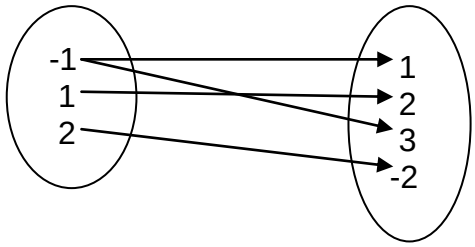
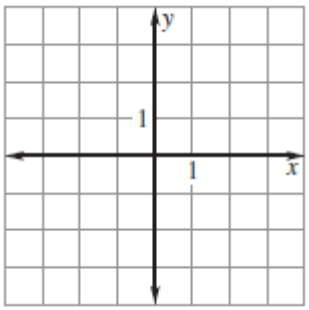
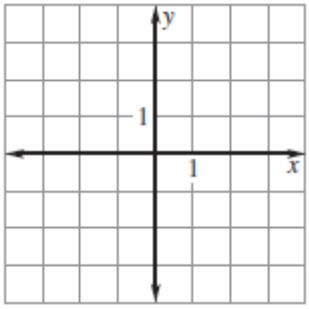
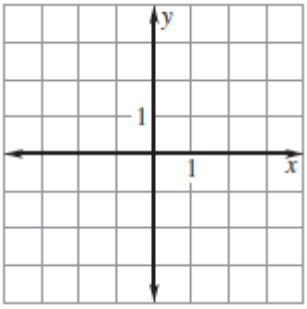
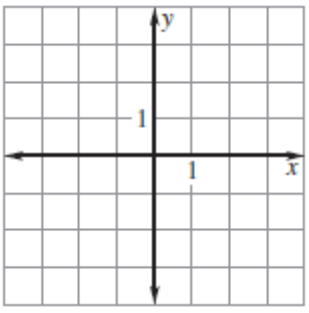
2.1	**Functions and Their Graphs**
Objectives	1. Represent relations and functions. 2. Graph and evaluate linear functions.
Key Terms	Relation Domain Range Function
Identify the domain and range.	 Domain _____ Range_____ Is the relation a function?
Graph the relation.	Write the relation from the above example as a set of ordered pairs, then graph the points. 

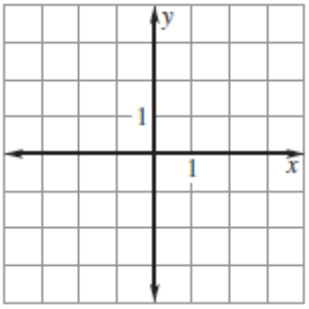
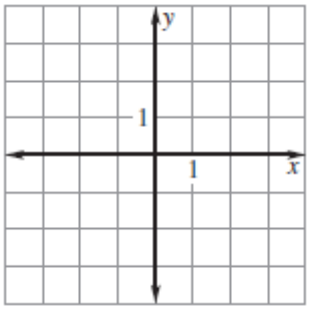
Vertical Line Test for Functions.	A relation is a function if and only if _____
Graphing Equations in Two Variables	**Step One:** Construct a table of values **Step Two:** Graph enough solutions to recognize a pattern. **Step Three:** Connect the points with a line or a curve. *******THESE STEPS WILL WORK FOR EVERY EQUATION YOU ARE TRYING TO GRAPH*******
Graph the Function.	y = x – 1 x | y | | | | | | | | | | 
	Linear Function y = mx + b **Function Notation** *f(x)* = mx + b *f(x)* is read as "the value of *f* at *x*" or "*f* of *x*"
Evaluate the function for the given value of x. Decide whether the function is linear.	$f(x) = -3x + 4 \ : f(4)$ $f(x) = x^2 - 4x - 1 \ ; f(-3)$

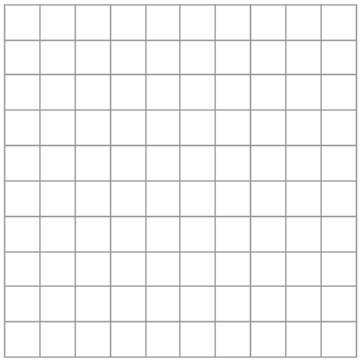
2.2	**Slope and Rate of Change**
Objectives	1. Find slopes of lines and classify parallel and perpendicular lines. 2. Use slope to solve real life problems.
Key Terms	Slope Parallel Perpendicular
	THE SLOPE OF A LINE $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{rise}{run}$
Find the slope of the line.	(3, 2) and (-4, 3) 
Classification of Lines by Slope	A line with a _____ slope rises from left to right. (m __ 0) A line with a _____ slope falls from left to right. (m __ 0)

	A line with a slope of _____ is horizontal. (m ___ 0) A line with an _____ slope is vertical (m _____)
	Parallel lines have the **same** slope. $m_1 = m_2$ **Perpendicular line**s have slope that are **negative reciprocals** of each other. $m_1 = -\frac{1}{m_2}$
Tell whether the lines are parallel, perpendicular, or neither.	Line 1: (-1, 9) and (-6, -6) Line 2: (-7, -23) and (0, -2) Line 1: (0, 3) and (0, -7) Line 2: (-6, -4) and (12, -4)

The slope of a road, or grade, is usually expressed as a percent. For example if a road has a grade of 3%, it rises 3 feet for every 100 feet of horizontal distance. **a. Find the grade of the road that rises 75 feet over a horizontal distance of 2000 feet.** **b. Find the horizontal length x of a road with a grade of 5% if it rises 50 feet over the length.**	
The temperature at 4 p.m. was 77˚F and at 1 a.m. was 58˚F. Find the average rate of change to find the temperature at 9 p.m.	

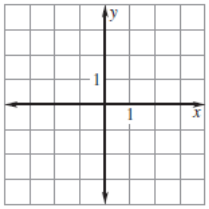
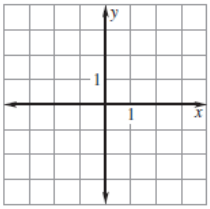
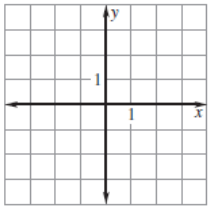
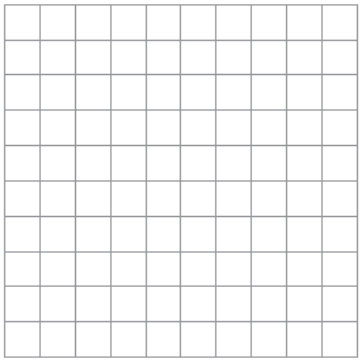
2.3	Quick Graphs of Linear Equations
Objectives	1. Use the slope-intercept form of an equation to graph linear equations. 2. Use standard form of a linear equation to graph linear equations.
Key Terms	y-intercept Slope Intercept Form Standard Form
	Graphing Equations in Slope Intercept Form **y = mx + b** **Step One** **Step Two** **Step Three** **Step Four**
Graph the equation.	$y + 1 = \frac{2}{3}x$ 

	Graphing Equations in Standard Form **Ax + By = C** **Step One** **Step Two** **Step Three** **Step Four**
Graph the equation.	2x + 5y = 10 
Horizontal and Vertical Lines	The graph **y = c** is a **horizontal line** through the point (0, c). The graph of **x = c** is a **vertical line** through the point (c, 0).
Graph the equations.	a. x = 3 b. y = -2 

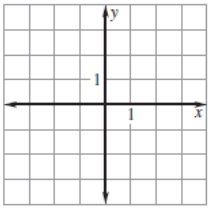
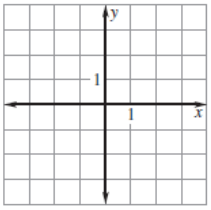
Students are selling tickets to a school play. The goal is to raise $600. Tickets are selling for $4 for adults and $3 for students. Describe the number of adult and student tickets sold that will reach the goal. Graph the solution.	

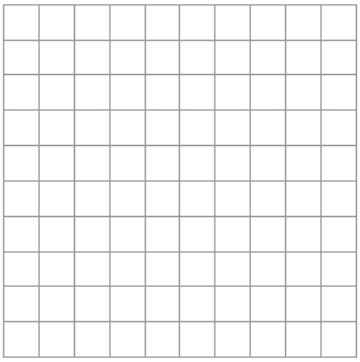
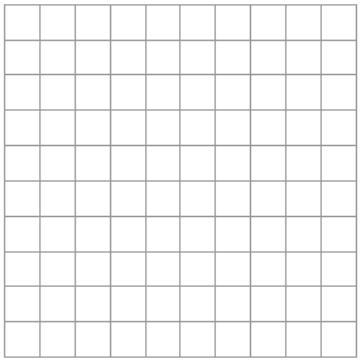
2.4	**Writing Equations of Lines**
Objectives	1. Write linear equations. 2. Write direct variation equations.
Key Terms	Direct Variation Constant of Variation
	Writing the Equation of a Line **Slope-Intercept Form:** Given the _____ and the_____ use this equation: **$y = mx + b$** **Point-Slope Form:** Given the _____ and _____ use this equation: **$y - y_1 = m(x - x_1)$** **Two Points:** Given two points _____ and _____, use the formula $m = \frac{\quad}{\quad}$ to find the slope m. Then use the **point-slope form** with this slope and either of the given points to write the equation of the line. ***All final equations are to be written in **Slope-Intercept Form**.***
Write the equations of the line given the following.	a. m = 5 , b = -3 b. (1, 2) , m = 2 c. (-5, 9) , (-4, 7)

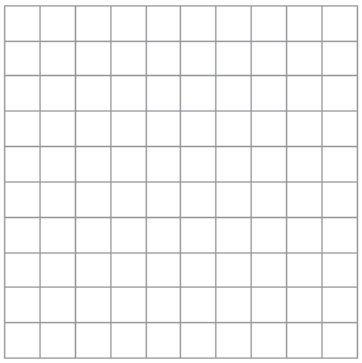
Writing the Equations of Parallel and Perpendicular Lines	Write an equation of the line that passes through (3, 4) and is **parallel** to the line y = 2x – 1. Write an equation of the line that passes through (3, 4) and is **perpendicular** to the line y = 2x – 1.
	Direct Variation y = kx
The variables x and y vary directly. Write an equation that relates the variables. Then find x when y=5.	x = 6 , y = 18 x = 18, y = 6
Identifying Direct Variation.	<table><tr><td>x</td><td>4</td><td>8</td><td>12</td><td>16</td><td>20</td></tr><tr><td>y</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table> <table><tr><td>x</td><td>1</td><td>2</td><td>4</td><td>5</td><td>10</td></tr><tr><td>y</td><td>10</td><td>5</td><td>2.5</td><td>2</td><td>1</td></tr></table>

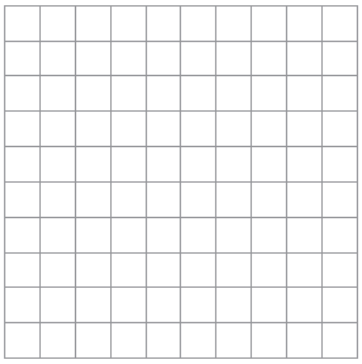
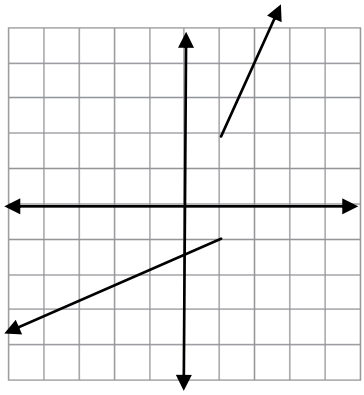
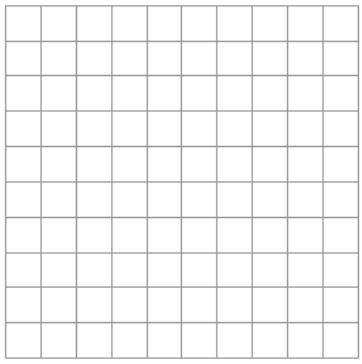
2.5	Correlation and Best Fitting Lines
Objectives	1. Use a scatter plot to identify the correlation shown by a set of data. 2. Approximate the best-fitting line for a set of data.
Key Terms	Scatter Plot
Correlation	Positive  Negative  No Correlation 
Finding the Line of Best Fit	**Years since 1989** | **0** | **1** | **2** | **3** | **4** | **5** | **6** **FM Radio Stations** | **4269** | **4392** | **4570** | **4785** | **4971** | **5100** | **5730** **Step One:** Draw a Scatter Plot.  **Step Two:** Sketch the line of best fit. **Step Three:** Choose 2 points on the line and estimate their coordinates. (They do NOT have to be original data points) **Step Four:** Find the equation of the line using the 2 points.

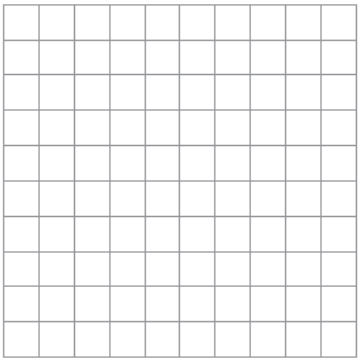
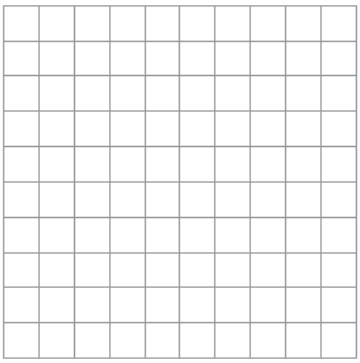
Write the equation of the line of best fit. (Hint: Use the process from Section 2.4)	
If the pattern continues how many FM stations will there be in 2012?	

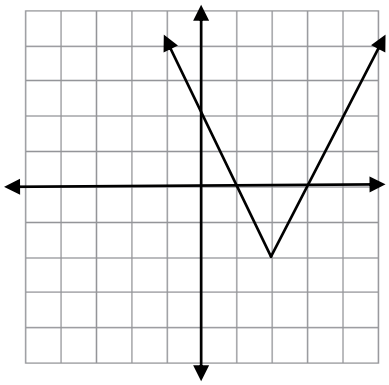
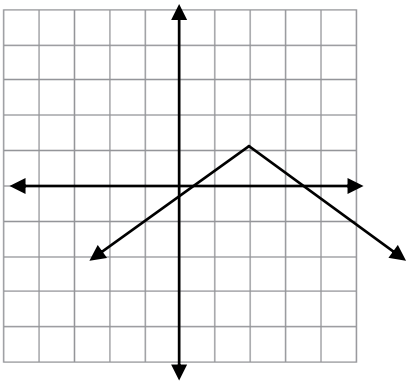
2.6	**Linear Inequalities in Two Variables**
Objectives	1. Graph linear inequalities in two variables. 2. Use linear inequalities to solve real life problems.
Key Terms	Linear Inequality Solution Half planes
Checking Solutions of Inequalities	Check whether the given ordered pairs are solutions of the inequality: $2y \geq 7$ (1, -6), (0, 4) $2x + 3y > 5$ (2, 1), (1, 1)
	Graphing a Linear Inequality 1. 2.
Linear Inequalities in One Variable	Graph: $x \leq 3$  $2y > -4$ 

Linear Inequalities in Two Variables	Graph: $2x - 5y \geq 10$ 
You have $40 and want to buy peanuts and soda for your friends at a baseball game. Peanuts are $2.50 and soda is $4 each. **Write a linear inequality in two variables to represent the number of soda and peanuts you can buy.** **Graph the solution.** **Give three different solutions.**	

2.7	**Piecewise Functions**
Objectives	1. Represent piecewise functions. 2. Use piecewise functions to model real life quantities.
Key Terms	Piecewise Function Step Function
Evaluating a Piecewise Function	Evaluate f(x) when x = 0, 2, 4 $f(x) = \begin{cases} x + 2, & \text{if } x < 2 \\ 2x + 1, & \text{if } x \geq 2 \end{cases}$
Graphing a Piecewise Function	Graph. $f(x) = \begin{cases} -2x + 3, & \text{if } x < 1 \\ x - 3, & \text{if } x \geq 1 \end{cases}$ 

Graphing a Step Function	Graph. $f(x)=\begin{cases} 1, \text{ if } 0 \le x < 1 \\ 2, \text{ if } 1 \le x < 2 \\ 3, \text{ if } 2 \le x < 3 \\ 4, \text{ if } 4 \le x < 5 \end{cases}$ 
Writing a Piecewise Function	
Shipping costs $3 on purchases up to $10, $5 on purchases up to $50, and $8 on purchases over $50 up to $100. Write a piecewise function for this situation and then graph it.	

2.8	**Absolute Value Functions**
Objectives	1. Represent absolute value functions. 2. Use absolute value functions to model real life situations.
Key Terms	Vertex
	Characteristics of Absolute Value Functions $\boldsymbol{y = a\lvert x - h\rvert + k}$ 1. The graph has a vertex at_____. 2. The graph is symmetric in the line _____. 3. The graph is V-shaped. It opens _____ if a > 0 and opens _____ if a < 0. 4. The absolute value of a tells if the graph opens **narrow** or **wide**.
Graph the absolute value functions.	$y = 2\lvert x + 1\rvert - 2$  $y = -\lvert x - 2\rvert - 3$ 

Write the absolute value equation.	 
Suppose that a tent is 7 feet wide and 5 feet tall. Draw a graph to model the front of the tent, then write and equation for the absolute function.