Name: _____

Middle School: _____

Welcome to your first KCHS math class!

SUMMER PACKET ALGEBRA 1

For this coming school year, you are enrolled in Algebra 1. This packet is meant to review material that you did in Pre-Algebra, as well as prepare you for your Algebra 1 class here at KCHS.

The expectations are as follows:

- **Packet is to be complete by the first week of school.**
- **ALL work must be shown throughout the packet.**
- **Packet will count as a participation grade in Quarter 1**
- **Test on packet will be given within first two weeks of being at school.**

We are so excited to have you here at Catholic and look forward to meeting you!

Go IRISH!

TABLE OF CONTENTS:

MULTIPLICATION PRACTICE:

NO CALCULATOR –

You will not be allowed a calculator on a test either.

$7 \times 5 =$	$11 \times 10 =$	$5 \times 1 =$	$8 \times 8 =$
$11 \times 6 =$	$4 \times 12 =$	$6 \times 12 =$	$3 \times 7 =$
$7 \times 9 =$	$3 \times 6 =$	$12 \times 11 =$	$5 \times 9 =$
$4 \times 4 =$	$6 \times 5 =$	$1 \times 8 =$	$5 \times 7 =$
$10 \times 5 =$	$9 \times 12 =$	$10 \times 11 =$	$1 \times 7 =$
$11 \times 5 =$	$5 \times 2 =$	$7 \times 4 =$	$1 \times 12 =$
$3 \times 9 =$	$9 \times 7 =$	$8 \times 12 =$	$5 \times 4 =$
$2 \times 11 =$	$1 \times 9 =$	$5 \times 6 =$	$9 \times 4 =$
$3 \times 9 =$	$9 \times 9 =$	$7 \times 7 =$	$10 \times 6 =$
$2 \times 11 =$	$9 \times 6 =$	$10 \times 10 =$	$12 \times 4 =$
$6 \times 3 =$	$5 \times 3 =$	$5 \times 5 =$	$3 \times 1 =$
$3 \times 5 =$	$2 \times 5 =$	$12 \times 10 =$	$6 \times 11 =$
$12 \times 12 =$	$4 \times 11 =$	$11 \times 4 =$	$9 \times 2 =$
$12 \times 8 =$	$1 \times 6 =$	$6 \times 6 =$	$4 \times 9 =$
$6 \times 12 =$	$10 \times 9 =$	$5 \times 9 =$	$3 \times 3 =$
$7 \times 8 =$	$9 \times 10 =$	$11 \times 11 =$	$8 \times 4 =$
$3 \times 2 =$	$7 \times 11 =$	$12 \times 3 =$	$8 \times 6 =$
$7 \times 11 =$	$1 \times 11 =$	$4 \times 2 =$	$5 \times 8 =$
$2 \times 12 =$	$8 \times 3 =$	$11 \times 3 =$	$10 \times 1 =$
$12 \times 7 =$	$2 \times 8 =$	$4 \times 5 =$	$6 \times 8 =$
$7 \times 6 =$	$10 \times 8 =$	$11 \times 2 =$	$6 \times 10 =$
$2 \times 6 =$	$12 \times 1 =$	$3 \times 8 =$	$6 \times 4 =$
$7 \times 2 =$	$10 \times 5 =$	$8 \times 9 =$	$8 \times 1 =$
$8 \times 1 =$	$9 \times 11 =$	$12 \times 9 =$	$12 \times 2 =$

Adding and Subtracting with Negatives:

NO CALCULATOR –

You will not be allowed a calculator on a test either.

$5 + (-3) =$

$5 - (-3) =$

$2 + (-4) =$

$2 - (-4) =$

$(-5) + 3 =$

$(-5) - 3 =$

$(-3) + 6 =$

$(-3) - 6 =$

$2 + (-5) =$

$2 - (-5) =$

$7 + (-1) =$

$7 - (-1) =$

$1 + (-6) =$

$1 - (-6) =$

$(-4) + (-5) =$

$(-4) - (-5) =$

$(-3) - (-7) =$

$(-3) + (-7) =$

$4 + (-6) =$

$4 - (-6) =$

$3 + (-4) =$

$(-4) - 5 =$

$(-6) + 5 =$

$2 - (-6) =$

$3 + (-5) =$

$5 - (-3) =$

$8 + (-7) =$

$(-3) - (-4) =$

$7 + (-10) =$

$(-1) - 7 =$

$(-6) + 11 =$

$(-8) - (-10) =$

$(-10) + 7 =$

$8 - 12 =$

$4 + (-11) =$

$(-6) - 3 =$

$(-5) + (-4) =$

$(-2) - (-10) =$

$(-8) + 15 =$

$(-7) - (-12) =$

Multiplying and Dividing with Negatives:

When you multiply/divide to negative numbers you get a positive or negative number.

When you multiply/divide a negative number by a positive number you get a positive or negative number.

NO CALCULATOR –

You will not be allowed a calculator on a test either.

B) Work out the multiple and division questions.

$(-8) \times 4 =$

$(-50) \div 10 =$

$5 \times (-9) =$

$21 \div (-7) =$

$(-7) \times (-5) =$

$(-18) \div (-6) =$

$(-8) \times 10 =$

$36 \div (-3) =$

$(-5) \times 0 =$

$(-42) \div 6 =$

$(-6) \times (-8) =$

$(-32) \div (-4) =$

$(-12) \times 3 =$

$0 \div (-9) =$

$(-8) \times (-7)$

$(-6) \times 12 =$

$48 \div (-6) =$

$(-80) \div 4 =$

$(-15) \times (-10) =$

$108 \div (-9) =$

A) Fill in the missing numbers.

$(-8) \times$ _____ $= -36$

$44 \div$ _____ $= -11$

$(-3) \times$ _____ $= 27$

$(-48) \div$ _____ $= -4$

_____ $\times 5 = -55$

_____ $\div (-7) = 4$

_____ $\times (-9) = -63$

_____ $\div 11 = -8$

Order of Operations:

NO CALCULATOR –

You will not be allowed a calculator on a test either.

It is important to not have different results for the same math problems. To avoid this issue, mathematicians came up with an order of operations that all math problems must follow.

An easy way to remember these steps is to use an acronym by PEMDAS.

Many people know this acronym as:

PLEASE, EXCUSE, MY, DEAR, AUNT, SALLY

P: Parenthesis (or any brackets)

E: Exponents

M: Multiplication

D: Division

A: Addition

S: Subtraction

Think of MD and AS as buddies:

Multiplication/division goes from left to right.

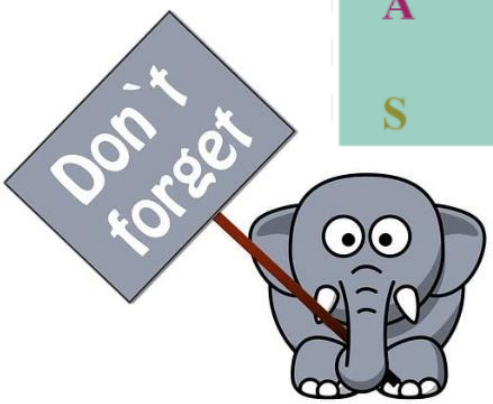
Addition/Subtraction goes from left to right.

EXAMPLES:

$$2 - 3^2 + (6 + 3 \times 2)$$
$$2 - 3^2 + (6 + 6)$$
$$2 - 3^2 + 12$$
$$2 - 9 + 12$$
$$-7 + 12$$
$$5$$

$$-7 + 4 + (2^3 - 8 \div -4)$$
$$-7 + 4 + (8 - 8 \div -4)$$
$$-7 + 4 + (8 - -2)$$
$$-7 + 4 + 10$$
$$-3 + 10$$
$$7$$

P	( )	Parentheses
E	x^2	Exponents
M	×	Multiplication
	or	and
D	÷	Division
A	+	Addition
	or	and
S	−	Subtraction



Try them on your own:

WRITE OUT EACH STEP YOU TAKE (IN ORDER ACCORDING TO PEMDAS)

DO NOT just write a final answer.

1. $6 + 4 - 2 \times 3 =$

3. $15 \div 3 \times 5 - 4 =$

4. $20 - 7 \times 4 =$

5. $50 - (17 + 8) =$

6. $10 \times (3 - 6^2) + 8 \div 2 =$

7. $(-2) \times 3 + 5 - 7 =$

8. $(12 - 4) \div 8 =$

9. $12 \div 3 - 6 \times 2 - 8 \div 4 =$

10. $18 - 4^2 + 7 =$

11. $3(2 + 7) - 9 \times 7 =$

Rounding

Step 1: Underline the place value to which you want to round.

Step 2: Look to the number of the right of your underlined number. Decide if that number is 5 OR MORE.

Step 3: If the number is 5 OR MORE, the underlined number will go up 1. If the number is LESS THAN 5, the number stays the same.

Decimal Place Value Chart									
Ten Thousands	Thousands	Hundreds	Tens	Ones	•	Tenths	Hundredths	Thousandths	Ten Thousandths
		7	8	6	.	4	3	2	

EXAMPLES:

Round the following number to the tenth decimal place.

23.1246

1. Underline the tenth decimal place (1)

2. Look at the number to the right

a. It is 2, which is less than 5.

3. This means the 1 stays the same.

Answer:

23. 1

Round the following number to the tenth decimal place.

64.2685

1. Underline the tenth decimal place (2)

2. Look at the number to the right

a. It is 6, which is more than 5

3. This means the 2 goes up to 3..

Answer:

64. 3

Round the following numbers to the tenths place:

1. 18.6231
2. 0.2653
3. 25.0153
4. 100.9185

Round the following numbers to the hundredth place:

1. 3.1925
2. 0.6701
3. 19.9816
4. 18.9862

4 or less LET IT REST....

5 or more RAISE THE SCORE....

Evaluating Expressions

Example #1:

Evaluate the expression when $x = 5$

Directions: Rewrite each expression substituting the 5 for the x.

a. $5x = 5(5) = 25$

b. $-2x = -2(5) = -10$

c. $5x - 15 = 5(5) - 15 = 25 - 15 = 10$

Example #2

Evaluate the expression when x = 3 and y = 4

Directions: Rewrite each expression substituting the 3 for the x and the 4 for the y.

a. $x + y = 3 + 4 = 7$

b. $2xy = 2(3)(4) = 24$

c. $2(x + y) = 2(3 + 4) = 2(7) = 14$

Expression	Substitute and Simplify (Show your Work)	Final Answer
$3x$		
$2(x+z)-y$		
$y+4$		
$5z-6$		
$xy+z$		
$2x+3y-z$		
$5x-(y+2z)$		
$\frac{xy}{2}$		
$2x(y+z)$		
$5z-(y-x)$		
$4x+2y-z$		
$\frac{yz}{2}$		

Combining Like Terms

What is **a term?**	The parts of an algebraic expression that are separated by an addition or subtraction sign are called **terms**.
What is **a like term?**	Terms with the same variable factors are called like terms. 2n and 3n are like terms, but 4x and 3y are NOT like terms because their variable factors x and y are different.

Examples:

Combine ALL like terms to simplify the expression completely.

$$x - 7x = -6x$$

$$3n - 7 + 2n - 4 = 5n - 11$$

How to Combine Like Terms

To Combine Like Terms, we add together items that are the same to make a simplified shorter list of items.

Consider the following family take-away order:

We can write this in Algebra as: **2b + f + d + 3b + 2f + 2d**

If we combine like items, we get a simplified list as follows:

5b + 3f + 3d ✓

$6n + 5n$	$25b + 15b$
$x - 5x$	$3n - 2n + 5 - 6$
$5r + 7r - 6$	$4t - 11y + 6t$
$2m + 3n - 5m + 6n$	$r - 2r$
$5p - 11p + 6r$	$6p - 4f + 3b + 7p + 7f - 2b$

Kevin, Rachel, and Logan all went to the ice cream shop together.

Kevin got three scoops of ice cream, two toppings, and one soda.

Rachel got one scoop of ice cream, three toppings, and no soda.

Logan got two scoops of ice cream, no toppings, and no soda.

1. Write an expression that show how many scoops (s), how many toppings (t), and how many drinks (d) they all got together.

2. Combine all the like terms to simplify the expression.

Adding and Subtracting Fractions

To Add/Subtract Fractions we need: COMMON DEMONIMATOR

Does your problem have common denominator?

YES

1. Add/subtract the numerators.
2. Keep the denominator the same

Is you fraction in simplest form?

YES

You're Done! (:

NO

1. Simplify your fraction by dividing both numbers by a common factor.

DONE (:

NO

1. Find the least common denominator of the two fractions.
2. Change the denominators to that LCD.
3. Multiply your numerator by the same number you multiplied the denominator by

DO YOU HAVE A COMMON DENOMINATOR?

YES

3. Add/subtract the numerators.
4. Keep the denominator the same

Examples:

1. $\frac{1}{3} + \frac{5}{3} = \frac{6}{3} = \frac{2}{1} = 2$

2. $\frac{6}{7} + \frac{11}{7} = \frac{17}{7}$ ⟵

This is in simplest form. This is your final answer. Do NOT put your answer into a decimal or a mixed number.

3. $\frac{3}{4} + \frac{5}{6} = \frac{18}{24} + \frac{20}{24} = \frac{38}{24} = \frac{17}{12}$

x3 x4 ÷ 2

x3 x4 ÷ 2

4. $\frac{1}{3} + \frac{4}{7} = \frac{7}{21} + \frac{12}{21} = \frac{19}{21}$

x7 x3

x7 x3

1. $\frac{1}{3} + \frac{2}{7} =$

2. $\frac{9}{20} - \frac{5}{20} =$

3. $\frac{13}{25} + \frac{6}{25} =$

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

5. $\frac{3}{4} + \frac{1}{8} =$

6. $\frac{5}{12} - \frac{3}{15} =$

7. $\frac{4}{9} + \frac{13}{15} =$

Multiplying and Dividing Fractions:

It's actually easier than addition/subtraction!

1. Multiply the two numerators together.
2. Multiply the two denominators together.
3. Simplify the fraction is necessary!

Examples:

1. $\frac{1}{3} \times \frac{6}{7} = \frac{1 \times 6}{3 \times 7} = \frac{6}{14} = \frac{3}{7}$

Dividing Fractions has 1 extra step:

1. KEEP CHANGE FLIP
2. Multiply the two numerators together.
3. Multiply the two denominators together.
4. Simplify the fraction is necessary!

What is Keep Change Flip?

Keep the first fraction

Change the sign

Flip the second fraction

$$\frac{1}{5} \div \frac{3}{2}$$

Keep Change Flip

$$\frac{1}{5} \times \frac{2}{3}$$

Examples:

1. $\frac{1}{3} \div \frac{8}{3} = \frac{1}{3} \times \frac{3}{8} = \frac{1 \times 3}{3 \times 8} = \frac{3}{24} = \frac{1}{8}$

2. $\frac{2}{7} \div \frac{8}{13} = \frac{2}{7} \times \frac{13}{8} = \frac{2 \times 13}{7 \times 8} = \frac{26}{56} = \frac{13}{28}$

1. $\frac{1}{3} \times \frac{2}{5} =$

2. $\frac{1}{3} \div \frac{5}{7} =$

3. $\frac{7}{10} \times \frac{3}{8} =$

4. $\frac{2}{3} \div \frac{3}{5} =$

5. $\frac{3}{4} \times \frac{2}{8} =$

6. $\frac{12}{7} \div \frac{3}{8} =$

7. $\frac{1}{10} \times \frac{5}{7} =$

One-Step Equations:

How do we solve for a variable?

To solve an equation is to **find the value** of the variable. We solve equations by isolating the variable using opposite operations.

Operation	Inverse
+	—
—	+
x	÷
÷	x

Inverse Operations:

Operations that undo each other.

Addition ⟹ Subtraction

Subtraction ⟹ Addition

Multiplication ⟹ Division

Division ⟹ Multiplication

Examples:

$x + 7 = 12$

$-7 \quad -7$

$x = 5$

Inverse of addition is subtraction

$y - 9 = 18$

$+9 \quad +9$

$y = 27$

Inverse of subtraction is addition

$\frac{3x}{3} = \frac{21}{3}$

$x = 7$

Inverse of multiplication is division

$\frac{x}{4} = 14$

$x = 14 \times 4$

$x = 56$

Inverse of division is multiplication

Remember a fraction is actually division!

$x + 12 = -4$

$r - 2 = 7$

$-8 = \frac{f}{3}$

$9x = 81$

$t - 22 = 4$

$h + 9 = -12$

$44 = 4k$

$5 = k - 8$

$r - 20 = 16$

$4w = 92$

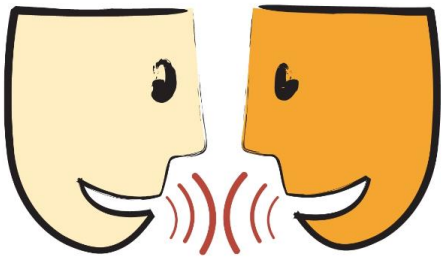
$50 = \frac{x}{10}$

$4v = -20$

Verbal Expressions

Keywords for Translations

Add	Subtract	Multiply	Divide	Inequalities	Variable	=
Plus	Decreased	Per	One-third	< is less than	A number	Same as
Sum	Smaller	For Every	Quotient	> is greater than	Some number	Equals
Longer than	Less than	For Each	Divided by	≤ is less than or equal to	Quantity	Is
Greater than	Difference	Triple	Each part	≥ is greater than or equal to		Total
Together	Reduced	Multiplied	Half as much			Was
Total	Differ	Of	Split equally			Result
Increased	Fewer	Times				Outcome
More than	Shorter than	Twice				Answer
In all	Minus	Double				
And	Diminished					



Examples:

1. The quotient of a number p and 12.
   a. $p \div 12$
2. A number h is increased by 6
   a. $h + 6$
3. Twice a number r is 32
   a. $2r = 32$

1. The quotient of a number p and 18

2. Six less than 5 times a number r

3. Three times a number s is 15

4. A number w is half of 16

5. Triple a number y is 3 less than 18

6. 6 times a number 4 decreased by 4

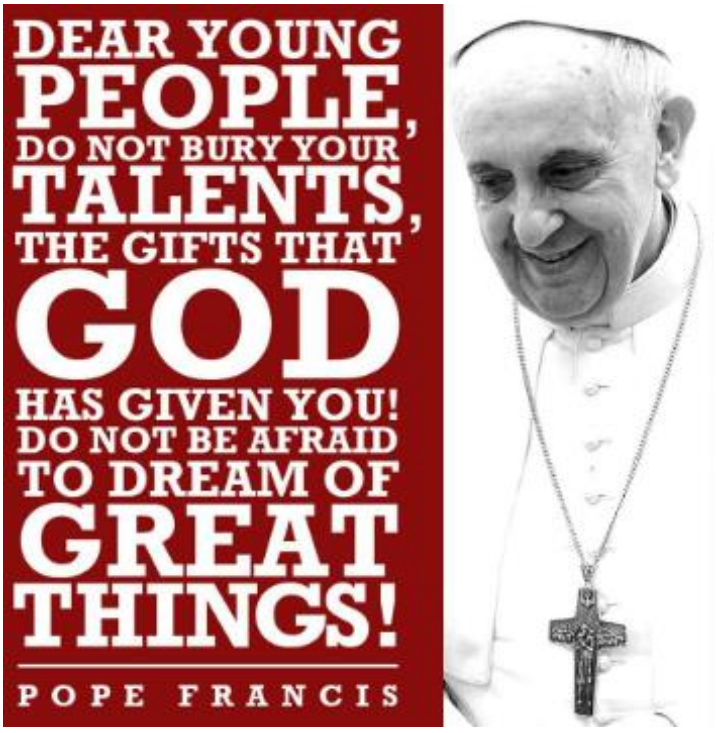
7. 12 less than the product of a number y and 12

8. 4 times a number added to 11

Matching: Put the letter of the algebraic expression that best matches the phrase.

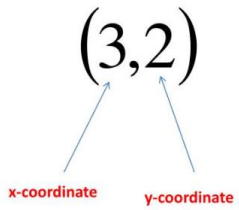
_____ 1. Two more than a number	a. $2x$
_____ 2. Two less than a number	b. $x + 2$
_____ 3. Half of a number	c. $x - 2$
_____ 4. Twice a number	d. $2 - x$
_____ 5. Two decreased by a number	e. $\frac{x}{2}$

Careful! Pay attention to subtraction. The order makes a difference. Translate to an algebraic expression then reread to check!



Coordinate Planes

Ordered Pair



Points in a plane are named using two numbers, called a coordinate pair. The first number is called the x-coordinate. The x-coordinate is positive if the point is to the right of the origin and negative if the point is to the left of the origin. The second number is called the y-coordinate. The y-coordinate is positive if the point is above the origin and negative if the point is below the origin.

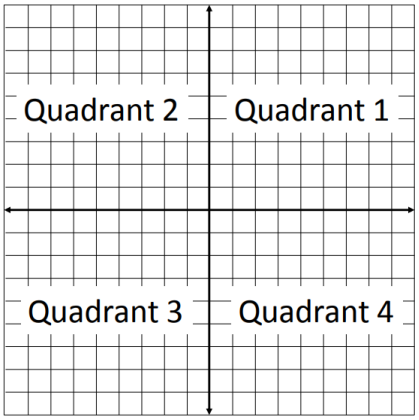
The x-y plane is divided into four quadrants (four sections) as described below.

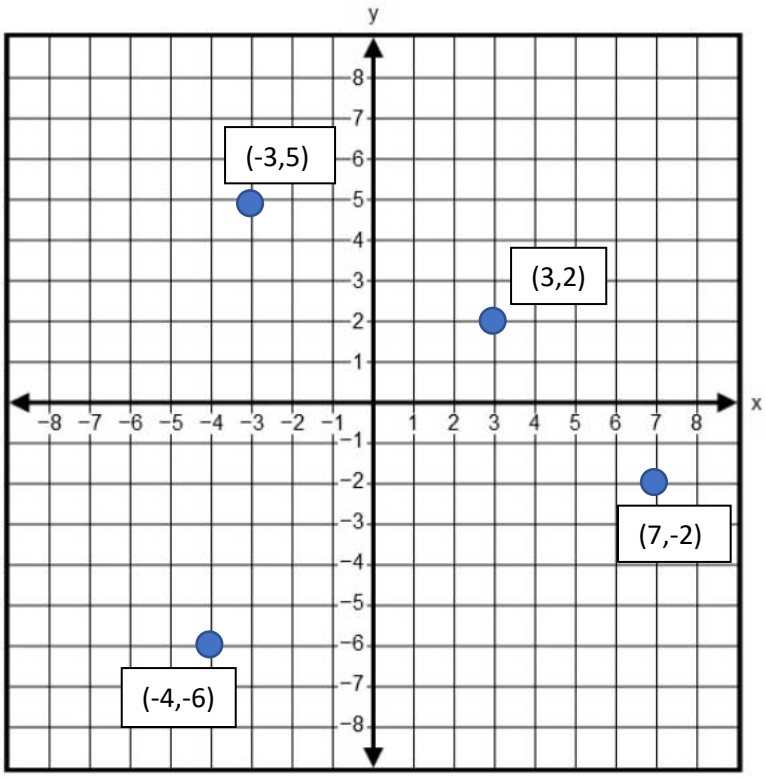
All points in Quadrant 1 have a positive x coordinate and a positive y coordinate (+x, +y).

All points in Quadrant 2 have a negative x coordinate and a positive y coordinate (-x, +y).

All points in Quadrant 3 have a negative x coordinate and a negative y coordinate (-x, -y).

All points in Quadrant 4 have a positive x coordinate and a negative y coordinate (+x, -y).



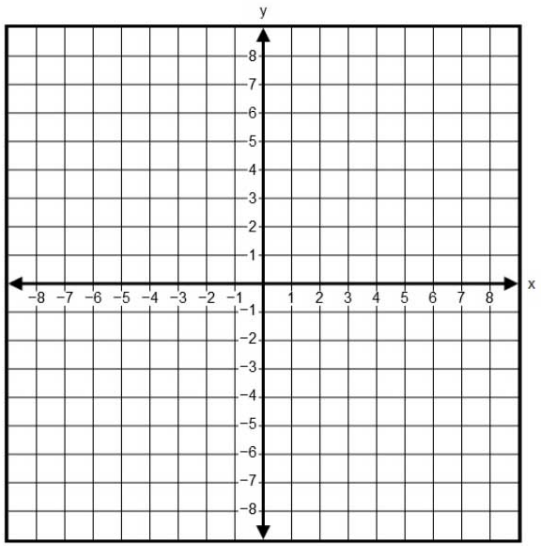


Example:

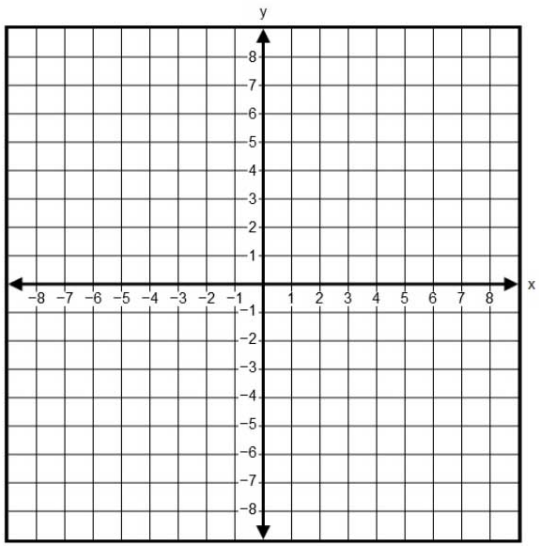
Graph the following points.

1. (3,2)
2. (7, -2)
3. (-4, -6)
4. (-3,5)

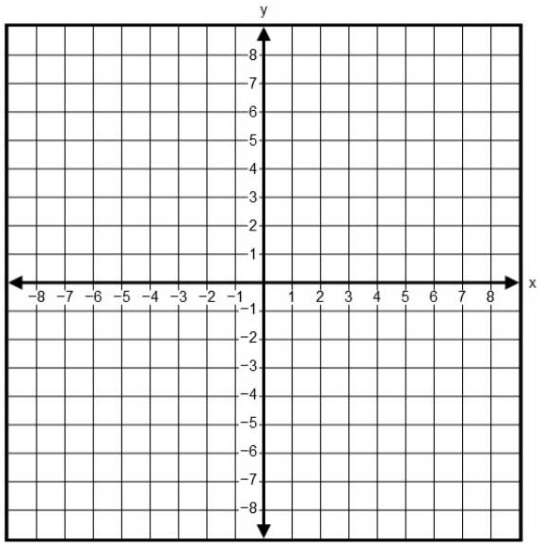
Graph the following points on the coordinate plane.



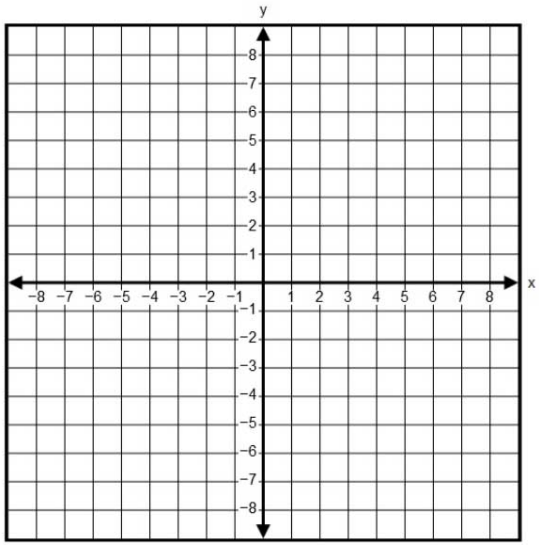
(4,9)



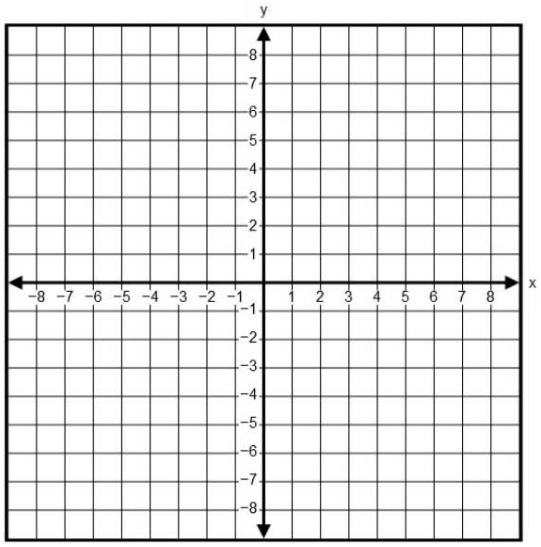
(-2,3)



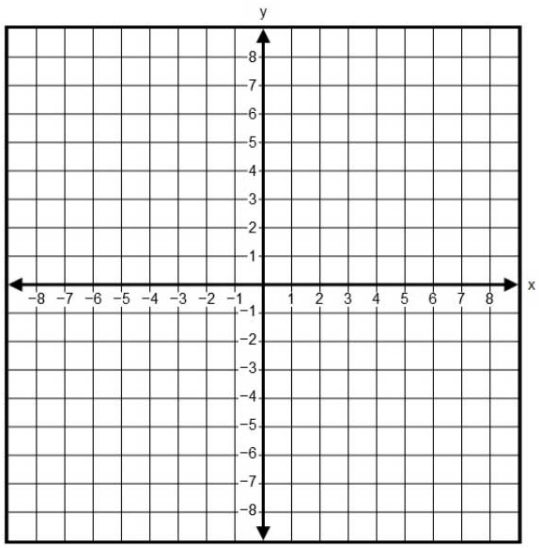
(0,7)



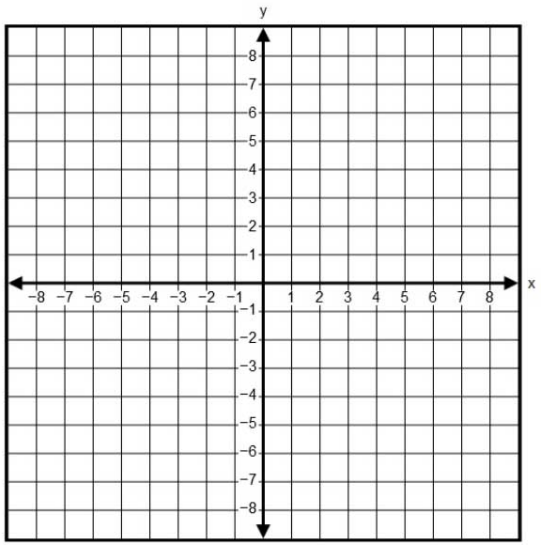
(7,0)



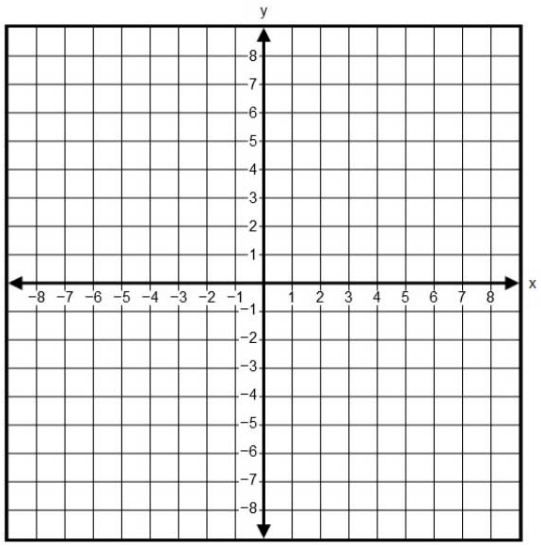
(-1,2)



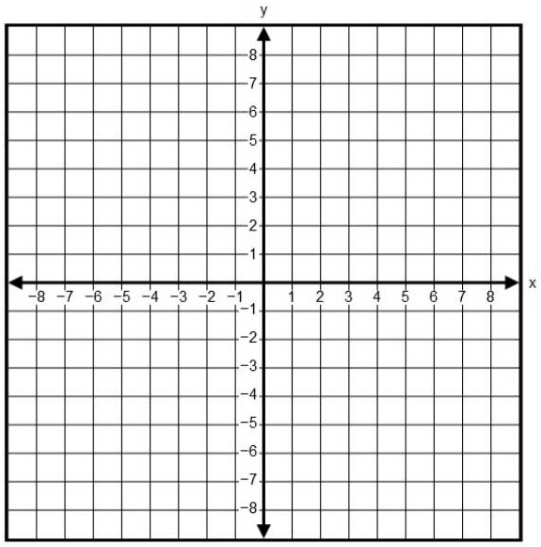
(3,-4)



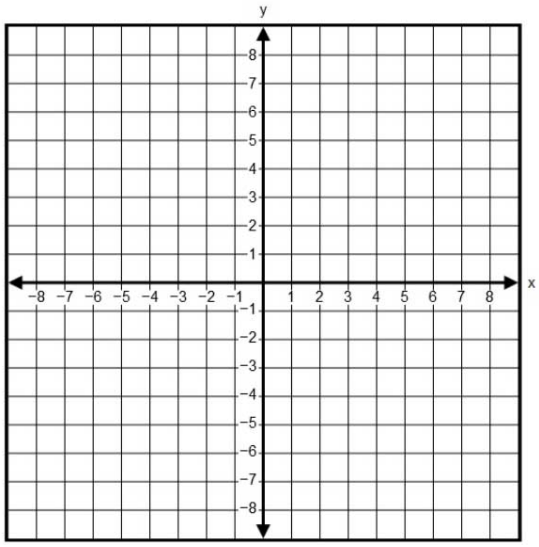
(6,6)



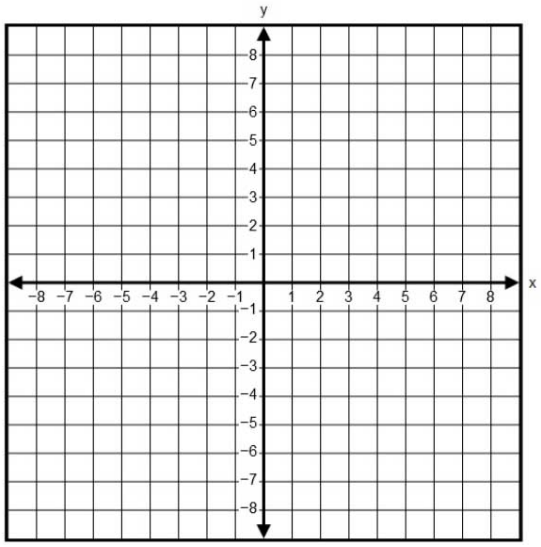
(5,-2)



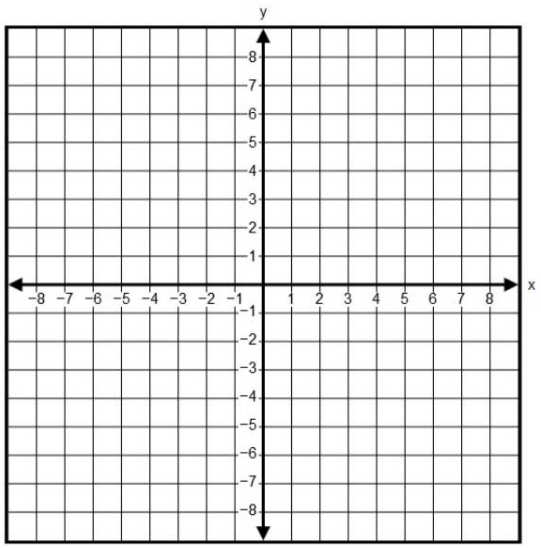
(-2,4)



(-3,-4)



(-1,6)



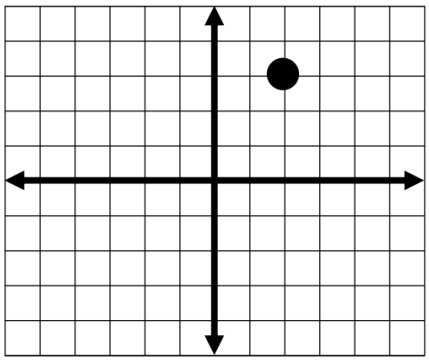
(-4,3)

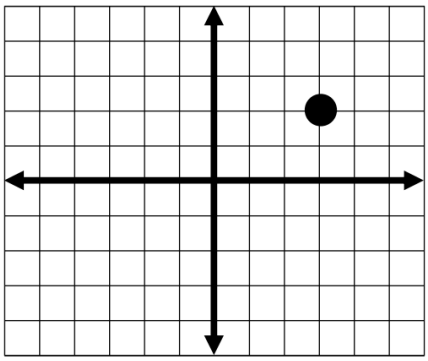
Determine the coordinates for each point below:

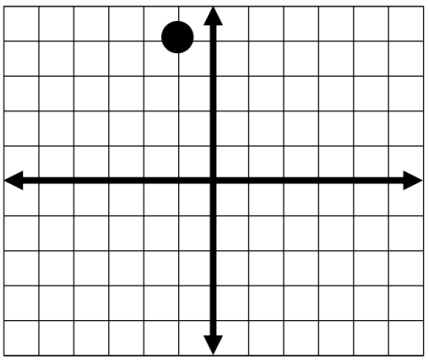
Example: (2,3)

(,)

(,)







(,)

(,)

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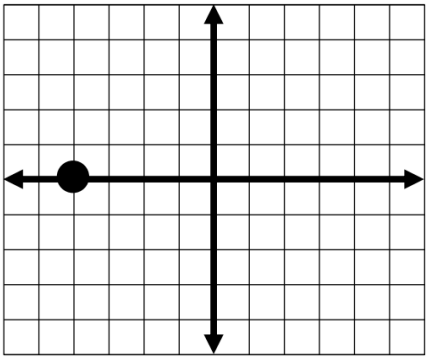

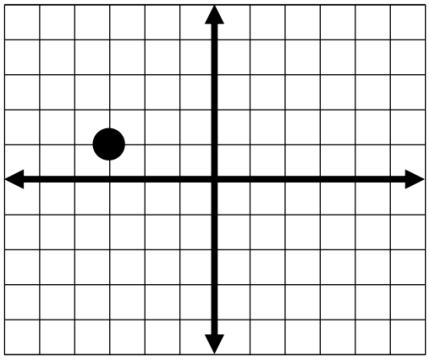

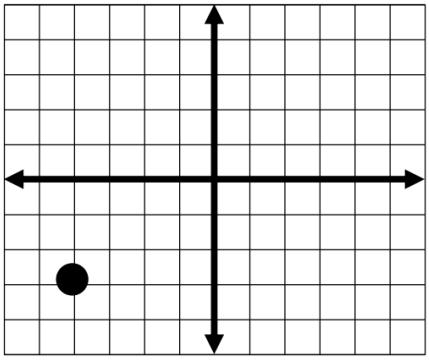

(,)

(,)

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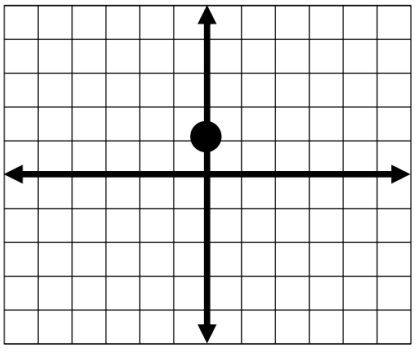

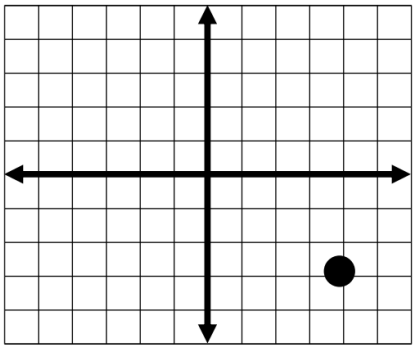

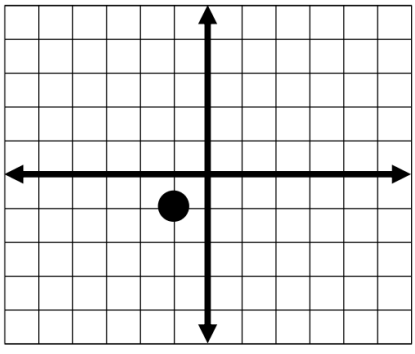

Word Problems

1. A video store charges a one-time membership fee of $12 and $1.50 per video game. If Peter rented three video games and is a member of the video store, how much did he spend?

2. Darell went to the mall and spent $41. He bought several t-shirts that each cost $12, and he bought 1 pair of socks for $5. How many t-shirts did Darell buy?

3. Janet weighs 20 more pounds than Anna. If the sum of their weights is 250 pounds, how much does each girl weigh?

4. The current price of a school t-shirt is $10.58. Next year the cost of a t-shirt will be $15.35. How much will the t-shirt increase next year?

5. Sarah drove 3 hours more than Michael on their trip to Texas. If the trip took 37 hours, how long did Sarah and Michael each drive?