

Name: _____

Middle School: _____

Welcome to your first KCHS math class!

SUMMER PACKET ALGEBRA 1 CP



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 week of being at school.

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



Go IRISH!



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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	\times or	Multiplication and
D	\div	Division
A	+ or	Addition and
S	-	Subtraction

Don't
forget



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.

64.9685

1. Underline the tenth decimal place (9)
2. Look at the number to the right
 - a. It is 6, which is more than 5
3. This means the 9 goes up to 10.
(Carry the 10 into the next decimal place)

Answer:

65.0

Round the following numbers to the tenths place:

1. 18.6231

2. 0.9653

3. 25.0753

4. 100.9785

Round the following numbers to the hundredth place:

1. 3.1925

2. 0.6791

3. 19.9856

4. 18.9852



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

**IT'S A
GREAT
DAY TO
SHOW
YOUR
WORK!**

Expression	Substitute and Simplify (Show your Work) $x = -2$ $y = 8$ $z = 7$	Final Answer
$3x$		
$2x^2$		
$3x^2 + y$		
$2(x + z) - y$		
$y + 4$		
$5z - 6$		
$xy + z$		
$2x + 3y - z$		
$5x - (y + 2z)$		
$\frac{xy}{2}$		
$x^2 + y^2 + z^2$		
$2x(y + z)$		
$5z - (y - x)$		
$4x + 2y - z$		

Combining Like Terms and Distributive Property

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.

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

$$6r^3 + 5r^2 + p^2 + 3r^2 = 6r^3 + 8r^2 + p^2$$

$$6(7y + 4) + 3y = 42y + 24 + 3y = 45y + 24$$

$6n^2 + 5n$	$12r + 5s - 7t + 11r + 9s - 4r$
$8y - 6(3y - 7)$	$3n - 2n + 5 - 6$
$-4(r + 6y) + 6y$	$4t - 11y + 6t + 5t^2 + 7t^2$
$2m + 3n - 5m + 6n$	$r - 2r$
$5(7 + 3x) - 12$	$6p - 4f + 3b + 7p + 7f - 2b$

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.



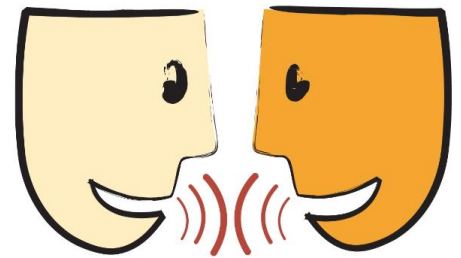
1. Write an expression that show how many scoops (s), how many toppings (t), and how many drinks (d) they all got together.

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

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. 3 times a number squared

a. $3x^2$

1. The quotient of a number p and 18
2. The product of a number and 25 equals 100
3. A number squared is 16.
4. Four plus 3 times a number is less than or equal to 18
5. Triple a number y is 3 less than 18
6. Twice a number decreased by 15 is equal to -27
7. Two thirds of a number squared.
8. Eighteen plus 3 times the quantity of x minus 8.

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.

Inverse Operations:

Operations that undo each other.

Addition \longrightarrow Subtraction

Subtraction \longrightarrow Addition

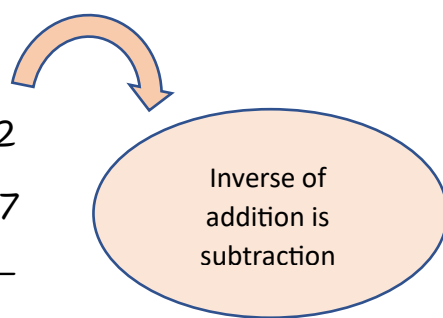
Multiplication \longrightarrow Division

Division \longrightarrow Multiplication

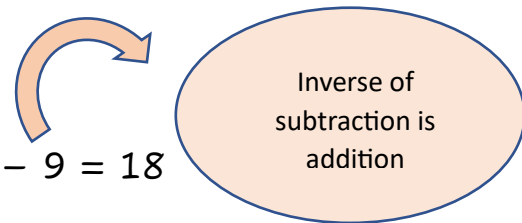
Operation	Inverse
+	-
-	+
x	÷
÷	x

Examples:

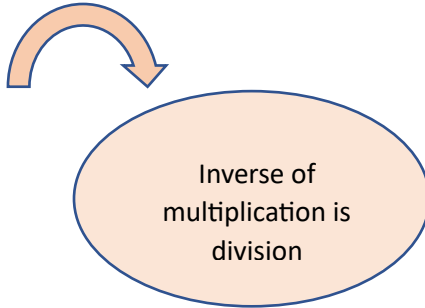
$$\begin{array}{r} x + 7 = 12 \\ -7 \quad -7 \\ \hline x = 5 \end{array}$$



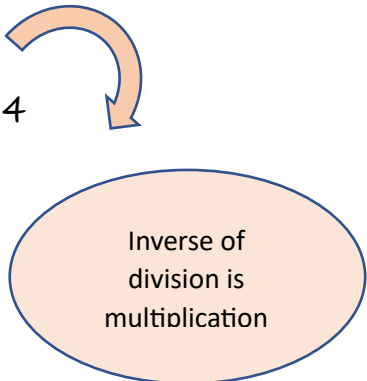
$$\begin{array}{r} y - 9 = 18 \\ +9 \quad +9 \\ \hline y = 27 \end{array}$$



$$\begin{array}{r} 3x = 21 \\ 3 \quad 3 \\ \hline x = 7 \end{array}$$



$$\begin{array}{r} \frac{x}{4} = 14 \\ x = 14 \times 4 \\ x = 56 \end{array}$$



Remember a fraction is actually division!

10. $y + 12 = 16$

11. $x - 9 = -6$

12. $-x = -9$

13. $x + 4 = -10$

14. $-6 + x = -10$

15. $4x = 16$

16. $-16x = 96$

17. $3x = 5$

18. $x - 2 = 0$

19. $-x = 13$

1. $12x = 108$

2. $\frac{x}{6} = -6$

3. $-\frac{x}{3} = -9$

4. $-2x = -10$

5. $-6x = 100$

6. $\frac{1}{4}x = 16$

7. $-16x = \frac{1}{4}$

8. $3x = 9$

9. $-2x = 0$

Two-Step Equations

Two-Step Equations follow the same rules as one-step equations. The goal is to **find the value** of the variable by **isolating** the variable.

We use **Inverse Operations** to do this.

Addition/Subtraction
always comes BEFORE
Multiplication/Division

LET'S PRACTICE



Examples:

$$2x + 5 = 21$$

$$2x + 5 - 5 = 21 - 5$$

$$2x = 16$$

$$\frac{2x}{2} = \frac{16}{2}$$

$$x = 8$$

$$-3x - 8 = -20$$

$$-3x - 8 + 8 = -20 + 8$$

$$-3x = -12$$

$$\frac{-3x}{-3} = \frac{-12}{-3}$$

$$x = 4$$

$$23 = \frac{x}{3} + 26$$

$$23 - 26 = \frac{x}{3} + 26 - 26$$

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

$$(-3)(3) = \left(\frac{x}{3}\right)(3)$$

$$-9 = x$$

1. $5t + 2 = 12$

2. $14 = 9 - p$

3. $\frac{h}{2} + 7 = 10$

4. $\frac{k-4}{3} = 3$

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

6. $\frac{p+5}{-2} = 9$

7. $9x - 7 = -9$

8. $8y + 7 = 31$

9. $1 + 2s = 35$

10. $-9v + 1 = -80$

11. $\frac{x-31}{4} = 3$

12. $17 - q = 6$

Solving Equations with Variables on Both Sides

Before beginning the process of isolating the variable, all like terms must be combined.

What do we do if we have variables on both sides?

Combine all like terms, before solving your equation.

Reminder: Like terms are terms with the same variable factors.

When we bring a like term to the other side of the equal sign, we must use inverse operations.

EXAMPLES:

Variable Terms	Constant Terms
$9n - 6$	$= 5n + 18$
$-5n$	$-5n$
$4n - 6$	$= 18$
$+6$	$+6$
$4n = 24$	
$n = 6$	

$6y + 4 - 3y = -5 + y + 17$	
Variable Terms	Constant Terms
$3y + 4$	$= y + 12$
$-y$	$-y$
$2y + 4$	$= 12$
$2y = 8$	
$y = 4$	

$$1.5x - 4 = 3x + 12$$

$$2. \quad 10 - 4x = -9x$$

$$3. \quad 26 - 4s = 9s$$

$$4. \quad 5p - 9 = 2p + 12$$

$$5. \quad -3r + 10 = 15r - 8$$

$$6. \quad 5t + 16 = 6 - 5t$$

$$7. \quad 7 + 3x - 12x = 3x + 1$$

$$8. \quad w - 2 + 2w = 6 + 5w$$

Solving Equations using Distributive Property

First, we need to **distribute** the value into the parenthesis.
From here, we **combine like terms** and **isolate** the variable.

EXAMPLES:

$$4(x+3) - 2 = 6$$

$$4x + 12 - 2 = 6$$

$$4x + 10 = 6$$

$$ - 10 - 10$$

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

$$x = -1$$

$$3(x-6) = 10$$

$$3x - 18 = 10$$

$$+ 18 + 18$$

$$\frac{3x}{3} = \frac{28}{3}$$

$$x = \frac{28}{3}$$

$$-4(x-3) = 15$$

$$-4x + 12 = 15$$

$$ - 12 - 12$$

$$\frac{-4x}{-4} = \frac{3}{-4}$$

$$x = -\frac{3}{4}$$

1. $10(g + 5) = 2(g + 9)$

2. $-9(t - 2) = 4(t - 15)$

3. $\frac{2}{3}(3x + 9) = -2(2x + 6)$

4. $2(2t + 4) = \frac{3}{4}(24 - 8t)$

5. $10(2y + 2) - y = 2(8y - 8)$

6. $2(4x + 2) = 4x - 12(x - 1)$

Graphing in Slope-Intercept Form

Slope Intercept Form: $y = mx + b$

Slope: the steepness of a line.

We graph slope by $\frac{\text{Rise}}{\text{Run}}$

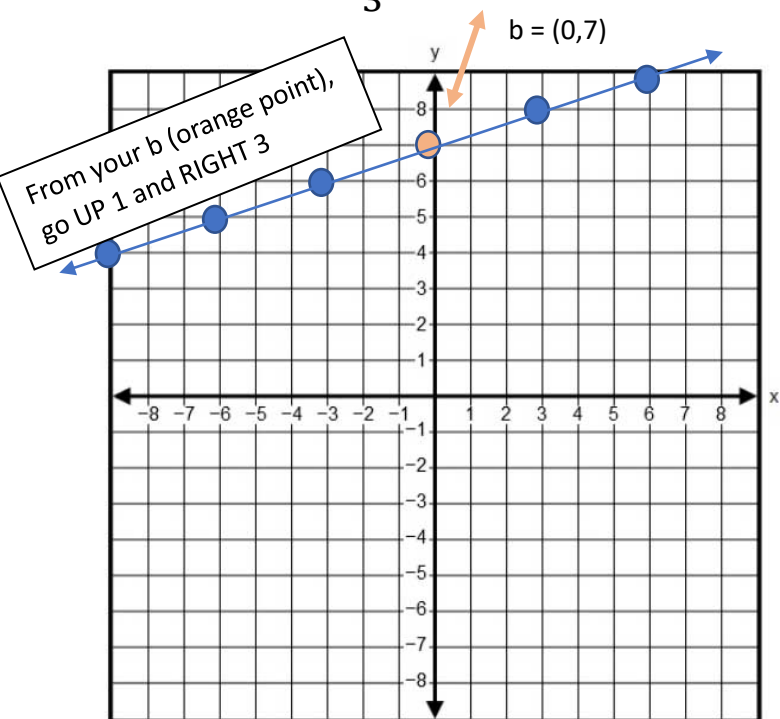
We rise UP and run RIGHT

Y-intercept: where the line crosses the y-intercept.

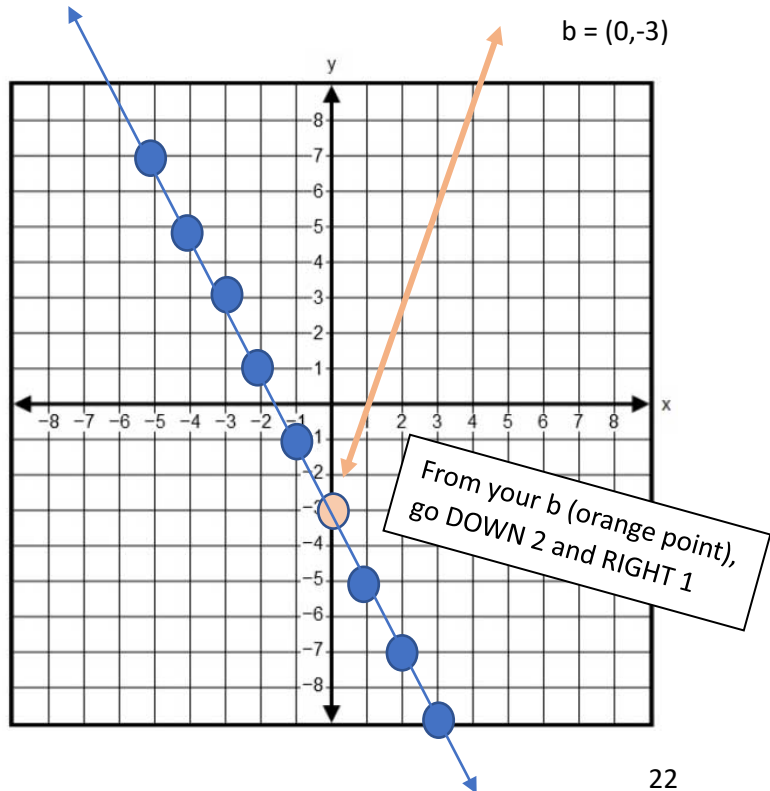
Examples:

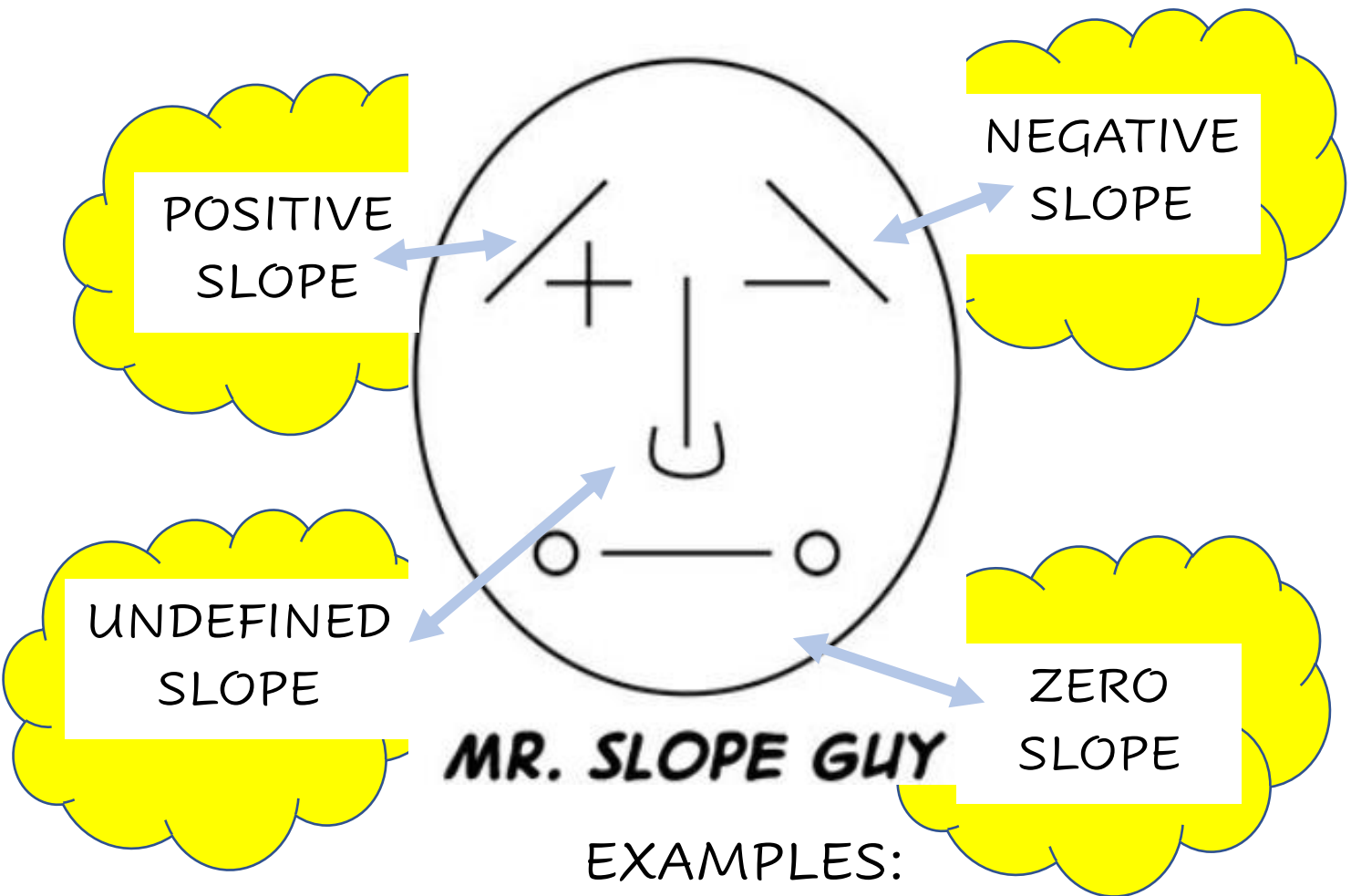
Remember -2 as a fraction is $\frac{-2}{1}$

$$y = \frac{1}{3}x + 7$$



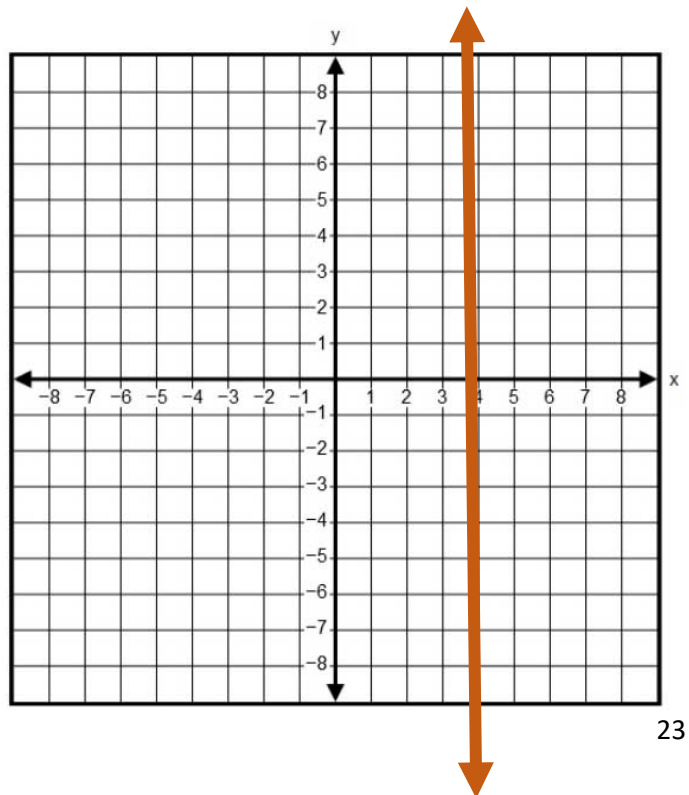
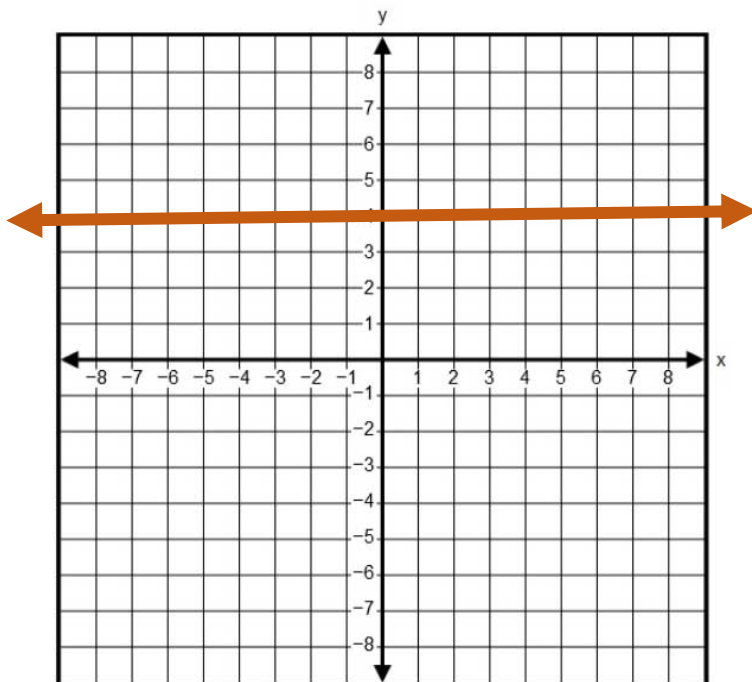
$$y = -2x - 3$$





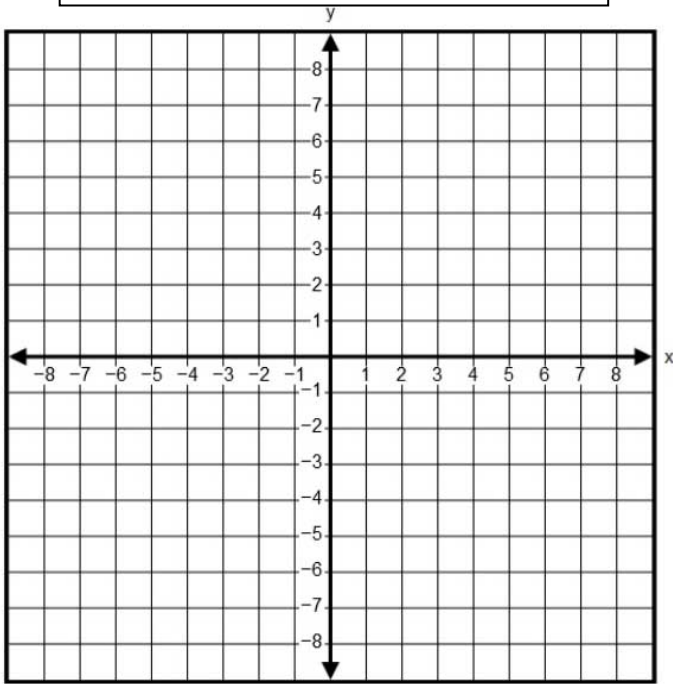
$$y = 4$$

$$x = 4$$

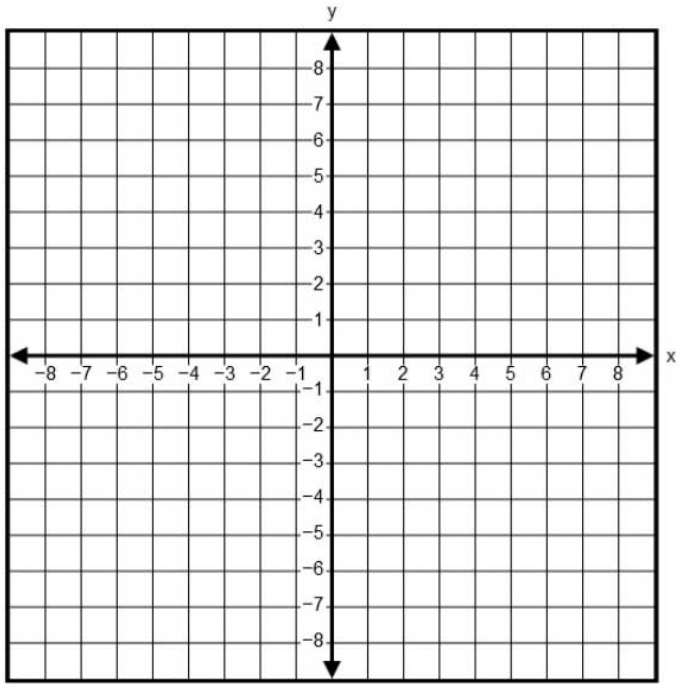


Directions: For the following examples, graph the equations.

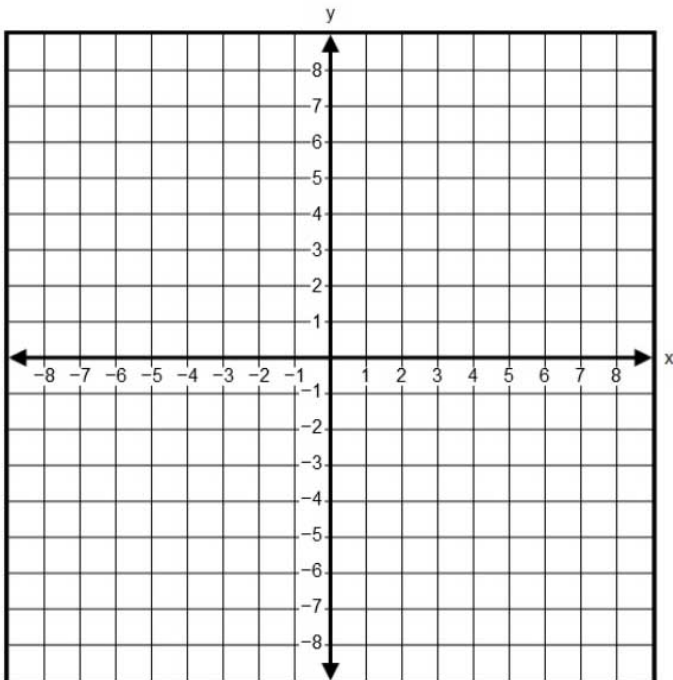
$$y = \frac{1}{3}x - 2$$



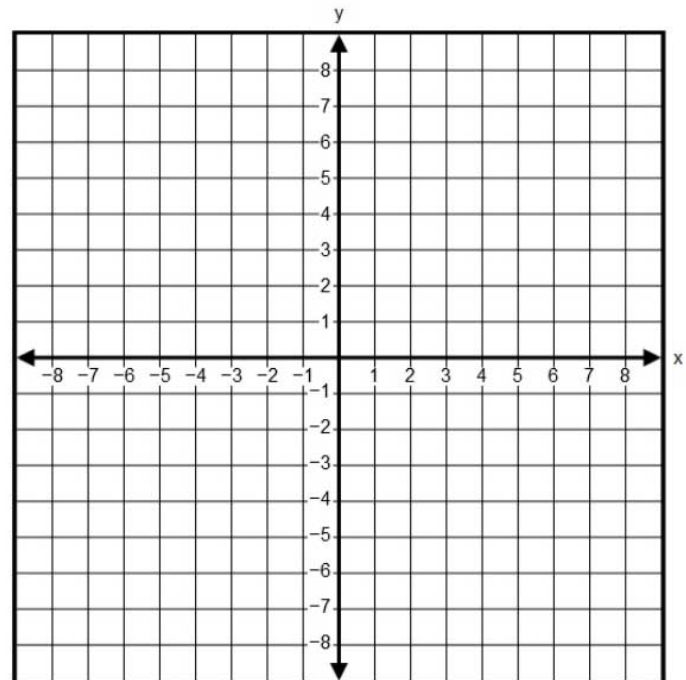
$$y = \frac{2}{5}x - 3$$



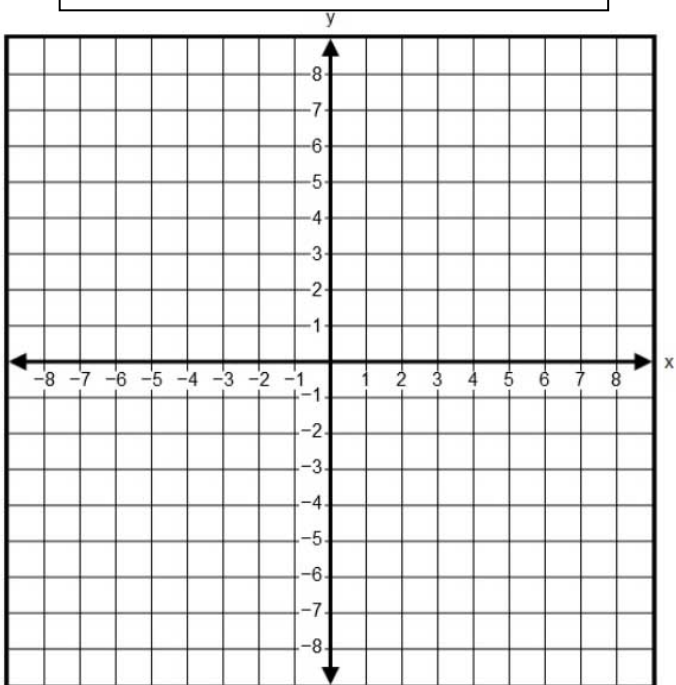
$$y = -2x - 2$$



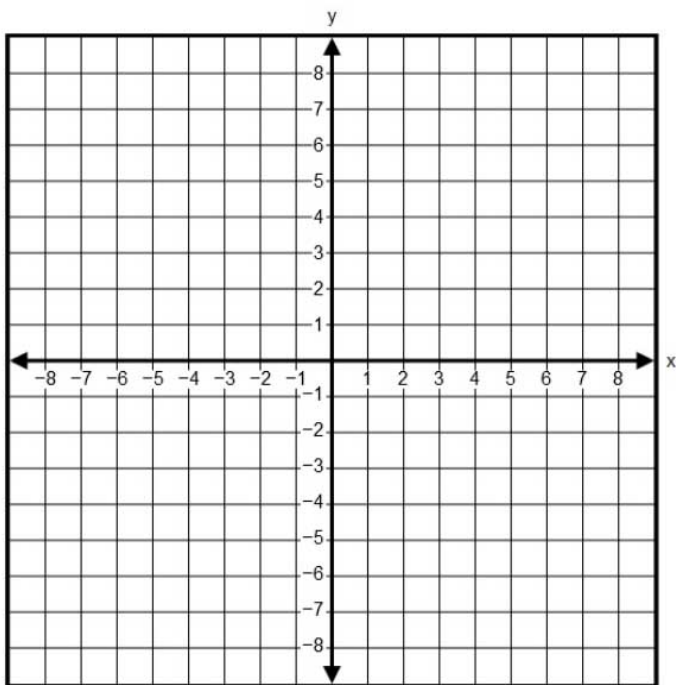
$$y = \frac{1}{4}x$$



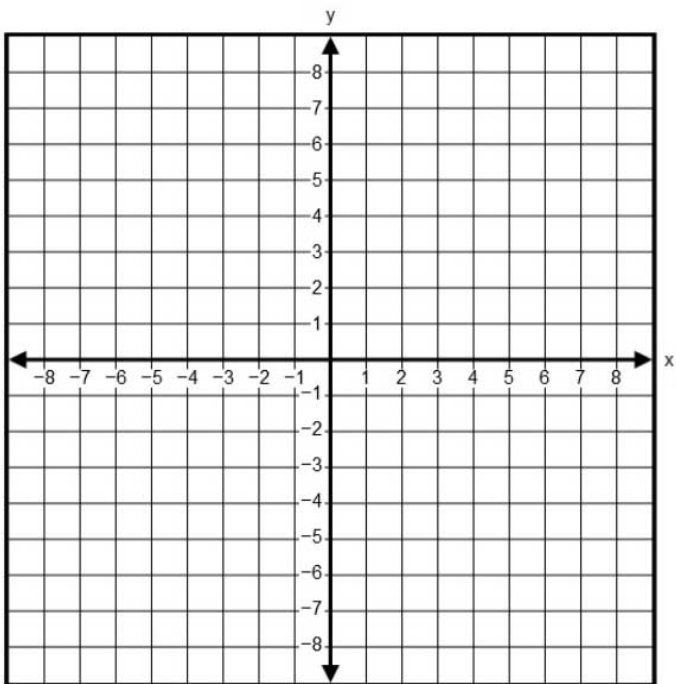
$$y = 6$$



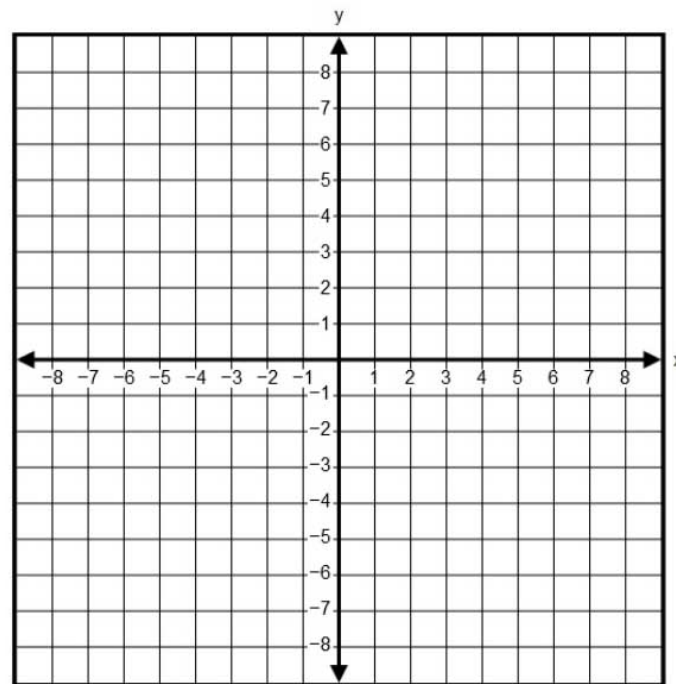
$$y = 3x + 4$$



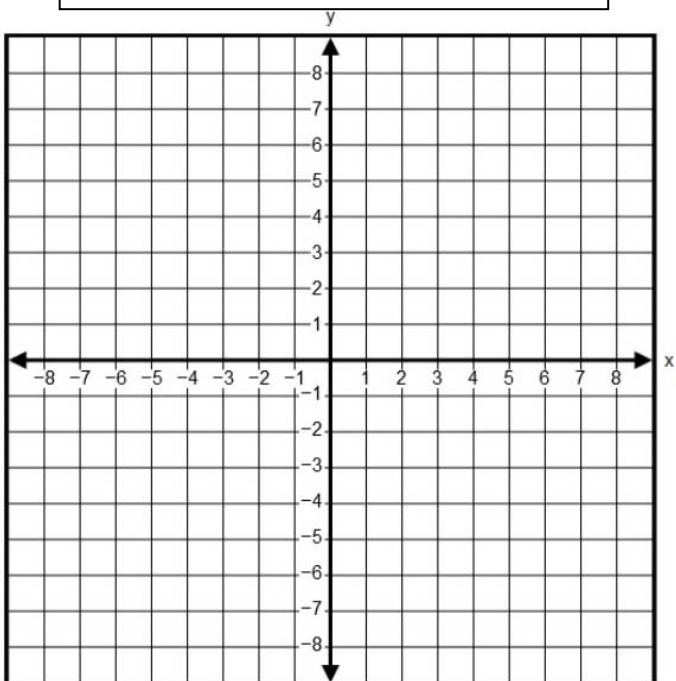
$$y = -\frac{5}{6}x - 3$$



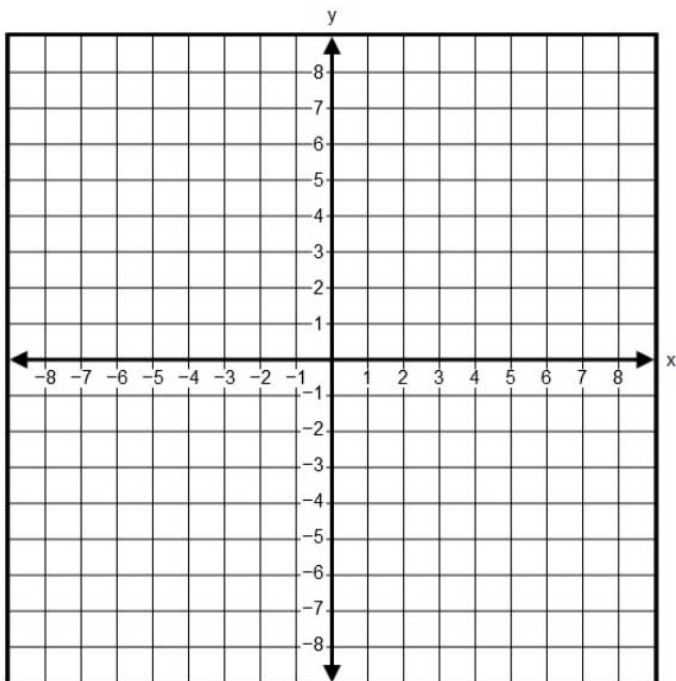
$$y = \frac{4}{3}x$$



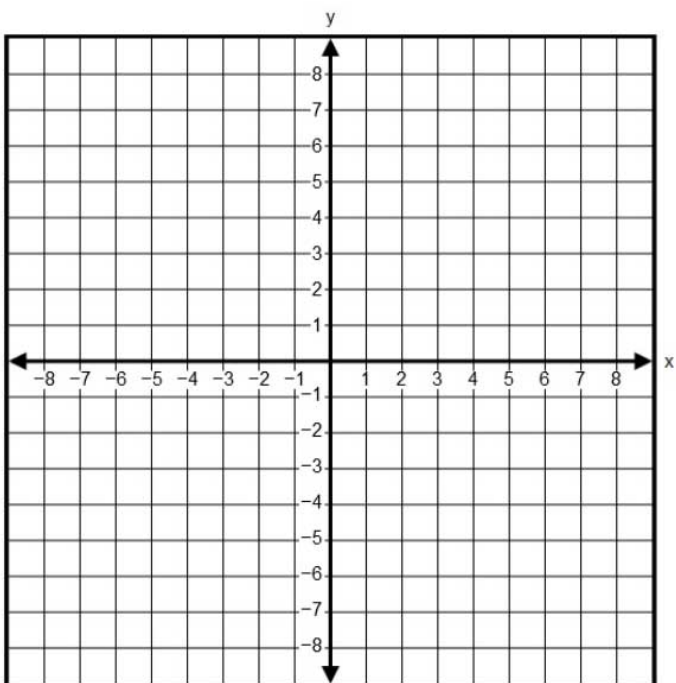
$$y = 3x$$



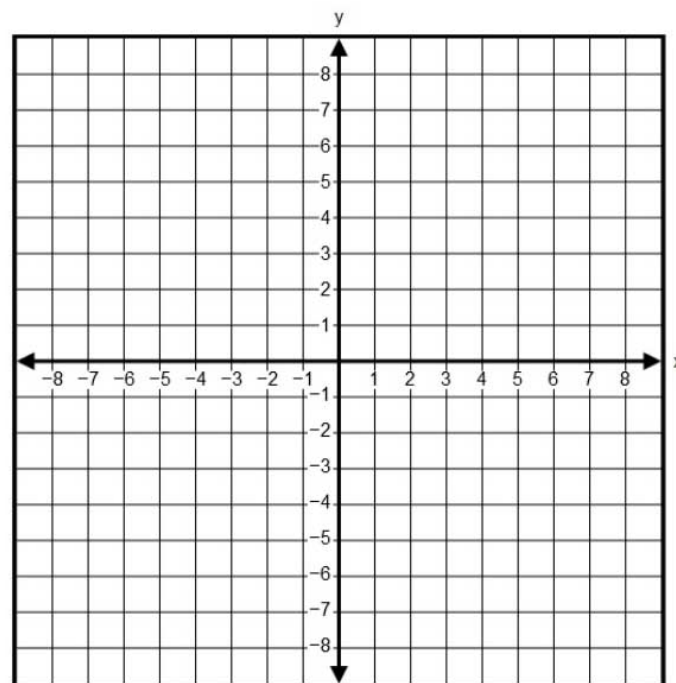
$$y = -8$$



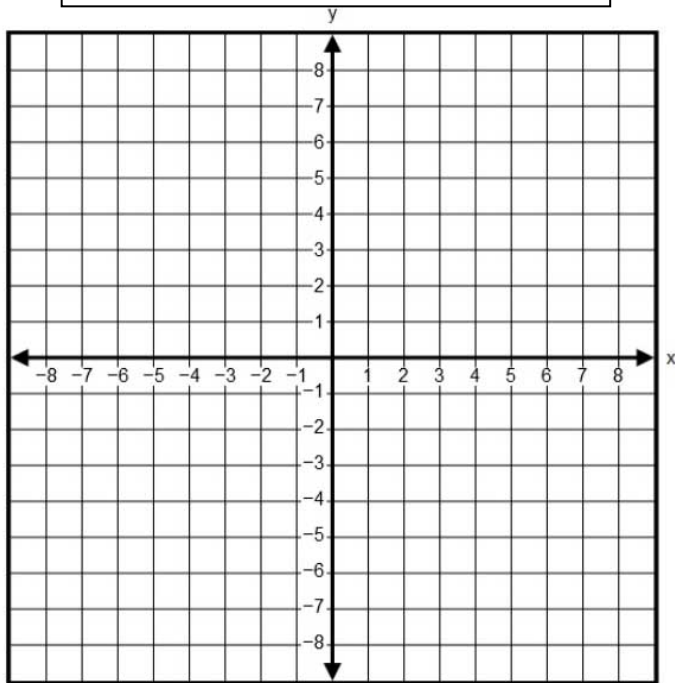
$$x = 4$$



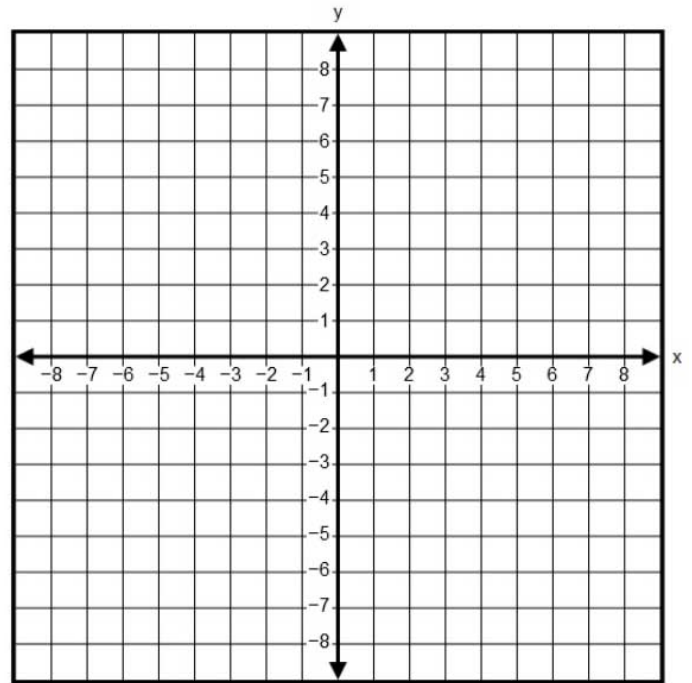
$$y = -\frac{2}{7}x - 4$$



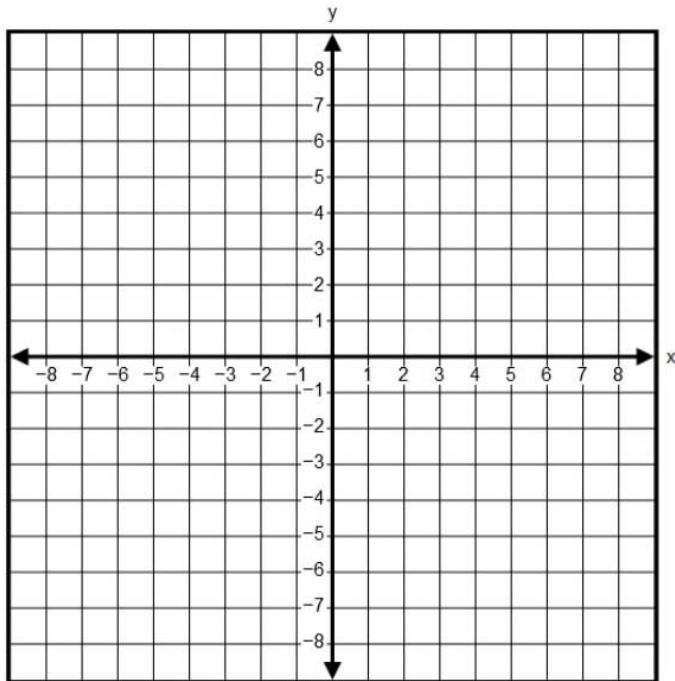
$$y = 3x - 2$$



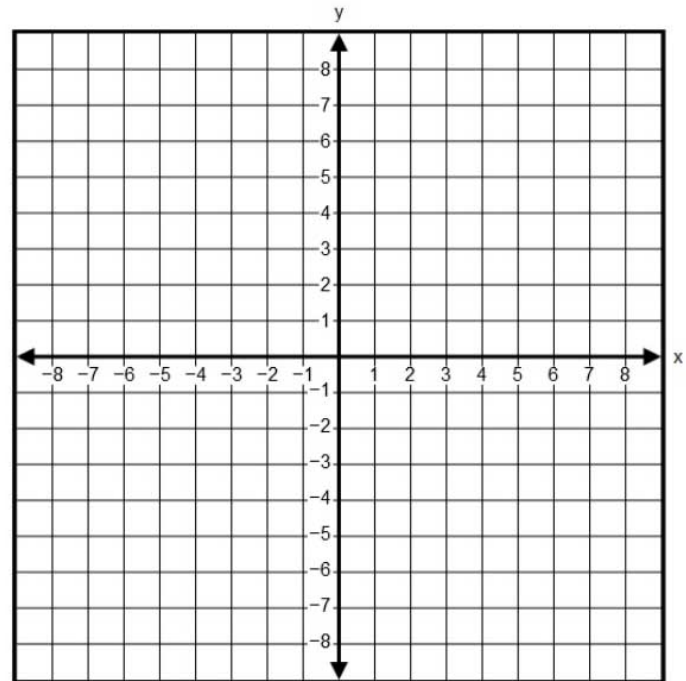
$$y = -\frac{1}{3}x + 4$$



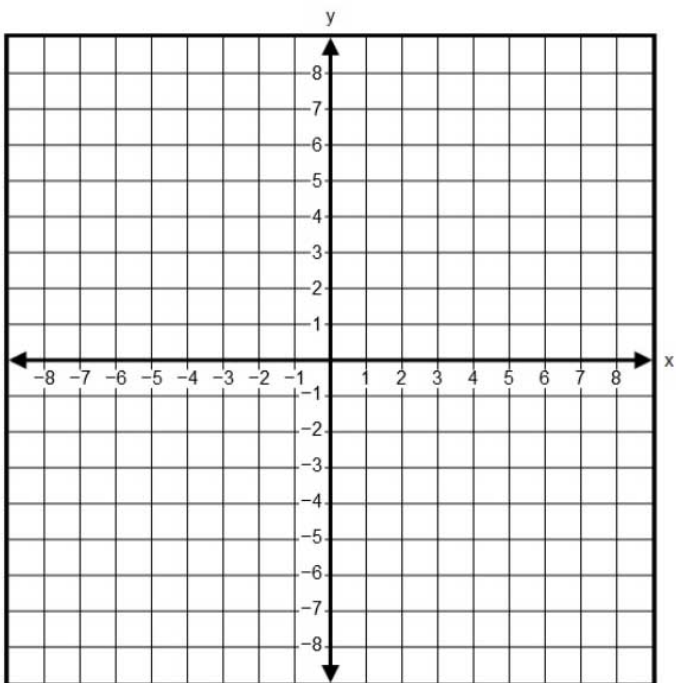
$$y = -\frac{1}{7}x + 8$$



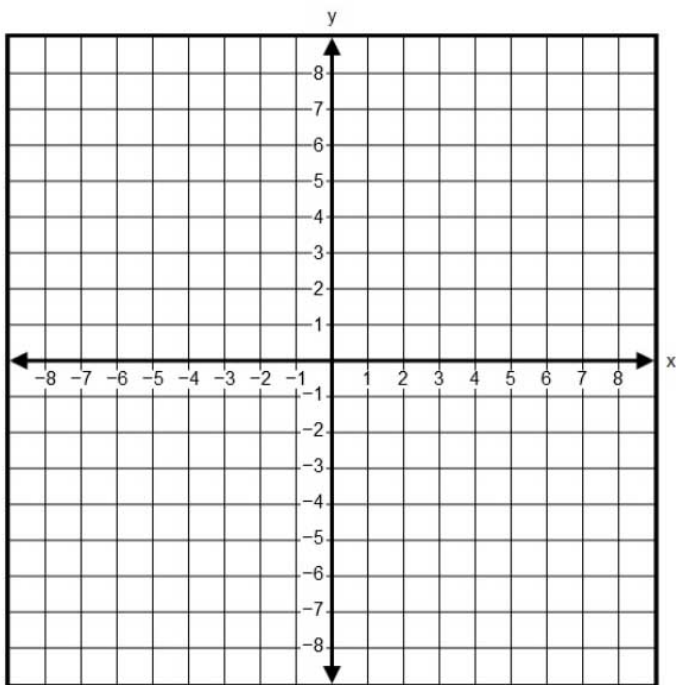
$$y = x - 6$$



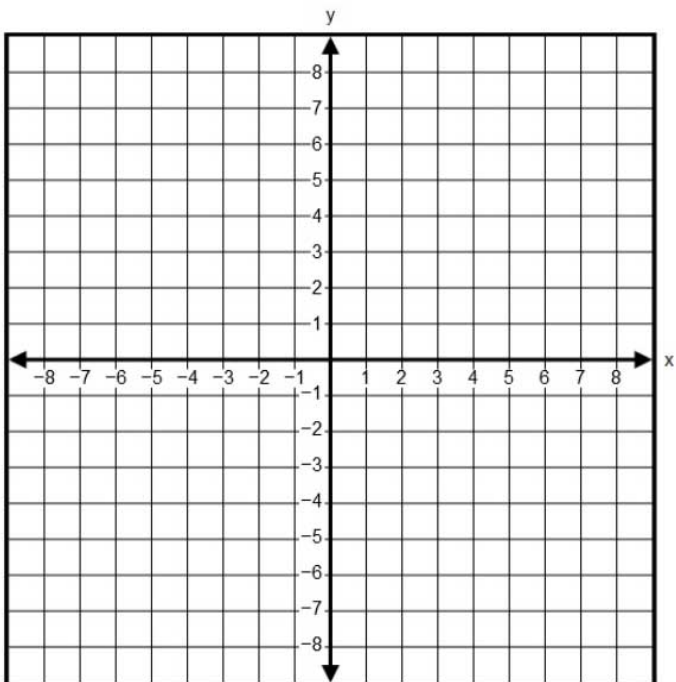
$$x = -7$$



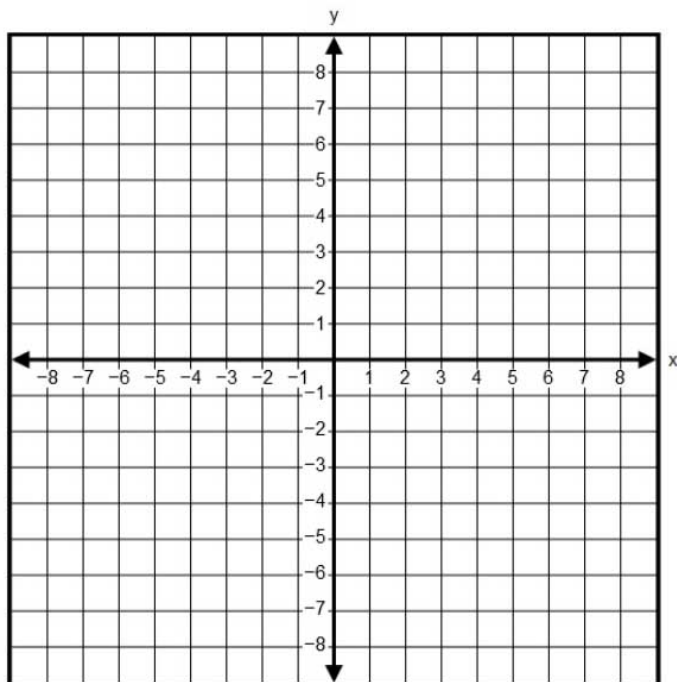
$$y = \frac{2}{7}x - 1$$



$$y = \frac{1}{4}x + 1$$

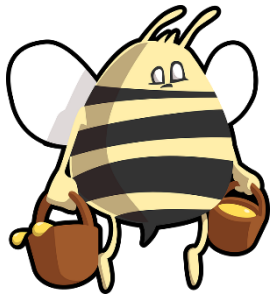


$$y = x$$



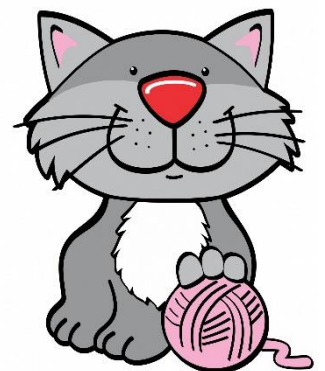
Word Problems

1. Holly bought 5 pints of frozen yogurt and a tray of jumbo shrimp from The Food Place for a total of \$45. If the price of a tray of jumbo shrimp is \$25, what is the price of a pint of frozen yogurt?



2. At Honey Beepot, the bulk price for honey is \$2.50 per pound, with a minimum purchase of 20 pounds. If Bobby paid \$80 for some honey, by how many pounds did Bobby's purchase exceed the minimum?

3. The Fluffy Lump Cat Toy Company rents a warehouse facility. There is a fixed cost of \$1200 a month for rent and a variable cost of \$5 per box of toys that are stored. If the total cost for this month was \$1315, how many boxes of toys are being stored?



4. Let x the distance traveled by Nick. Translate each English phrase into an algebraic statement.
- a. Annie drove 7 miles less than the distance traveled by Nick.
 - b. Wayne traveled 8 miles further than the distance traveled by Nick.
 - c. Karl swam seven-eighths of the distance traveled by Nick.
5. For problem 4, if Nick traveled 50 miles, find how far each of his friends traveled.

