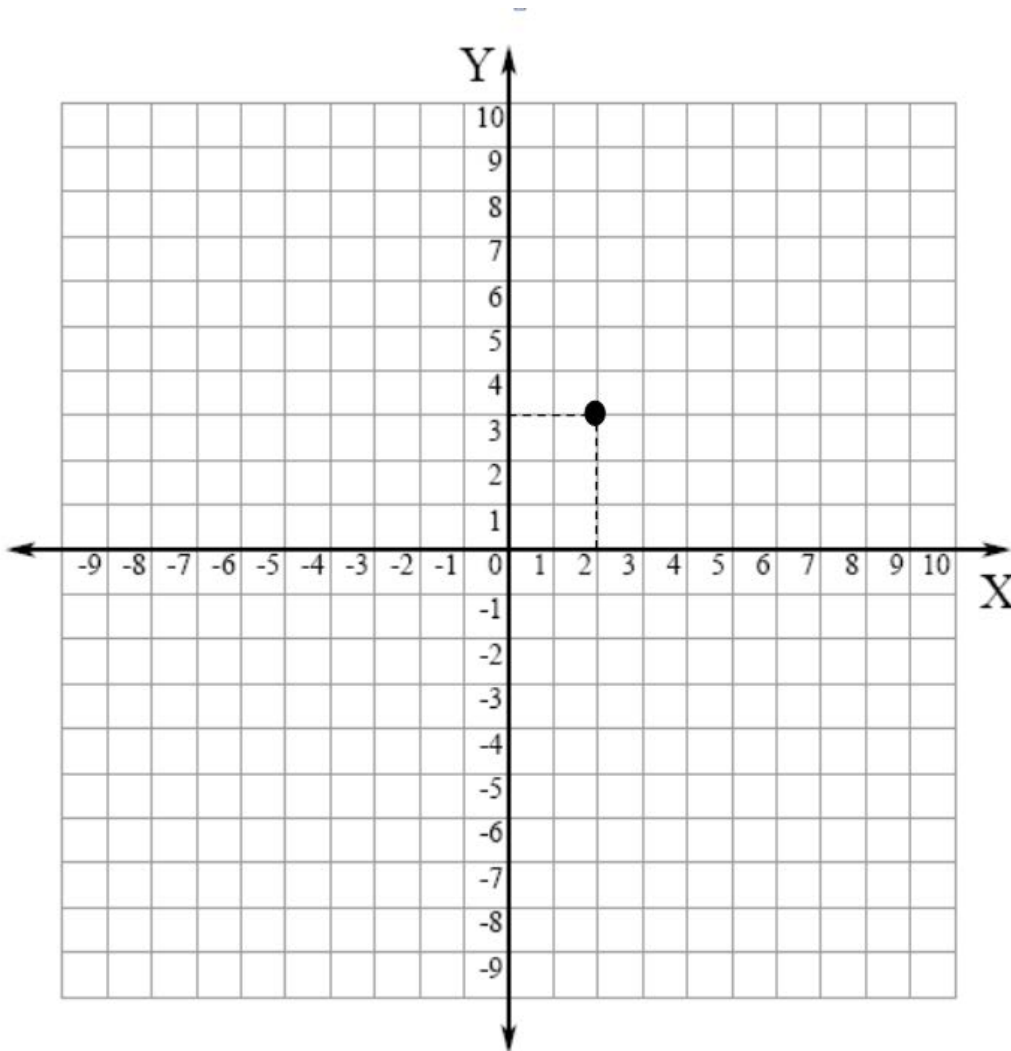


State the quadrant or axis that each point lies in.

- 1) $J(5, 10)$ _____
- 2) $G(-6, 8)$ _____
- 3) $D(-8, -4)$ _____
- 4) $A(-8, 1)$ _____
- 5) $I(1, 9)$ _____
- 6) $F(9, 0)$ _____
- 7) $C(0, 5)$ _____
- 8) $H(6, -9)$ _____
- 9) $E(6, 0)$ _____
- 10) $B(1, 1)$ _____

Plotting Points

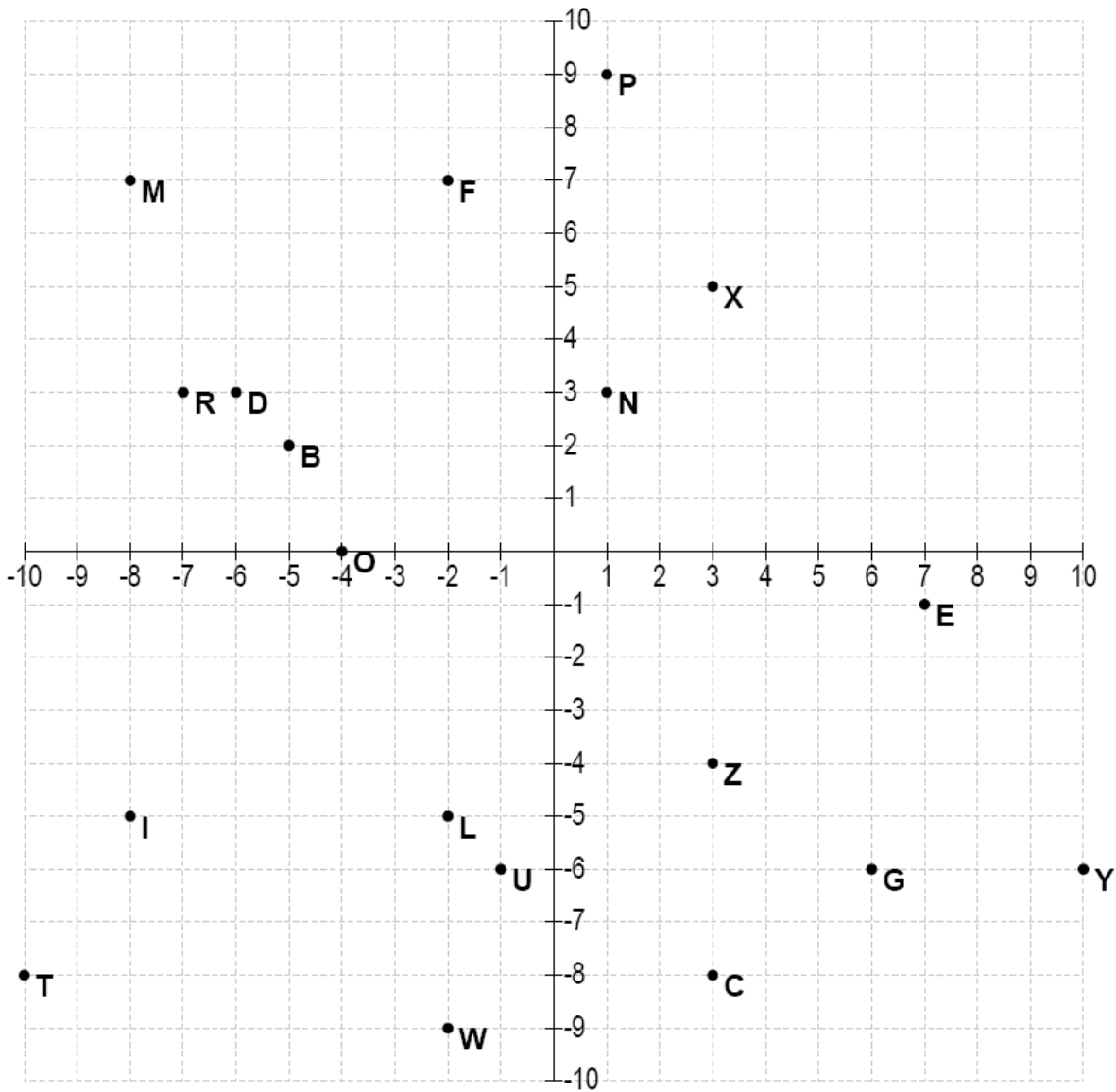
The first coordinate of a plotted point is called the '**x**' coordinate. The '**x**' coordinate is the horizontal distance from the origin to the plotted point. The second coordinate of a plotted point is called the '**y**' coordinate. The '**y**' coordinate is the vertical distance from the origin to the plotted point. So, to locate the point: (2, 3) on our graph below, we start at the origin and move 2 units horizontally and 3 units vertically. When locating points, **positive** '**x**' values are to the **right** of the origin, while **negative** '**x**' values are to the **left** of the origin. Also, positive '**y**' values are above the origin, while negative '**y**' values are below the origin.



Plot each of the points on the graph:

- | | | |
|---------------------------|---------------------------|----------------------------|
| (1) Point D at (0, 10) | (5) Point E at (-4, -8) | (9) Point P at (-9, -10) |
| (2) Point J at (-1, 6) | (6) Point F at (5, 6) | (10) Point G at (-7, 9) |
| (3) Point O at (-8, 1) | (7) Point S at (-8, 2) | (11) Point Z at (-7, -5) |
| (4) Point B at (-9, -3) | (8) Point H at (6, 8) | (12) Point Y at (0, -8) |

Plotting Points



Write the coordinates of each point:

1) Point L: _____ 6) Point F: _____ 11) Point N: _____ 16) Point O: _____

2) Point U: _____ 7) Point X: _____ 12) Point D: _____ 17) Point W: _____

3) Point B: _____ 8) Point I: _____ 13) Point Y: _____ 18) Point T: _____

4) Point P: _____ 9) Point G: _____ 14) Point R: _____

5) Point C: _____ 10) Point M: _____ 15) Point E: _____