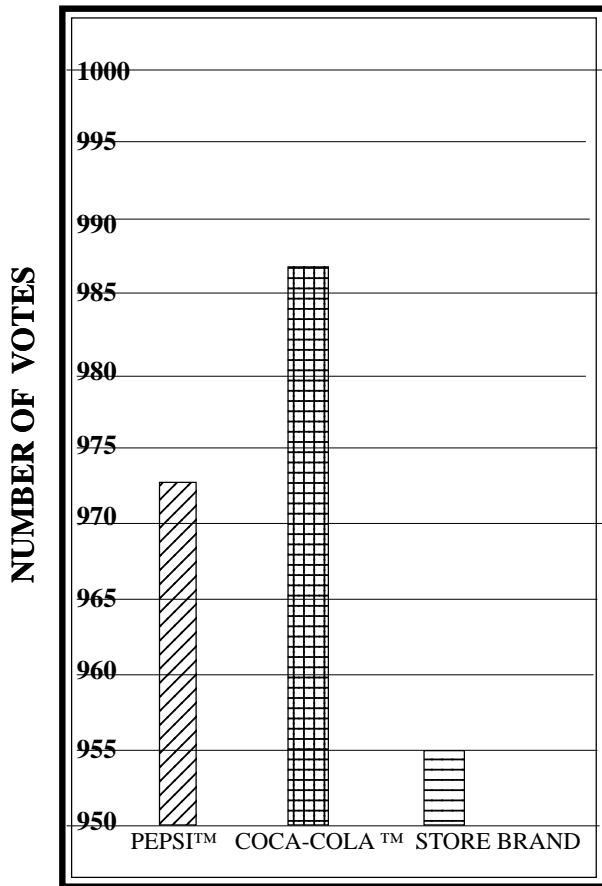
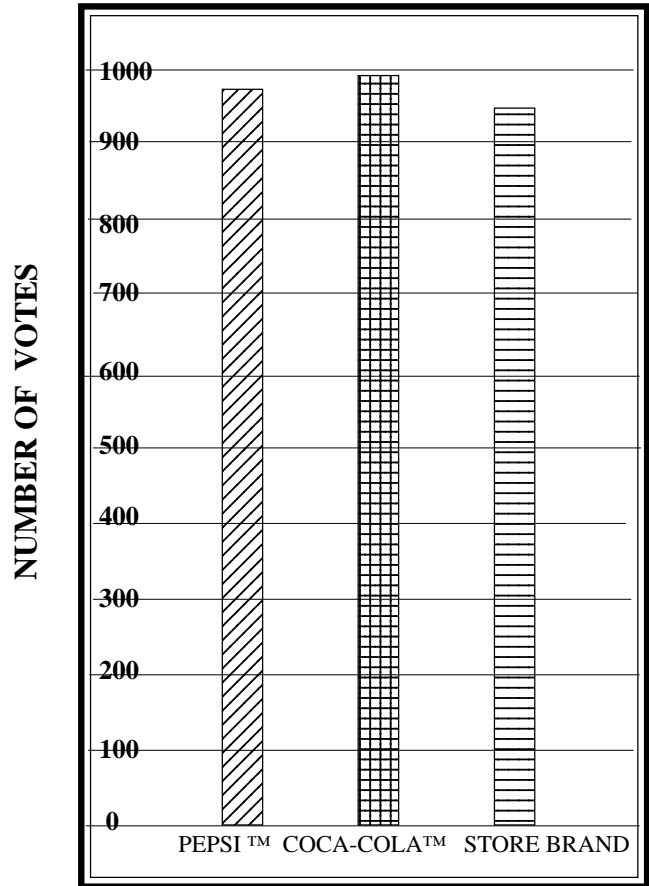


VOTE FOR YOUR FAVORITE SODA BRAND!!



FAVORITE SODA



FAVORITE SODA

Your school is trying to put in soda vending machines. The student council has organized a vote of the student body to decide which company they will use to supply the vending machines. Look at the graphs above to answer the following questions:

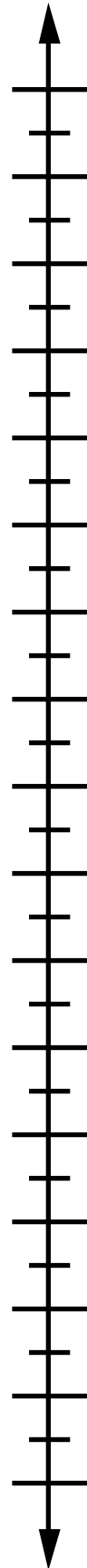
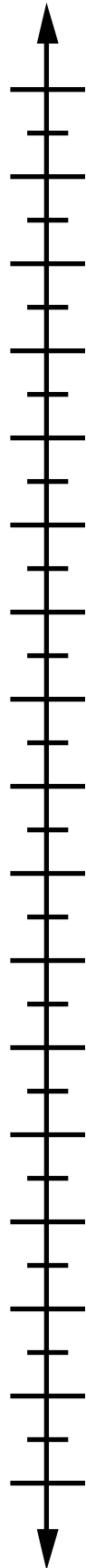
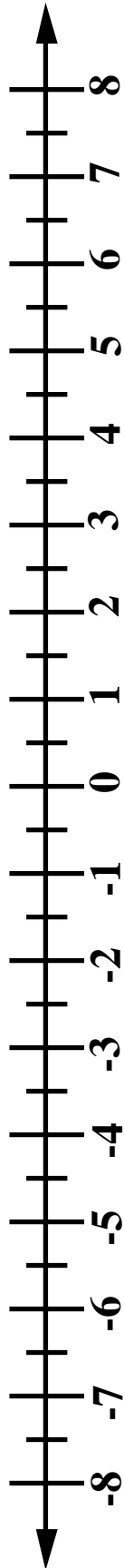
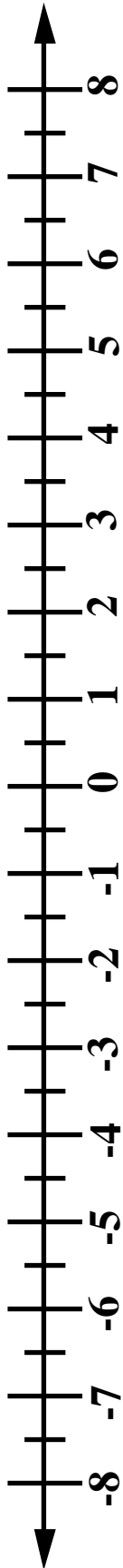
1. What graph would you show the Administration so that they could make their decision? Why?

2. If there were 40 students absent and they then voted late for Pepsi, would that change your graph a lot? How would it change each graph?

3. Explain how the two graphs that have the same data can look so different.

4. Can you think of a real-life example where data may be manipulated like this? Explain.

Name _____ Date _____



How Do They Fit?

$y < -4$ $y > \frac{1}{2}$	$y + 2 < 8$ $y > -3$	$y > -6$ $y < -3$
$y + 1 < -2$ $y > -3$	$12y < -6$ $\frac{1}{2} > y$	$\frac{3}{5} > \frac{3}{5}y$ $y > 5$
$\frac{1}{2} < -1$ $\frac{2}{y} < 2$	$y > 9$ $\frac{y}{-2} > -3$	$y < 3$ $-2y < -6$
$5y > 15$ $y < 2$	$4 > y$ $\frac{1}{3} > y$	$15y < 3$ $y + 3 > 5$
$y > -1$ $-6y < -2$	$-2 > y$ $y > 1$	$L < 8 - 7y$ $2 > y$
$y > -1$ $-6y < -2$	$-2 > y$ $y > 1$	$L < 8 - 7y$ $2 > y$
$5y > 15$ $y < 2$	$4 > y$ $\frac{1}{3} > y$	$15y < 3$ $y + 3 > 5$

Make an overhead transparency of the following equations. Cover all but one for display to the students.

$$Y = X$$

$$Y = -X$$

$$Y = 2X$$

$$Y = 3X$$

$$Y = (0.5) X$$

$$Y = - (0.5) X$$

$$Y = X + 2$$

$$Y = 2X + 2$$

$$Y = -2X - 5$$

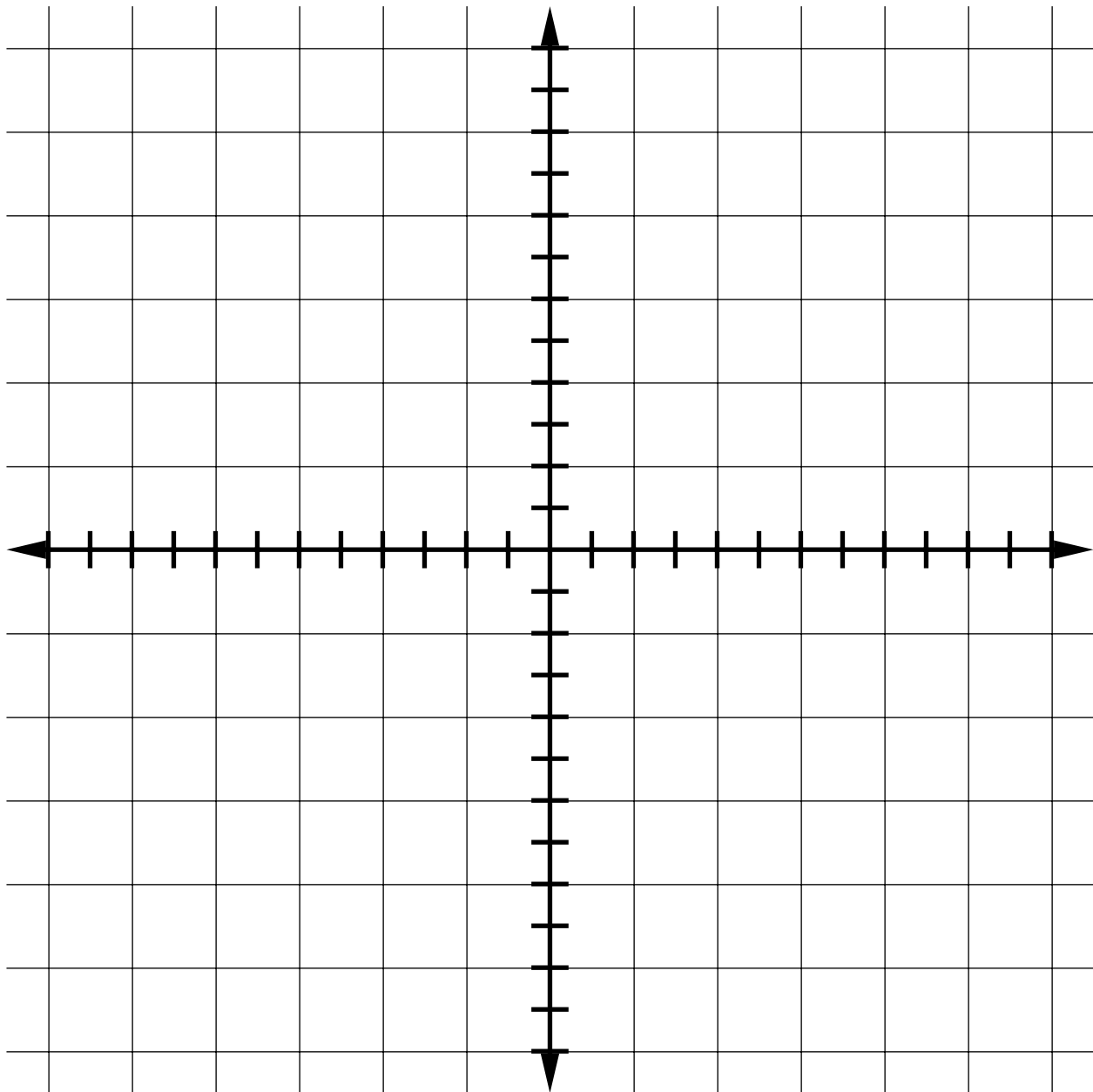
$$Y = X^2$$

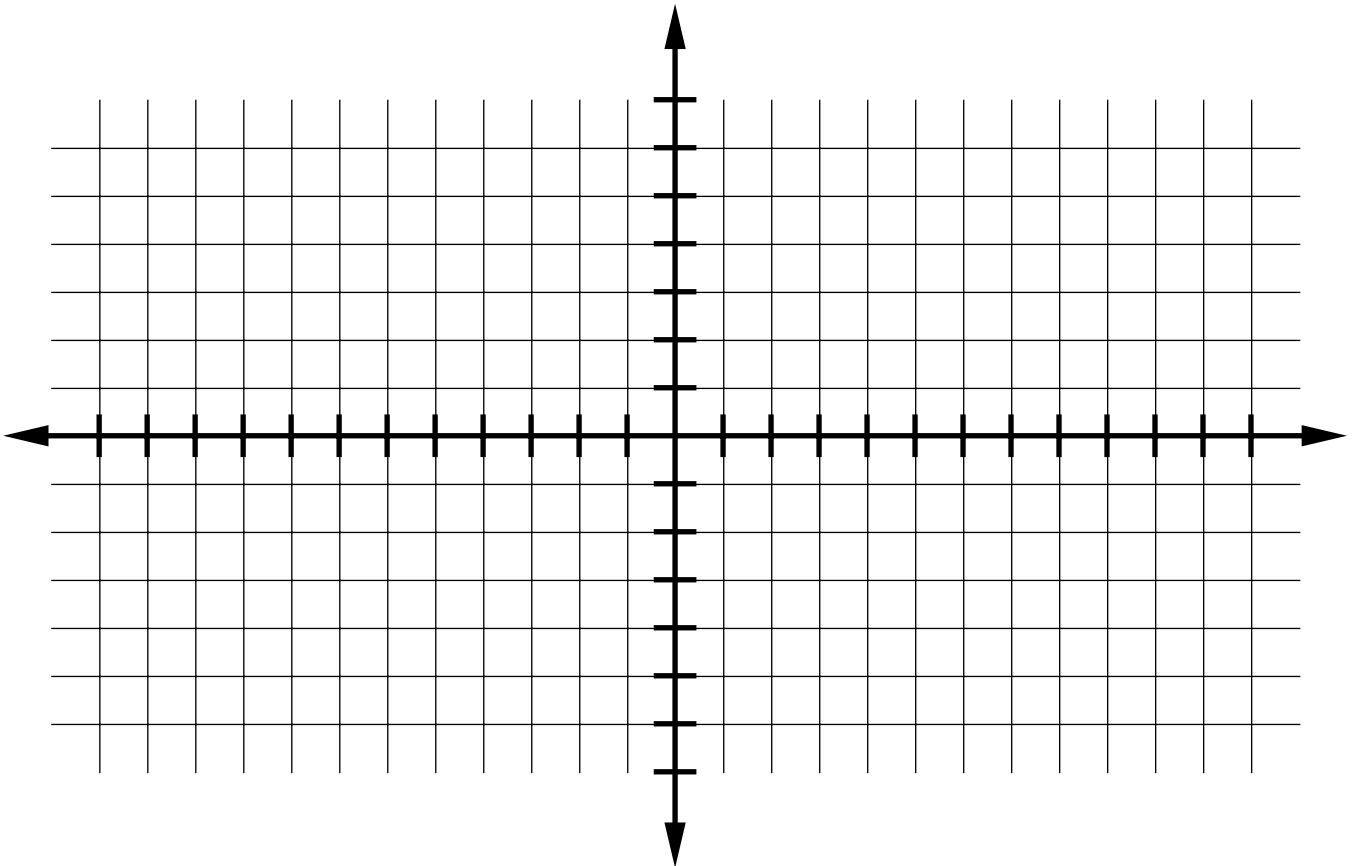
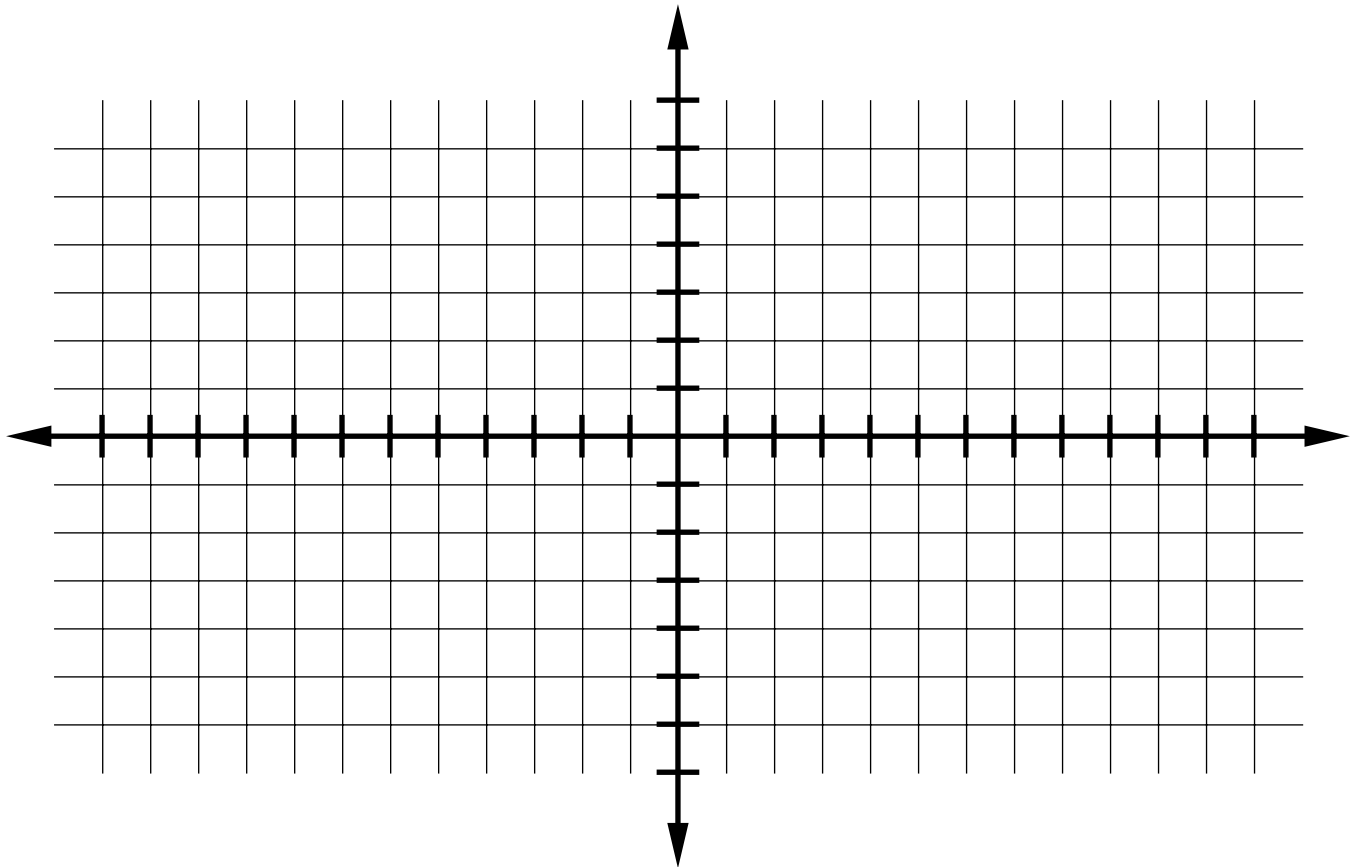
$$Y = 2X^2$$

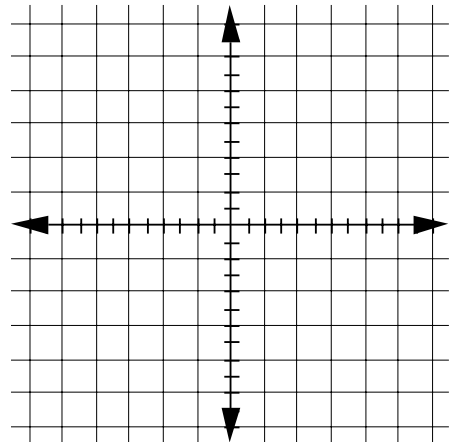
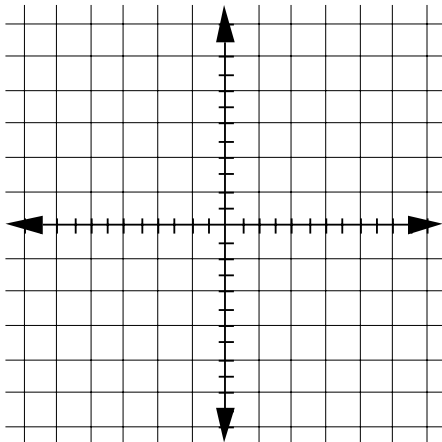
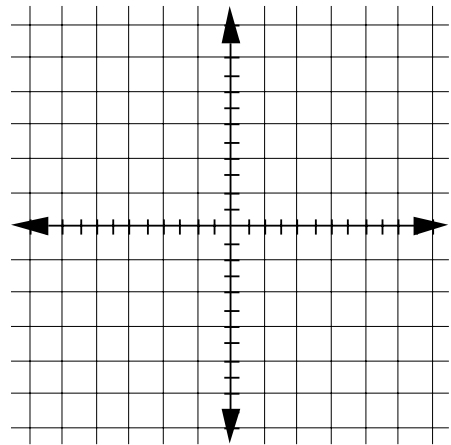
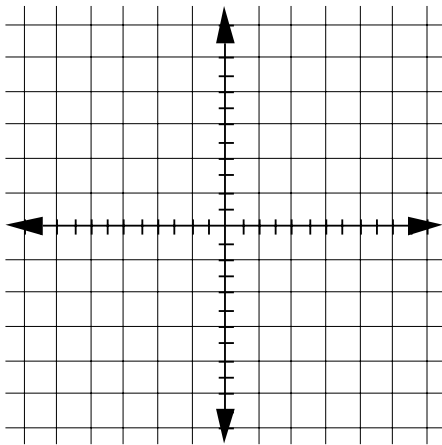
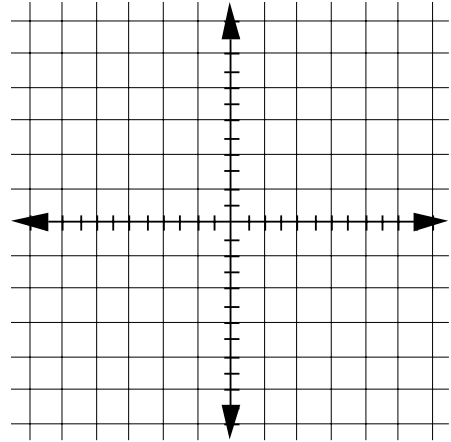
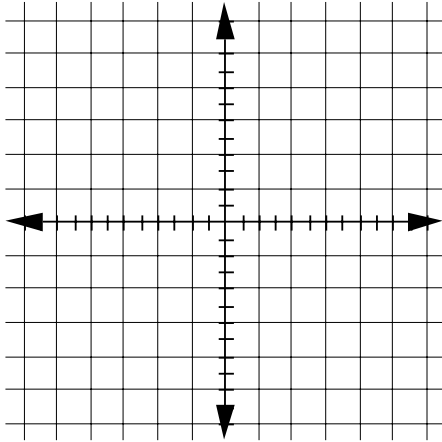
$$Y = -X^2$$

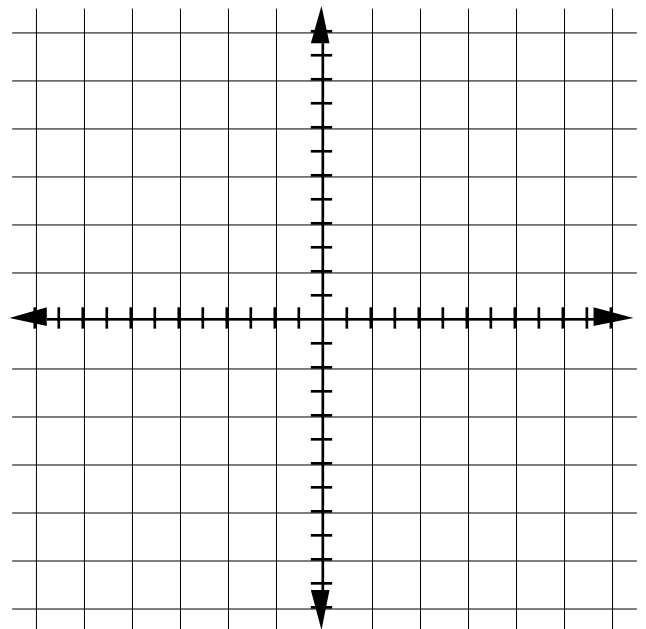
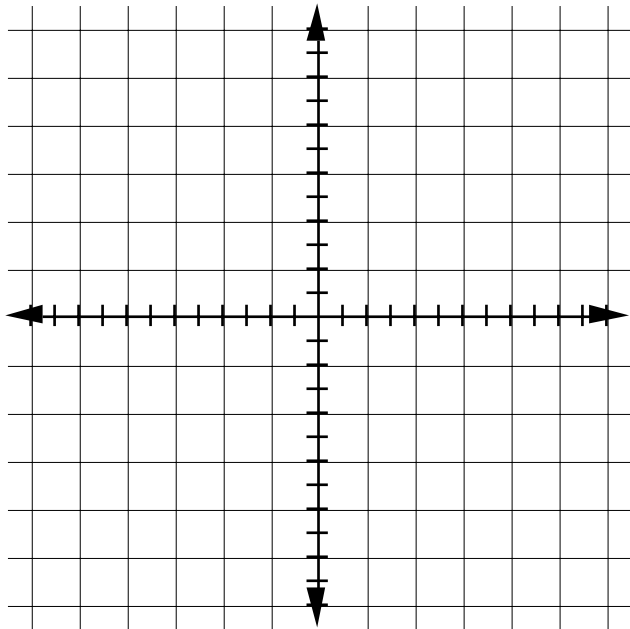
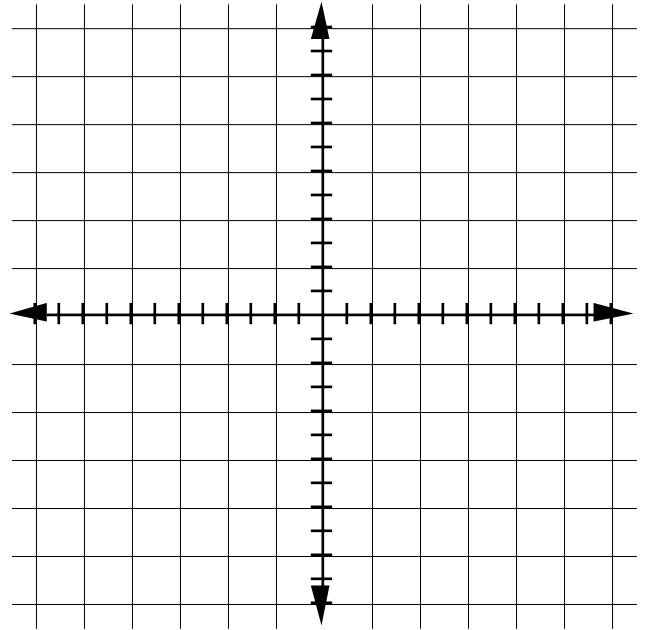
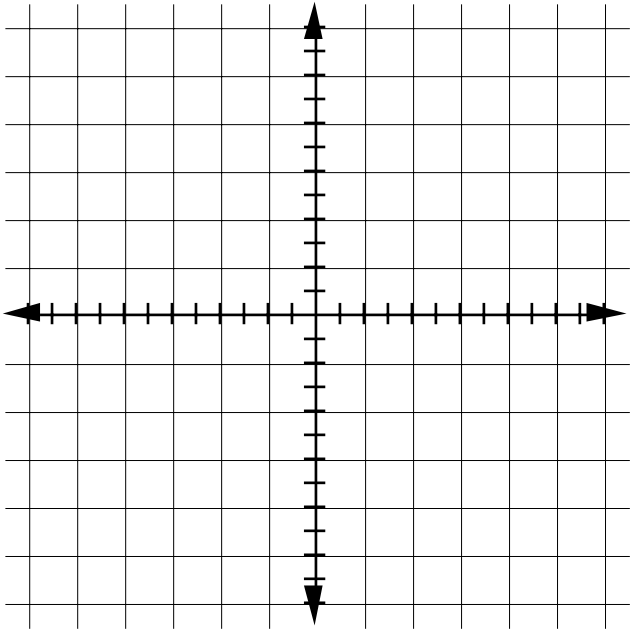
$$Y = X^3$$

$$Y = -X^3 + 2$$









EQUATION	FIRST STEP	SECOND STEP
$16 = 2 - 2x$	SUBTRACT 7	DIVIDE BY -5
$-16 = 5x - 11$	ADD 55	DIVIDE BY 5
$3x - 1 = 14$	SUBTRACT 2	MULTIPLY BY 5
$-5x - 55 = 0$	ADD 1	DIVIDE BY -5
$1 - 5x = -9$	SUBTRACT 2	MULTIPLY BY -4
$14 = -1 - 5N$	SUBTRACT 6	DIVIDE BY -2
$8 - 3x = 20$	ADD 1	MULTIPLY BY -2
$\frac{x}{4} + 6 = -5$	SUBTRACT 1	DIVIDE BY -5
$-1 = \frac{x}{-4} - 6$	SUBTRACT 1	DIVIDE BY 3
$\frac{x}{-2} - 7 = -3$	ADD 6	MULTIPLY BY 3
$\frac{x}{3} + 1 = 7$	ADD 11	MULTIPLY BY 4



Graph, Table, Equation

Plot1 Plot2 Plot3

$Y_1 = X + 1$

$Y_2 =$

$Y_3 =$

$Y_4 =$

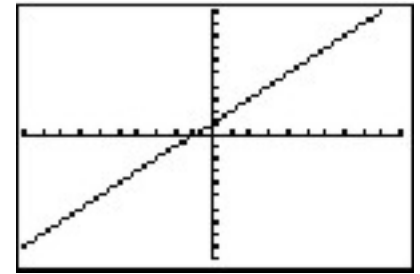
$Y_5 =$

$Y_6 =$

$Y_7 =$

X	Y1
3	4
2	3
1	2
0	1
-1	0
-2	-1
-3	-2

$Y_1 = X + 1$



Plot1 Plot2 Plot3

$Y_1 = -(1/2)X - 3$

$Y_2 =$

$Y_3 =$

$Y_4 =$

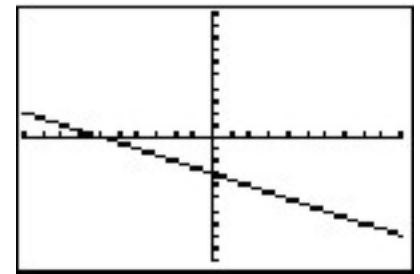
$Y_5 =$

$Y_6 =$

$Y_7 =$

X	Y1
3	-1.5
2	-2.5
1	-3.5
0	-4.5
-1	-5.5
-2	-6.5
-3	-7.5

$X = -3$



Plot1 Plot2 Plot3

$Y_1 = 2X - 5$

$Y_2 =$

$Y_3 =$

$Y_4 =$

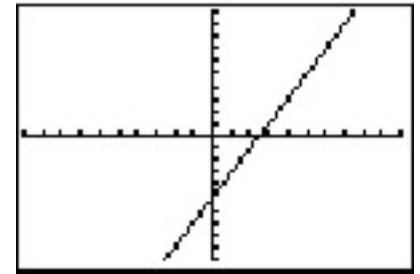
$Y_5 =$

$Y_6 =$

$Y_7 =$

X	Y1
3	1
2	3
1	5
0	7
-1	9
-2	11
-3	13

$X = -3$



Plot1 Plot2 Plot3

$Y_1 = -3X + 2$

$Y_2 =$

$Y_3 =$

$Y_4 =$

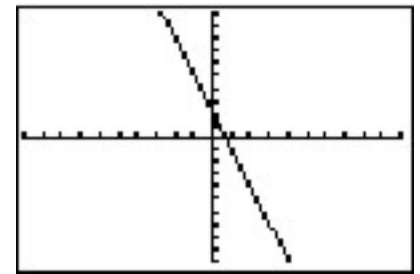
$Y_5 =$

$Y_6 =$

$Y_7 =$

X	Y1
3	-7
2	-4
1	-1
0	2
-1	5
-2	8
-3	11

$X = -3$



Plot1 Plot2 Plot3

$Y_1 = 8X$

$Y_2 =$

$Y_3 =$

$Y_4 =$

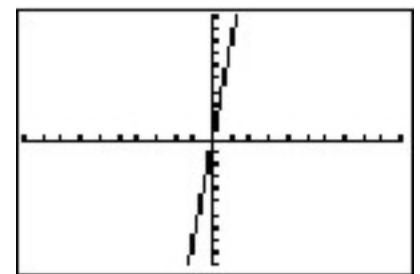
$Y_5 =$

$Y_6 =$

$Y_7 =$

X	Y1
3	24
2	16
1	8
0	0
-1	-8
-2	-16
-3	-24

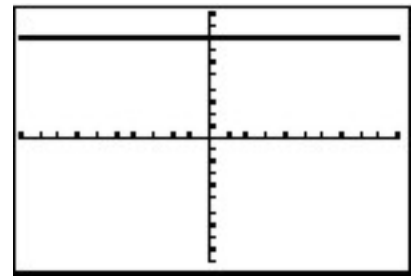
$X = -3$



Plot1 Plot2 Plot3
 Y1 = 8
 Y2 =
 Y3 =
 Y4 =
 Y5 =
 Y6 =
 Y7 =

X	Y1	
3	8	
2	8	
1	8	
0	8	
-1	8	
-2	8	
-3	8	

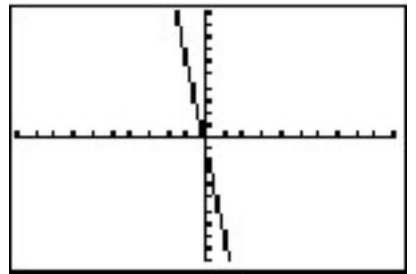
X = -3



Plot1 Plot2 Plot3
 Y1 = -7X - 1
 Y2 =
 Y3 =
 Y4 =
 Y5 =
 Y6 =
 Y7 =

X	Y1	
3	20	
2	13	
1	6	
0	-1	
-1	-8	
-2	-15	
-3	-22	

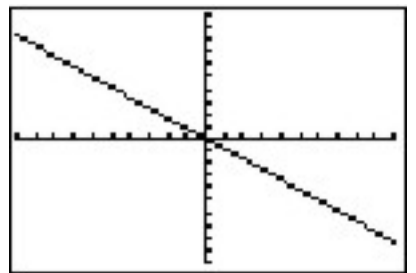
X = -3



Plot1 Plot2 Plot3
 Y1 = -(5/6)X
 Y2 =
 Y3 =
 Y4 =
 Y5 =
 Y6 =
 Y7 =

X	Y1	
3	2.5	
2	1.6667	
1	.83333	
0	0	
-1	-.8333	
-2	-1.667	
-3	-2.5	

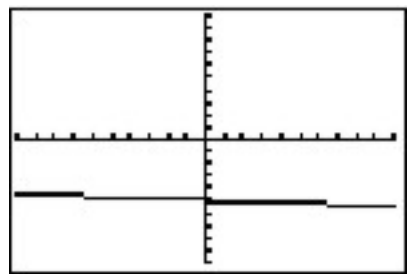
X = -3



Plot1 Plot2 Plot3
 Y1 = (1/20)X - 5
 Y2 =
 Y3 =
 Y4 =
 Y5 =
 Y6 =
 Y7 =

X	Y1	
3	-4.85	
2	-4.9	
1	-4.95	
0	-5	
-1	-5.05	
-2	-5.1	
-3	-5.15	

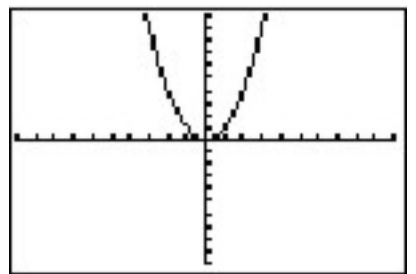
X = -3



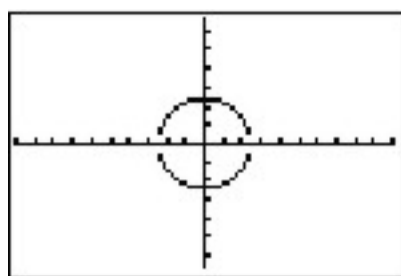
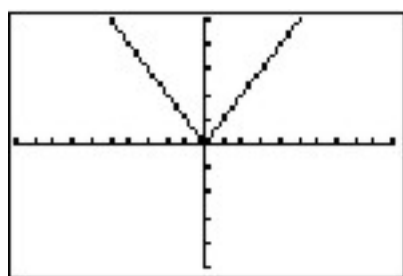
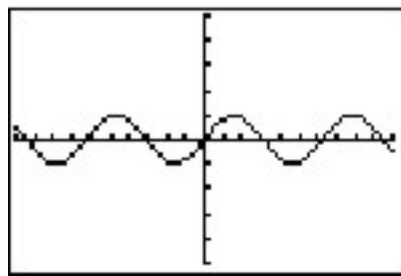
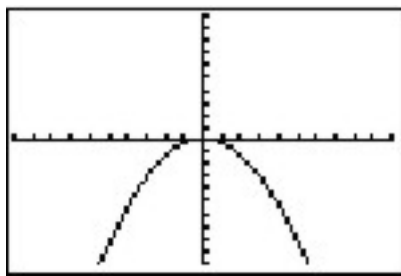
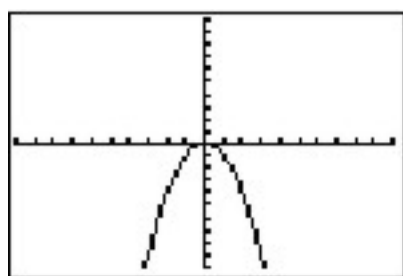
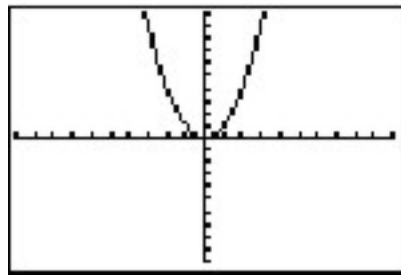
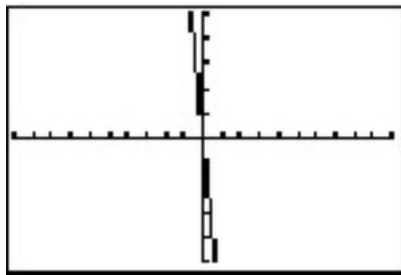
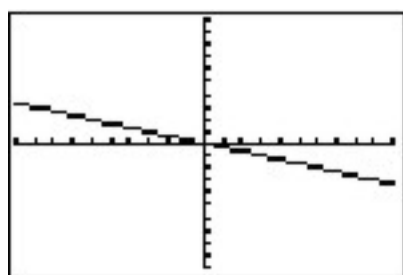
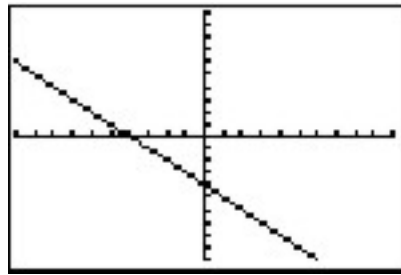
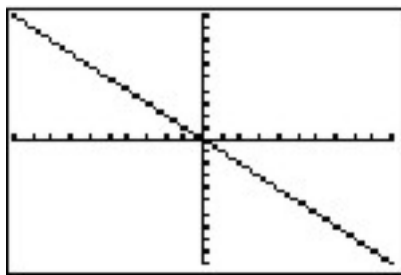
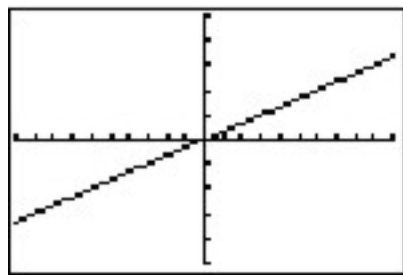
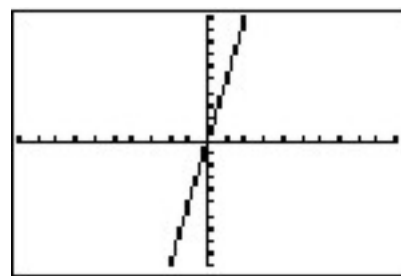
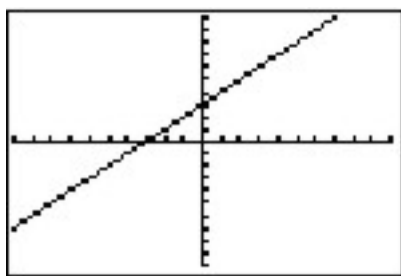
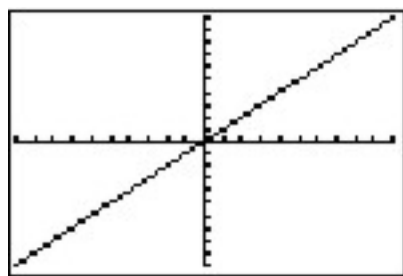
Plot1 Plot2 Plot3
 Y1 = X^2
 Y2 =
 Y3 =
 Y4 =
 Y5 =
 Y6 =
 Y7 =

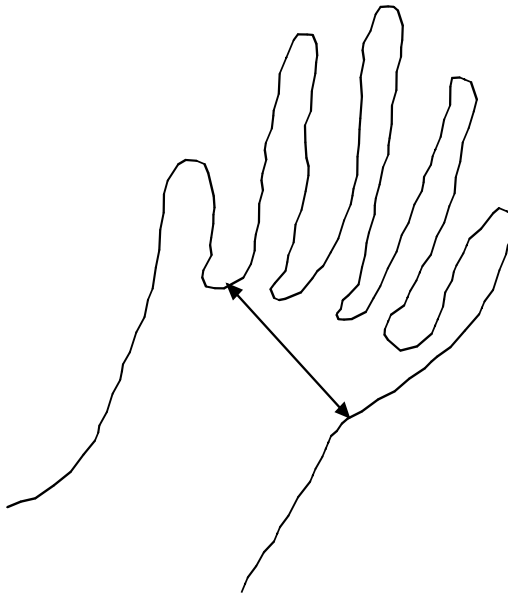
X	Y1	
3	9	
2	4	
1	1	
0	0	
-1	1	
-2	4	
-3	9	

X = -3



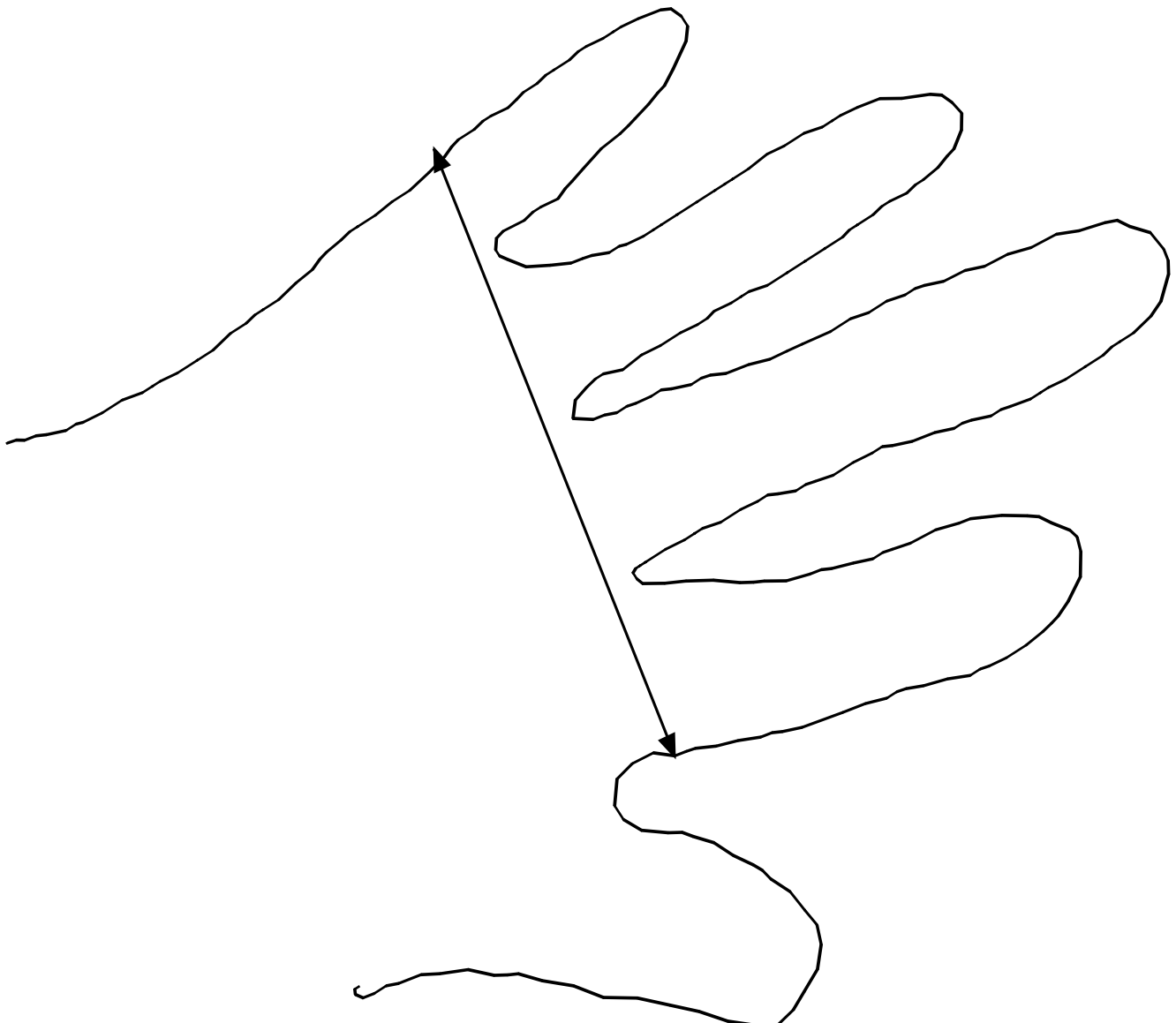
Ranger



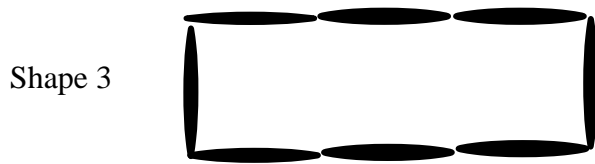
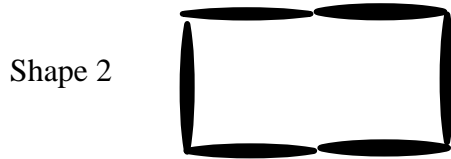
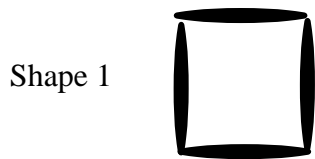


Research indicates that 95% of people have a palm width, p (in inches), that satisfies the following inequality: $3.12 \leq p \leq 3.86$. This is important because this information is used when designing control panels on airplanes, keyboards for computers, gloves, and many other things.

Determine whether the hand below satisfies the mathematical model described above.



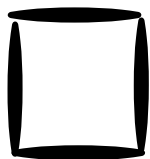
Toothpick Task One



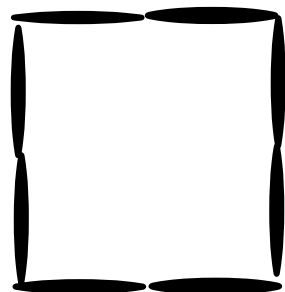
Shape #	Perimeter	Area
1	4	1
2	6	2
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
N		

Toothpick Task Two

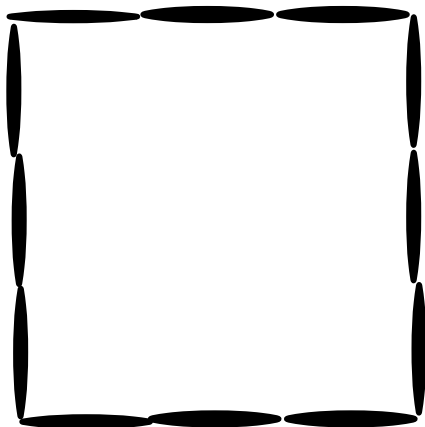
Shape 1



Shape 2



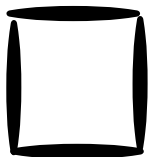
Shape 3



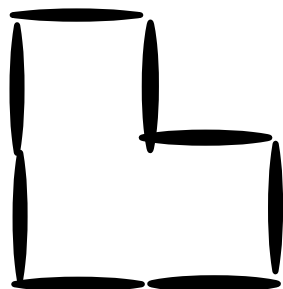
Shape #	Perimeter	Area
1	4	1
2	8	4
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
N		

Toothpick Task Three

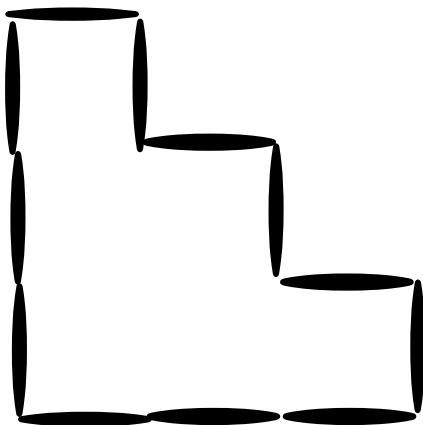
Shape 1



Shape 2



Shape 3



Shape #	Perimeter	Area
1	4	1
2	8	3
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
N		

Name _____ Date _____

CELL PHONE TASK

(adapted from *Principles and Standards for School Mathematics*. Reston, VA: NCTM, 2000)

Sarah found advertisements for two cellular telephone companies. Make-A-Call offers phone service for a basic fee of \$20.00 per month plus \$0.10 for each minute used. Chatterbox has no monthly basic fee but charges \$0.45 a minute. Both companies use technology that allows them to charge for the exact time used. Unlike many of their competitors, they do not “round up” the time to the nearest minute. Compare the two companies’ charges for the time used each month.

Name _____ Date _____

CELL PHONE TASK

(adapted from *Principles and Standards for School Mathematics*. Reston, VA: NCTM, 2000)

Sarah found advertisements for two cellular telephone companies. Make-A-Call offers phone service for a basic fee of \$20.00 per month plus \$0.10 for each minute used. Chatterbox has no monthly basic fee but charges \$0.45 a minute. Both companies use technology that allows them to charge for the exact time used. Unlike many of their competitors, they do not “round up” the time to the nearest minute. Compare the two companies’ charges for the time used each month.

Cell Phone Task Extension

1. Draw the graphs of the two cell phone company options using the “Total Number of Minutes Used” versus the “Total Cost per Month”. Compare the graphs.
2. Is it appropriate to connect the points on the graphs to make lines? Explain.
3. Which line is steeper? Interpret the meaning of the slope of that line.
4. Which function grows at a faster rate? Which function grows at the slower rate? What are the slopes? Interpret the meaning of each slope.
5. If the lines were extended through the y-axis, would any of the lines go through the origin? Explain.
6. What is the “break even point”? What is the significance about where the points on the graph intersect?

Date _____

Name _____

Cell Phone Task Extension (continued)

1. Write an equation that can be used to find the total cost per month for each cell phone company for any number of minutes.
2. Create a new cell phone company that has a faster rate of growth than both Make-A-Call and Chatterbox. Write an equation to find the total cost per month for this company.
3. If Sarah talked for 50 minutes on his cell phone in the month of December, how much would each cell phone company charge her? If Sarah talked for 60 minutes, how much would each company charge her?
4. How many minutes could Sarah use in a month if she spent \$27 with Make-A-Call?
5. If she spent \$36 with Chatterbox, how many minutes could she use in a month?
6. Use an inequality to explain when it is better to use each company.

Date _____

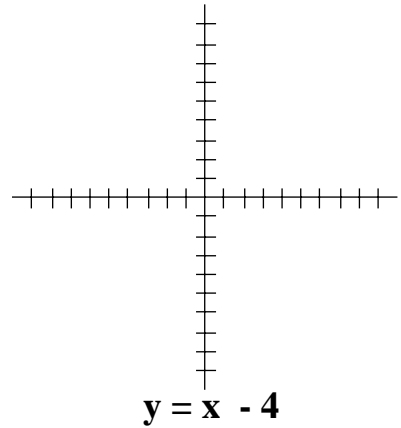
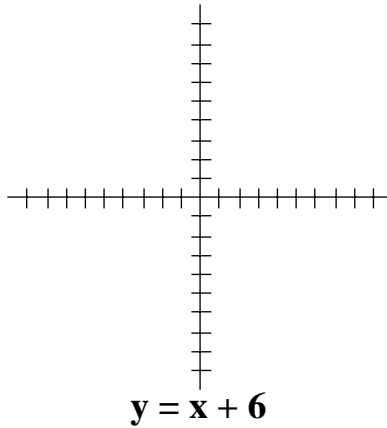
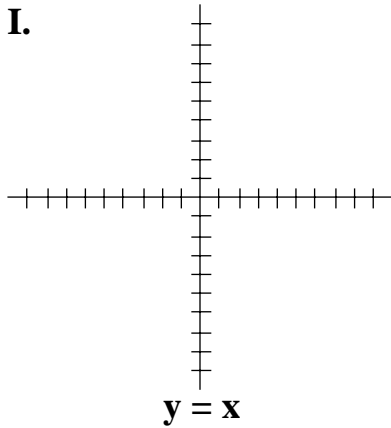
Name _____

The Picture Tells the (Linear) Story

Sketch each equation's graph on the axes provided.

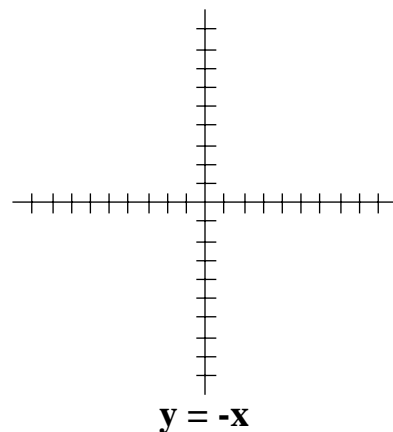
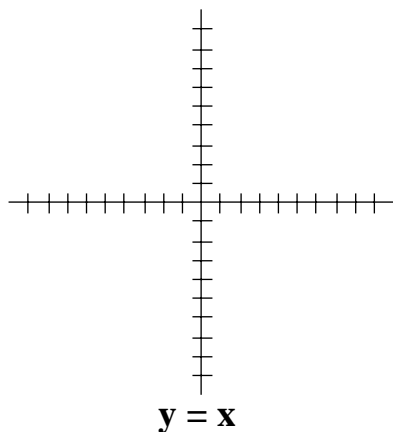
Answer the questions for each family of equations.

I.



- ◆ How are the lines the same?
- ◆ What is different about the lines?
- ◆ Where does each line cross the y -axis?
- ◆ What happens to the graph when a constant is added to $y = x$?
- ◆ Write an equation for a line similar to those above but crosses the y -axis at 5.
- ◆ Write an equation for a line similar to those above but crosses the y -axis at -2.

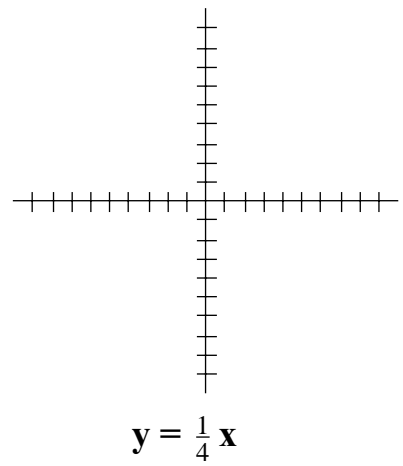
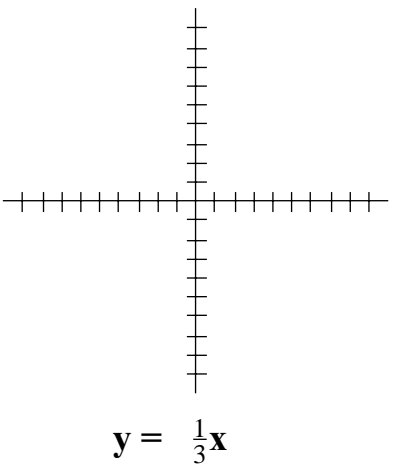
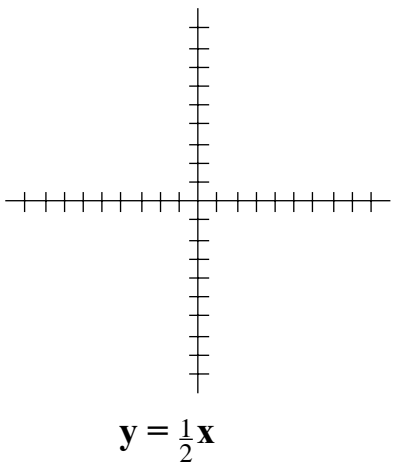
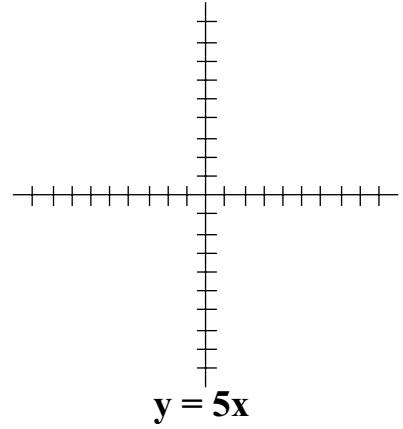
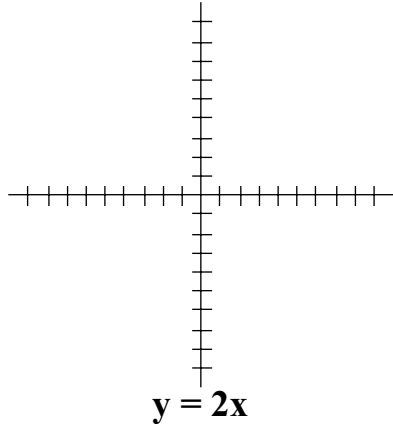
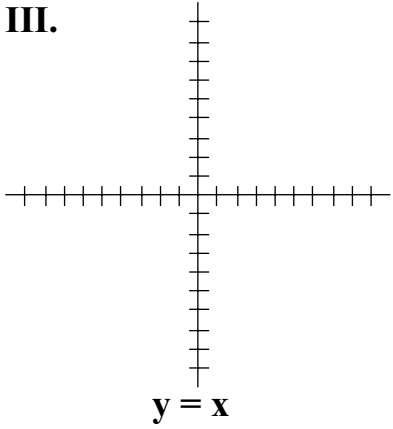
II.



- ◆ How are the lines alike?
- ◆ How are the lines different?

The Picture Tells the (Linear) Story

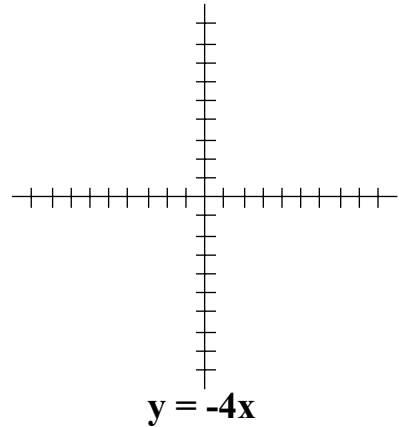
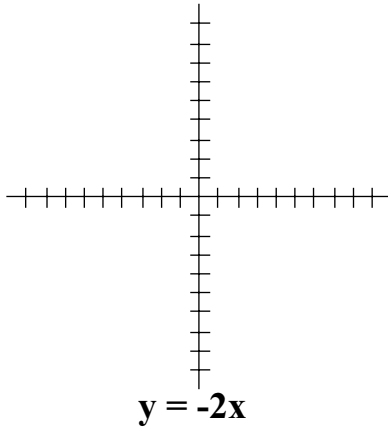
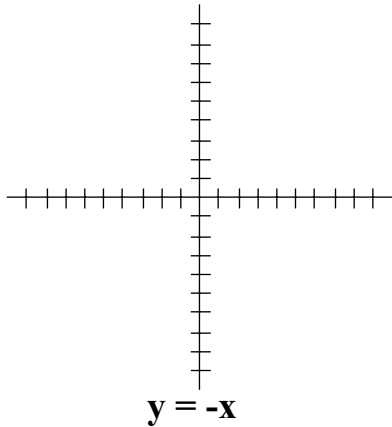
III.



- ◆ Describe the differences in the graphs.
- ◆ Which line appears the steepest?
- ◆ What makes the difference?

The Picture Tells the (Linear) Story

IV.



- ◆ How are the lines different?
- ◆ Which line appears the steepest?
- ◆ What makes the difference?

V.

- ◆ Where does each of the following cross the **y**-axis?
- ◆ Which line is steepest and why.

$y = 2x + 7$ _____

$y = -x + 11$ _____

$y = \frac{1}{2}x - 8$ _____

- ◆ Where does each of the following cross the **y**-axis?
- ◆ Which line is steepest and why.

$y = x + 8$ _____

$y = 3x - 4$ _____

$y = \frac{1}{2}x + 3$ _____

- ◆ Where does each of the following cross the **y**-axis?
- ◆ Which line is steepest and why.

$y = -x + 8$ _____

$y = -2x + 5$ _____

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

◆ If a linear equation can be written in the form $y = mx + b$, where **m** and **b** represent any real values, explain the effect of **m** on the graph of the equation.

- ◆ Explain the effect of **b** on the graph.

Moving on the Graph

Name _____

Write an equation you think will satisfy each of the conditions below.
Test your hypothesis with a calculator.

1. What do you do to the equation $y = x$ to make its graph steeper?

Write two examples of such equations.

2. What do you do to the equation $y = x$ to make its graph flatter?

Write two examples of such equations.

3. What do you do to the equation $y = x$ to make its graph move up on the y-axis?

Write two examples of such equations.

4. What do you do to the equation $y = x$ to make its graph move down on the y-axis?

Write two examples of such equations.

5. What do you do to the equation $y = x$ to make its graph go through the second and fourth quadrants?

Write two examples of such equations.

How Do They Fit?

Determine the slope and y-intercept.

$m = 1, b = 0$ $2x + 3y = 6$	$m = 3, b = \frac{-4}{3}$ $x - 4y = 40$	$3x - y = -5$ $6x + 4y = 15$
$m = \frac{4}{3}, b = 3$ $5x - 3y = 7$	$m = \frac{1}{5}, b = \frac{5}{2}$ $2x + 7y = 8$	$9 - = 3y + x$ $m = -2, b = -4$
$m = \frac{3}{7}, b = \frac{3}{5}$ $5x - 3y = 7$	$m = \frac{5}{2}, b = \frac{5}{4}$ $4x - 3y = 9$	$5x - 4y = 9$
$m = \frac{7}{2}, b = \frac{7}{8}$ $2x - 3y = 18$	$m = \frac{2}{3}, b = 6$ $7x - y = 2$	$6x - 2y = 16$ $6x + 4y = 0$

How Do They Fit?
Master Sheet
