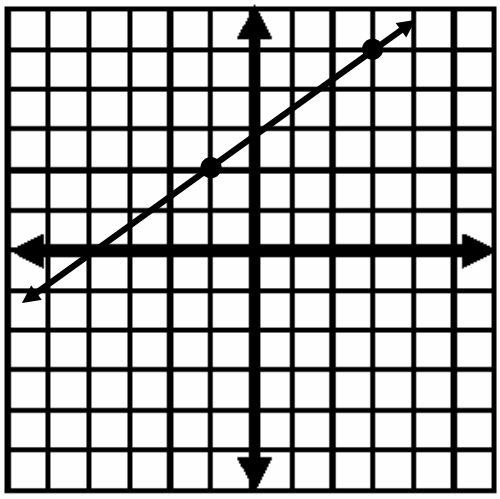
Chapter 5 Notes

Writing Linear Equations



Today's Date: _____

5.1 Write Linear Equations in Slope-Intercept Form

Use slope and y-intercept to write an equation.

1. Write an equation of the line with a slope of -4 and a y-intercept of 6.

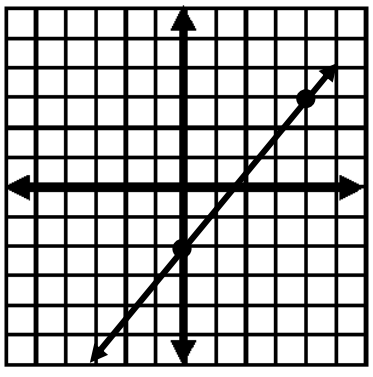
2. Slope is 8; y-intercept is -5.

3. Slope is $\frac{2}{3}$; y-intercept is -2.

4. Slope is -3; y-intercept is 7.

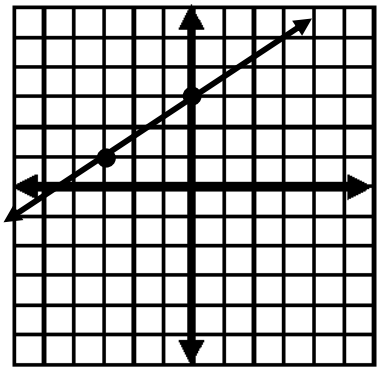
5. Slope is $-\frac{5}{2}$; y-intercept is 9.

Write an equation of a line given two points.

6. 

Write an equation of a line given two points.

7.



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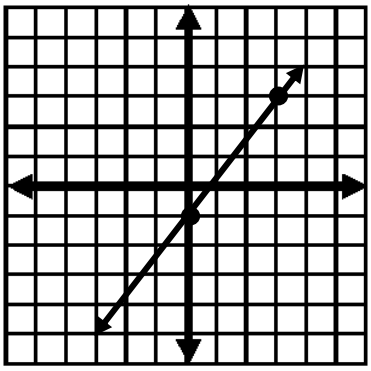


Write a linear function.

9. Write an equation for the linear function f with the values f(0) = 4 and f(2) = 12.

10. Write an equation for the linear function with the values f(0) = 3 and f(3) = 15.

11. Write an equation for the linear function with the values f(3) = 1 and f(0) = 7.

Today's Date: _____

5.2 Use Linear Equations in Slope-Intercept Form

Writing an Equation of a Line in Slope-Intercept Form

1. Identify the slope ___. You can use the slope formula to calculate the slope if you know two points on the line.
2. Find the y-intercept ____, You can substitute the slope and the coordinates of a point (x,y) on the line into y = mx + b. Then solve for b.
3. Write an equation using _____.

Write an Equation given the Slope and a Point

1. Write an equation of the line that passes through the point (1,2) and has a slope of 3.

2. Write an equation of the line that passes through the point (2, 2) and has a slope of 4.

Write an Equation given Two Points

3. Write an equation of the line that passes through (2, -3) and (-2, 1).

Write an Equation given Two Points

4. Write an equation of the line that passes through (-3, 4) and (1, 2).

5. Write an equation of the line that passes through (-8, -13) and (4, 2).

Solve a multi-step Problem

6. From 1990 to 2001, the number of airports in the United States increased at a relatively constant rate of 175 airports per year. There were 19,306 airports in the United States in 2001.

   a. How many U.S. airports were there in 1990?

   b. Write an equation that gives the number of U.S. airports as a function of the number of years since 1990.

   c. Find the year in which the number of U.S. airports reached 19,500.

7. Your gym membership costs $33 per month after an initial membership fee. You paid a total of $228 after 6 months. Write an equation that gives the cost as a function of the length of your gym membership (in months). Find the total cost after 9 months.

Today's Date: _____

5.3 Write Linear Equations in Point-Slope Form

The **point-slope form** of the equation of the nonvertical line through a given point (x_1, y_1) with a slope of m is :_____

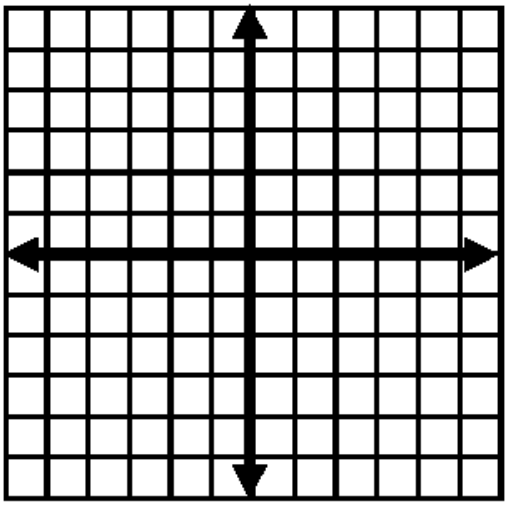
Write an equation in point-slope form

1. Write an equation in point-slope form on the line that passes through the point (3, 2) and has a slope of 2.

2. Write an equation in point-slope form on the line that passes through the point (-3, 5) and has a slope of 4.

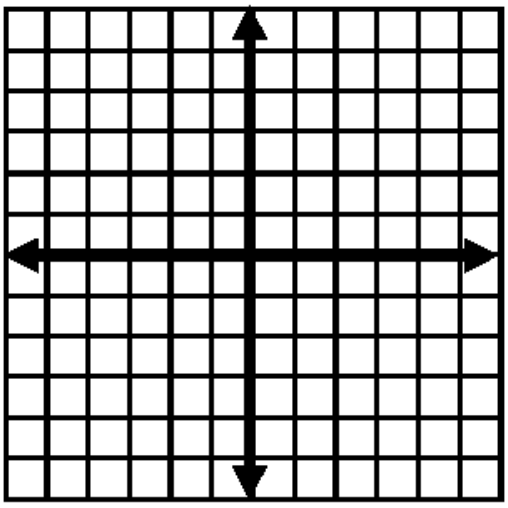
Graph an equation in point-slope form

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



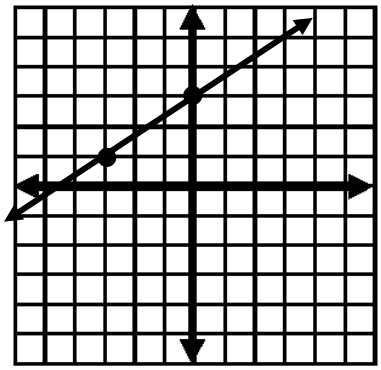
Graph an equation in point-slope form

4. $y + 1 = 2(x - 1)$

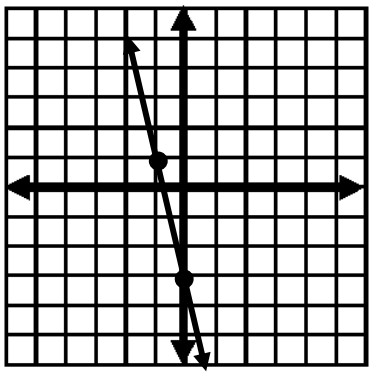


Use point-slope form to write an equation

5. Write an equation in point-slope form of the line shown.



6. Write an equation in point-slope form of the line shown.



Solve a multi-step problem.

7. You are designing a sticker to advertise your band. A company charges $225 for the first 1000 stickers and $80 for each additional 1000 stickers. Write an equation that gives the total cost (in dollars) of stickers as a function of the number (in thousands) of stickers ordered. Find the cost of 9000 stickers.

Write a real-world linear model from a table.

8. The table shows the cost of visiting a working ranch for one day and night for different numbers of people. Can the situation be modeled by a linear equation? Explain. If possible, write an equation that gives the cost as a function of the number of people in the group.

Number of people	4	6	8	10	12
Cost (dollars)	250	350	450	550	650

Today's Date: _____

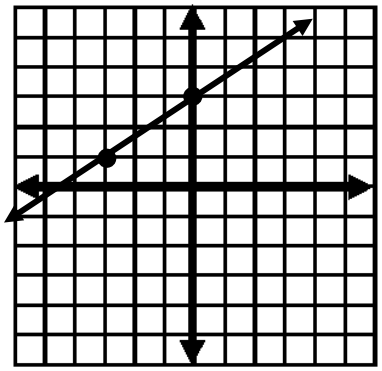
5.4 Write Linear Equations in Standard Form

Standard Form: _____

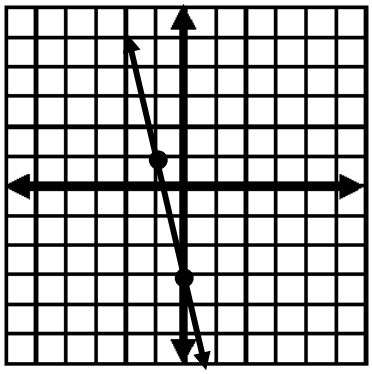
Write equivalent equations in standard form

Write an equation from a graph

a. Write an equation in standard form of the line shown.



b. Write an equation in standard form of the line shown.



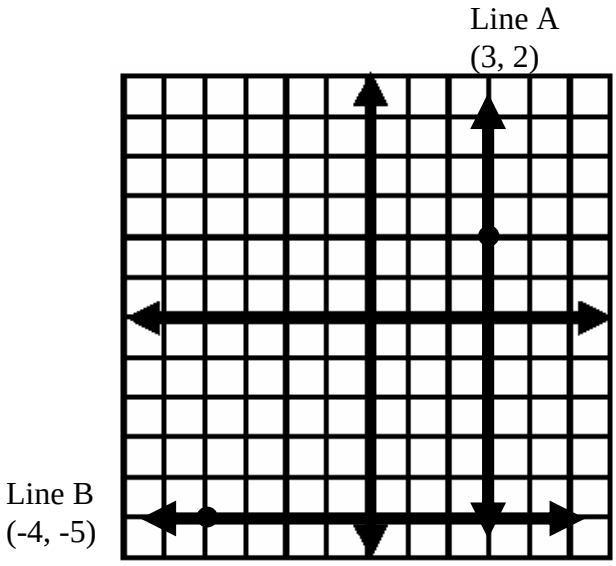
Write an equation from two points.

c. Write an equation in standard form of the line through (3,-1) and (2,-4)

Write an equation of a line.

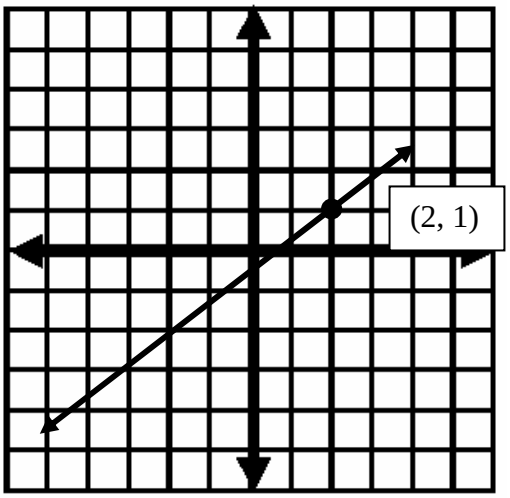
d. Line A

e. Line B



Complete an equation in standard form

f. Find the missing coefficient in the equation of the line shown. Write the completed equation.



Ax + 5y = -3

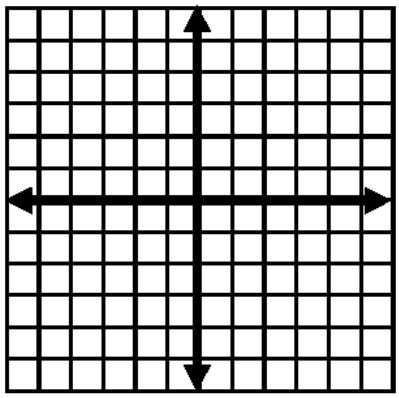
g. Find the missing coefficient in the equation of the line that passes through (-2, 2). Write the completed equation.

6x + By = 4

Today's Date: _____

5.5 Write Equations of Parallel and Perpendicular Lines

Parallel lines have the _____ slope.



Graph the two lines: $y = 3x + 2$

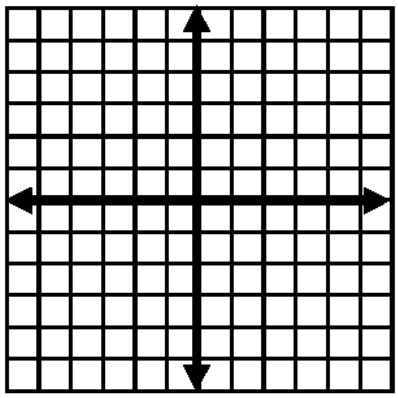
$y = 3x - 4$

Write the slope of a line that is parallel to each line.

1. $y = \frac{-1}{4}x + 2$ _____ 2. $2x - 3y = 9$ _____

Perpendicular lines have _____ slopes.

Here are a couple examples:



Graph the two lines: $y = 3x - 4$

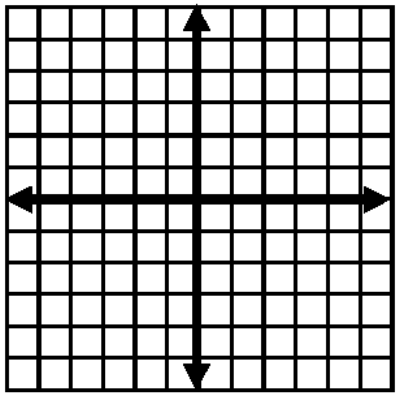
$y = \frac{-1}{3}x + 2$

Write the slope of a line that is perpendicular to each line.

3. $y = 3x + 5$ _____ 4. $-x + 4y = 20$ _____

	Slope:	Parallel	Perpendicular
5.	y = 5x + 2	_____	_____
6.	y = -2x – 3	_____	_____
7.	y = $\frac{-2}{3}$x + 2	_____	_____
8.	4x + 3y = 8	_____	_____
9.	6x – y = 4	_____	_____

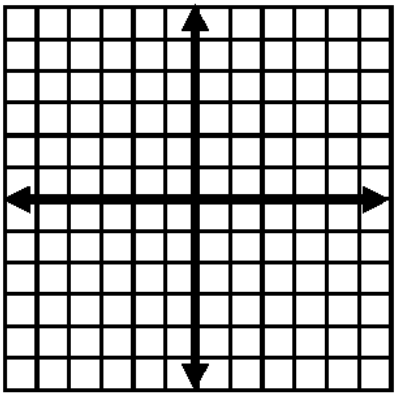
Write an equation for the line containing the point (2, 3) and…



7. parallel to the line y = 2x + 3. _____

8. perpendicular to the line y = 2x + 3. _____

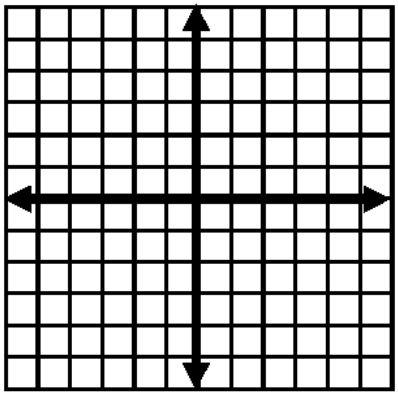
Write an equation for the line containing the point (1, -3) and…



9. parallel to the line y = x – 6. _____

10. perpendicular to the line y = x – 6 _____

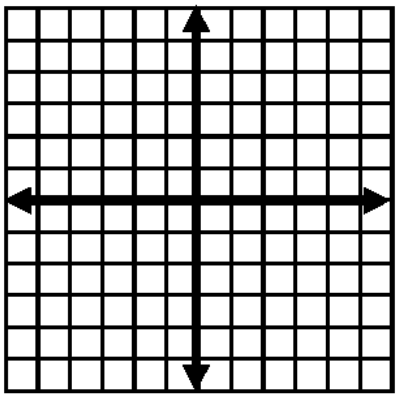
Write an equation for the line containing the point (-5, 3) and…



11. parallel to the line y = -4. _____

12. perpendicular to the line y = -4 _____

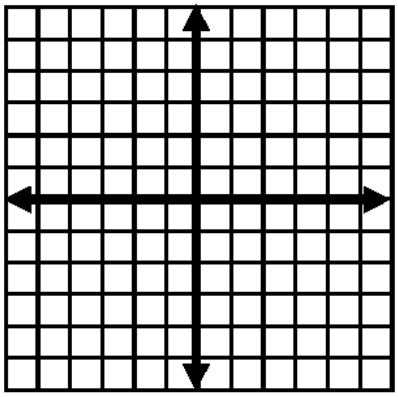
Write an equation for the line containing the point (_____) and…



13. parallel to the line _____ . _____

14. perpendicular to the line _____. _____

Write an equation for the line containing the point (_____) and…



15. parallel to the line _____ . _____

16. perpendicular to the line _____. _____

Today's Date: _____

5.6 Fit a Line of Data

Scatter Plot: _____

_____

Correlation: _____

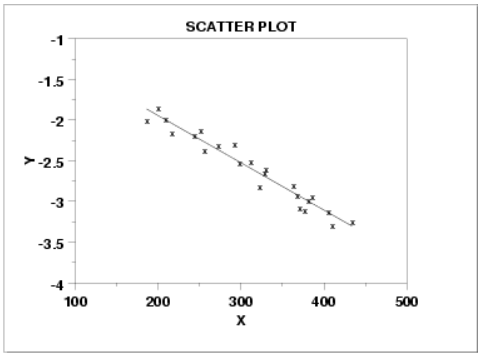
Line of fit: _____

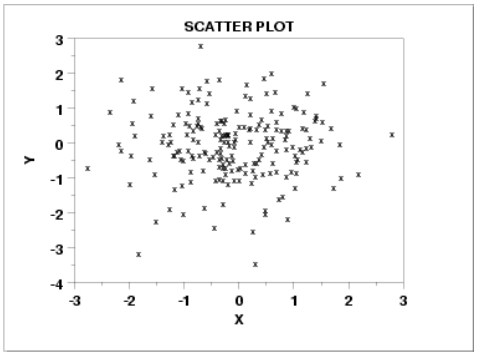
If y tends to increase as x increases, the paired data are said to have a _____ correlation.

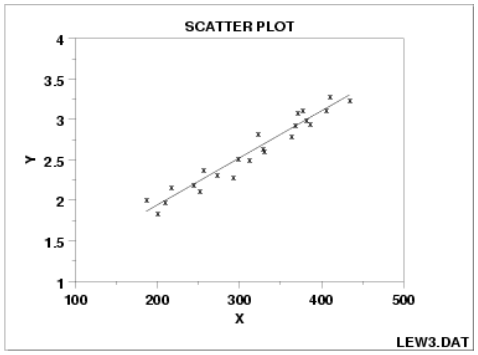
If y tends to decrease as x increases, the paired data are said to have a _____ correlation.

If x and y have no apparent relationship, the paired data are said to have _____ correlation.

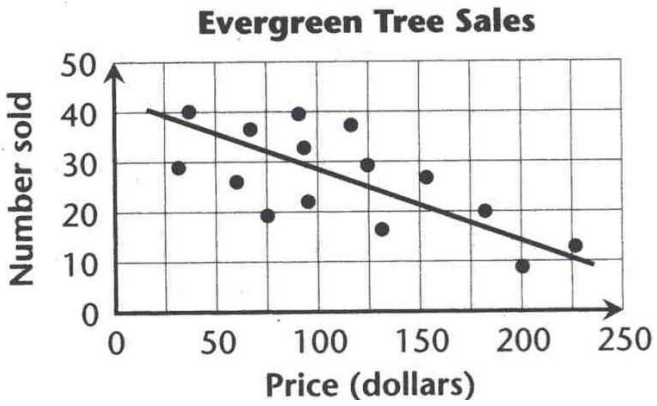
Describe the correlation of data graphed in the scatter plot.







For example, the fitted line on the scatter plot at the right can be used to predict that about **25 trees** will be sold at **$125 each**.



Using the same scatter plot,

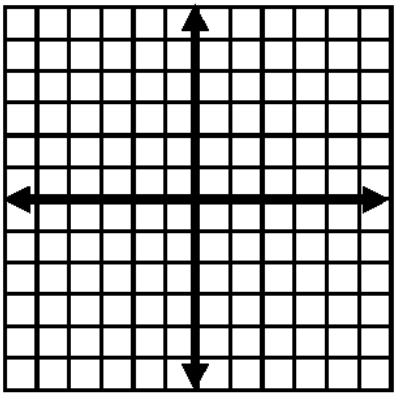
1. How much will 15 trees be sold for?

2. How many trees will be sold for about $25?

Make a Scatter Plot

a. Make a scatter plot of the data in the table.

X	1	1.5	2	2	3	3.5	4
Y	3	1	1	-0.5	-1	-0.5	-2



b. Describe the correlation of the data:

Using a Line of Fit to Model Data

Step 1: Make a _____ of the data.

Step 2: Decide whether the data can be modeled by a _____.

Step 3: Draw a line that appears to _____ the data closely. There should be approximately as many points _____ the line as below it.

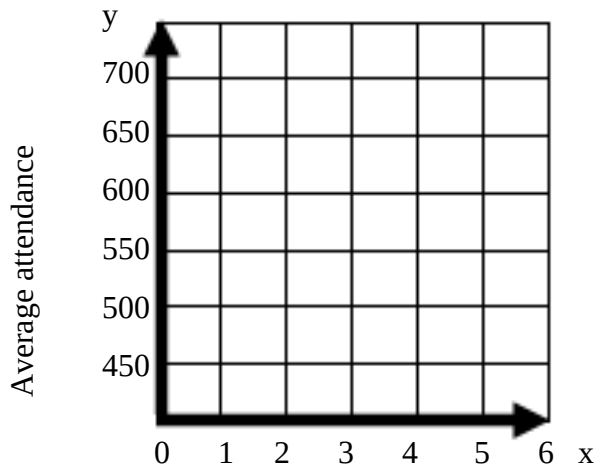
Step 4. Write an equation using _____ points on the line. The points do not have to represent actual data pairs, but they must lie on the line of fit.

Write an equation to model data.

Game attendance: The table shows the average attendance at a school's varsity basketball games for various years. Write an equation that models the average attendance at varsity basketball games as a function of the number of years since 2000.

Year	2000	2001	2002	2003	2004	2005	2006
Avg. Game attendance	488	497	525	567	583	621	688

Game Attendance

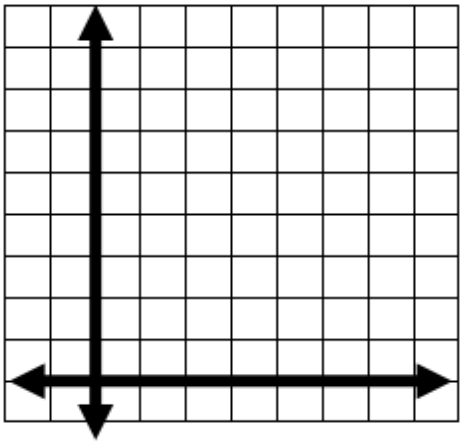


1. Make a scatter plot.
2. Can you make a line?
3. Draw the line.
4. Write an equation.
   Calculate the slope of the line.

Write an equation to model data.

Make a scatter plot of the data in the table. Describe the correlation and write an equation of the line.

x	1	2	2	3	4	5
y	5	5	6	7	8	8



1. Make a scatter plot.
2. Can you make a line?
3. Draw the line.
4. Write an equation.
   Calculate the slope of the line.

Today's Date: _____

5.7 Predict with Linear Models

Best-fitting line: _____

_____

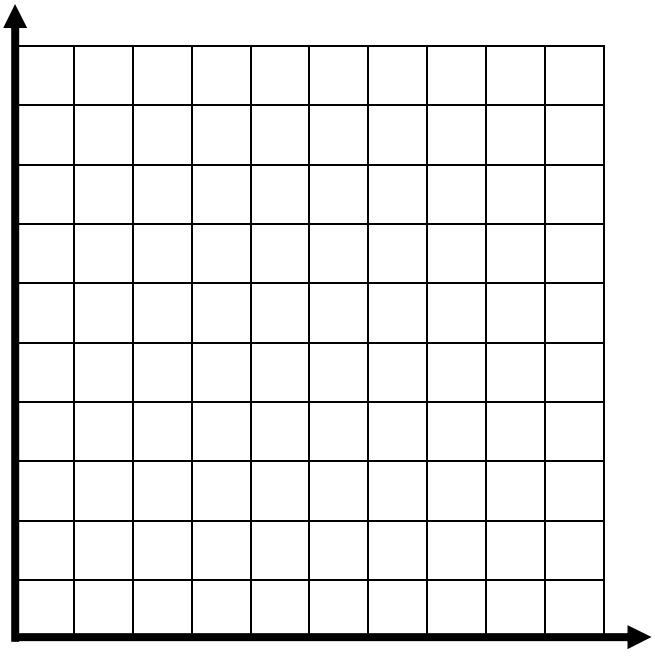
Zero of a function: _____

_____

Make a scatter plot of the data. Find the equation of the best-fitting line. Approximate the value of y for x = 5.

1.

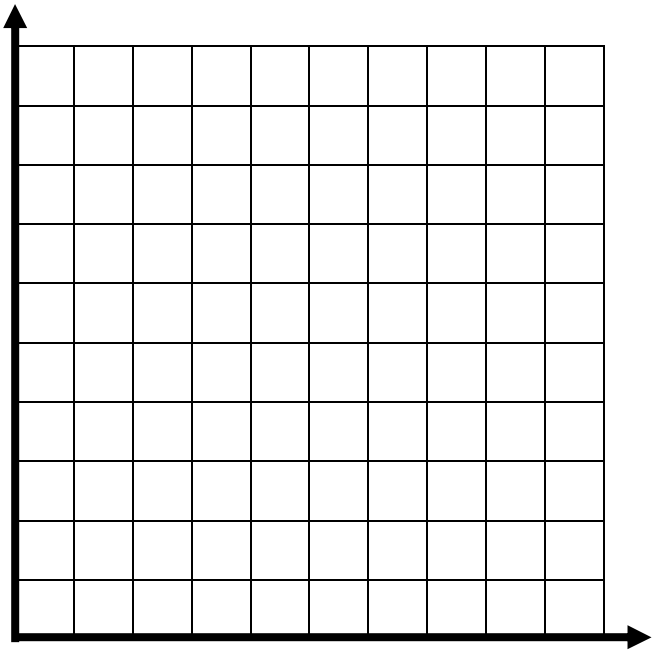
X	0	2	4	6	7
y	2	7	14	17	20



Make a scatter plot of the data. Find the equation of the best-fitting line. Approximate the value of y for x = 10.

2.

X	0	1	2	3	4
Y	20	32	39	53	63



Zero of a Function

a. f(x) = 7.5x + 20

b. f(x) = -x + 7

c. f(x) = 17x – 68

d. f(x) = -0.5x + 0.75

e. f(x) = 5x – 7

f. f(x) = -2x + 4