Algebra 2B   Name _____
Stats 11.1   <u>Assignment</u>

1. Given the variance of 46, find the standard deviation: _____

2. Given the standard deviation of 6.8, find the variance: _____

3. In words, describe the relationship between variance and standard deviation:

4. Use the following data to answer the following.

   11, 16, 9, 15, 18

4a. Calculate the mean ($\bar{x}$) = $\bar{x} = \dfrac{1}{n} \cdot \sum\limits_{1}^{n} x_i$ = _____   **4b.** Calculate the variance:

x_i	$x_i - \bar{x}$	$(x_i - \bar{x})^2$

$$S^2 = \dfrac{\sum\limits_{1}^{n}\left(x_i - \bar{x}\right)^2}{n-1} =$$

4c. Calculate the standard deviation:

$$\sqrt{S^2} =$$

5. Use the following data to answer the following.

   21, 36, 19, 25, 28, 15

5a. Calculate the mean ($\bar{x}$) = $\bar{x} = \dfrac{1}{n} \cdot \sum\limits_{1}^{n} x_i$ = _____   **5b.** Calculate the variance:

x_i	$x_i - \bar{x}$	$(x_i - \bar{x})^2$

$$S^2 = \dfrac{\sum\limits_{1}^{n}\left(x_i - \bar{x}\right)^2}{n-1} =$$

5c. Calculate the standard deviation:

$$\sqrt{S^2} =$$

For questions #1-4, identify the most likely shape for the distribution of each data set:

1. The heights of several trees in a forest.

2. The number of children that parents have.

3. The average price of admission to any Major League Baseball game.

4. The results of rolling a single die 50 times.

Use the test score data below to answer the following.

Test scores from the algebra test:

	4th Hour test scores								
10	0	0	2						
9	1	2	3	4	5	8	8	8	8
	9								
8	0	1	4	4	6	6	7		
7	0	2	3	3	4	4	8		
6	2	3	7						
5	1								
4	2	9							
3	9								

5. Find the percentile rank of the value 87 in the data above: _____

6. Find the percentile rank of the value 67 in the data above: _____

7. Find what test score is at the 15th percentile: _____

8. Find what test score is at the 25th percentile: _____

9. The time is takes a bicycle courier to deliver a parcel to his farthest customer is normally distributed with a mean of 40 minutes and a standard deviation of 4 minutes.

a) About what percent of the courier's trips to this customer take between 36 and 44 minutes?

b) About what percent of the courier's trips to this customer take between 40 and 48 minutes?

c) About what percent of the courier's trips to this customer take less than 36 minutes or more than 44 minutes?

10. The average time it takes sophomores to complete a math test is normally distributed with a mean of 63.3 minutes and a standard deviation of 12.3 minutes.

a) About what percent of sophomores take more than 75.6 minutes to complete the test?

b) About what percent of sophomores take between 51 and 63.3 minutes?

c) About what percent of sophomores take less than 63.3 minutes to complete the test?

For #1 and 2 below, identify the explanatory variable and the response variable.

1. The amount of time you spend studying for a test and your score on the test.

   explanatory variable:

   response variable:

2. The amount of laps you swim and the number of calories you burn.
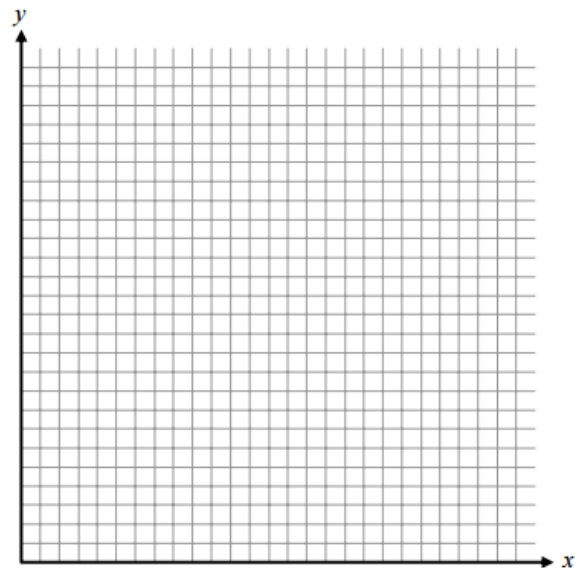
   explanatory variable:

   response variable:

3. Below is some data about the temperature, along with the ice cream sales for an ice cream shop.

Ice Cream Sales vs. Temperature	
Temperature °F	Ice Cream Sales
58°	$215
62°	$325
53°	$185
59°	$332
65°	$406
72°	$522
67°	$412
77°	$614
74°	$544
65°	$421
73°	$445
63°	$408

a. What is the explanatory (independent) variable?

b. What is the response (dependent) variable?

c. Construct a scatter plot of the data.

d. Describe the direction of the relationship. Are the variables positively or negatively associated?
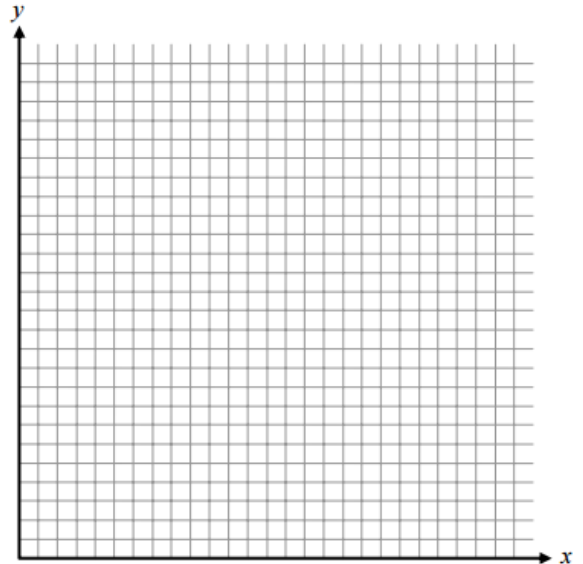
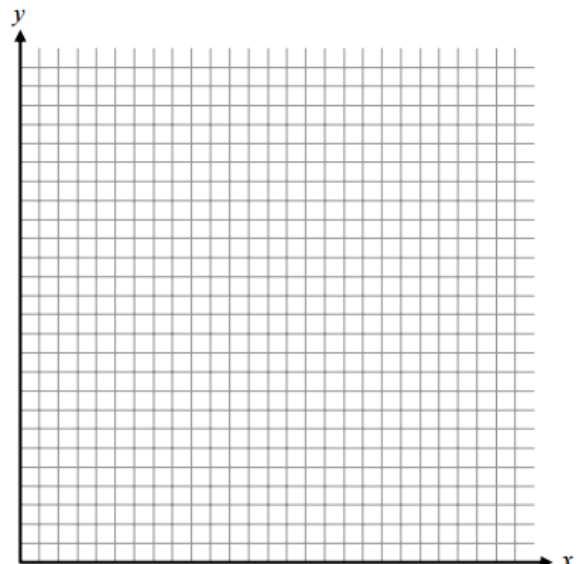e. What does this mean in the context of the situation?

4. Below is some data about average years of education and average annual income.

Education and Income	
Average Years of Education	Average Annual Income (in $1000s)
10	$23
12	$32
13	$36
14	$38
16	$53
17	$63
20	$81

a. What is the explanatory (independent) variable?

b. What is the response (dependent) variable?

c. Construct a scatter plot of the data.

d. Describe the direction of the relationship. Are the variables positively or negatively associated?

e. What does this mean in the context of the situation?

5. Below is some data about average years of education and unemployment rate.

Education and Unemployment	
Average Years of Education	Unemployment Rate (in %)
10	14.1
12	9.4
13	8.7
14	6.8
16	4.9
17	3.6
20	2.4

a. What is the explanatory (independent) variable?

b. What is the response (dependent) variable?

c. Construct a scatter plot of the data.

d. Describe the direction of the relationship. Are the variables positively or negatively associated?

e. What does this mean in the context of the situation?

Algebra 2B   **Name** _____
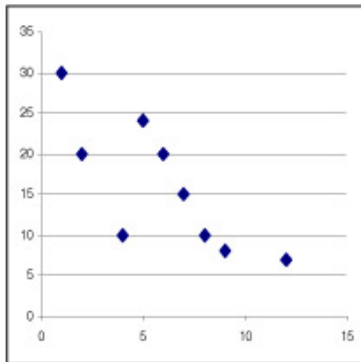
Stats 11.4   <u>**Assignment**</u>
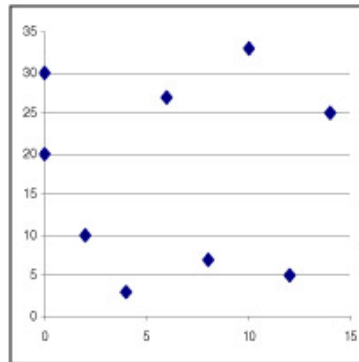
For #1-6, estimate the correlation coefficient for each scatterplot.

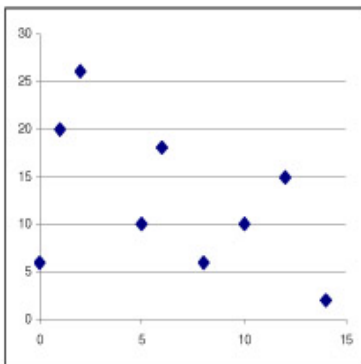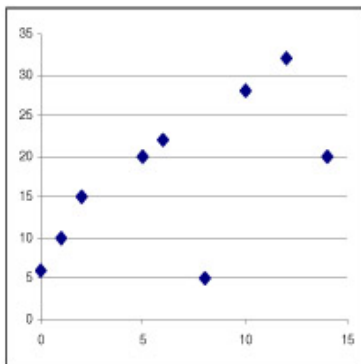| .9, | -.6, | 0, | -.2, | .4, | .75 |
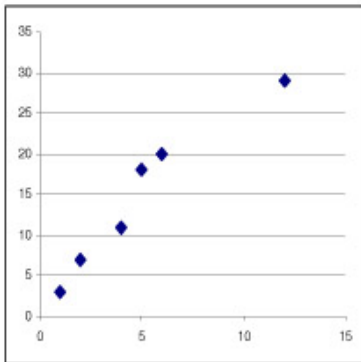
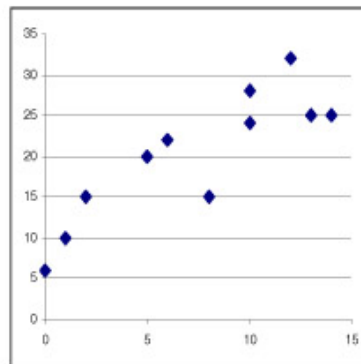1. _____   2. _____   3. _____

4. _____   5. _____   6. _____

For #7-9, select the most likely value of the correlation coefficient (*r*) for each pair of variables.

7. x = the age of a used car
   y = the price

    a. *r* = 0.94
    b. *r* = 0
    c. *r* = 1
    d. *r* = -0.81

8. x = the height of a person
   y = the person's IQ

    a. *r* = 0
    b. *r* = -0.75
    c. *r* = 0.87
    d. *r* = 1

9. x = distance traveled on delivery trip
   y = time the delivery took

    a. *r* = 1
    b. *r* = 0
    c. *r* = -0.91
    d. *r* = 0.86

10. Look again at the data relating average years of education and average annual income. Put the data in to L₁ and L₂ in your calculator and make a scatterplot. Sketch below.

Education and Income	
Average Years of Education	**Average Annual Income (in $1000s)**
10	$23
12	$32
13	$36
14	$38
16	$53
17	$63
20	$81

Based on looking at the scatterplot, will the value of r (the correlation coefficient) be positive or negative? _____ Why does this make sense?

Make a prediction on the value of r. _____

11. The following table gives the number of negative customer reviews for a given model of cell phone and the total number of that same cell phone model that were sold.

Number of negative customer reviews	Number of cell phones sold (in 1000s)
125	163
98	505
50	701
106	355
21	925
69	592
80	700
37	890

a. Calculate the value of the correlation coefficient.

b. What does the value of r tell you about the relationship between the number of negative customer reviews and the number of cell phones sold?

1. Look again at the data relating average years of education and average annual income. Construct
   a scatterplot of the data set on the calculator. Make a sketch below.

Education and Income	
Average Years of Education	**Average Annual Income (in $1000s)**
10	$23
12	$32
13	$36
14	$38
16	$53
17	$63
20	$81

    a. Find the equation of the least-squares regression line (LSRL). Round values to 3 decimal
   places.

    b. What is the slope of the LSRL? Interpret the slope in context.

       Slope = _____. This means that for each additional year of education a person

       has, we can predict their average annual income will _____ by _____.

    c. What is the *y*-intercept of the LSRL? Interpret the *y*-intercept in context.

       y-int = _____. This means that if a person has zero years of education, we can

       predict their average annual salary will be _____.

    d. Use your LSRL equation to predict a person's average annual salary if that person has had
   19 years of education.

2. Is there a relationship between the fat grams and total calories in fast food? Below are several sandwich items from McDonald's menu, along with the number of fat grams and calories of each item. Construct a scatterplot of the data set on the calculator. Make a sketch below.

Item	Fat (grams)	Calories
Big Mac	27	530
Hamburger	8	240
Double Cheeseburger	21	430
Crispy Chicken Sandwich	22	510
Grilled Chicken Sandwich	9	350
Filet-O-Fish	19	390
McRib	26	500
Premium McWrap Chicken & Ranch (Crispy Chicken)	31	610
Quarter Pounder with Cheese	26	520
Bacon Clubhouse Crispy Chicken Sandwich	38	750

   a. Find the equation of the least-squares regression line (LSRL). Round values to 3 decimal places.

   b. What is the slope of the LSRL? Interpret the slope in context.

   Slope = _____. This means that for each additional gram of fat, we can predict

   the number of calories will _____ by _____.

   c. What is the *y*-intercept of the LSRL? Interpret the *y*-intercept in context.

   y-int = _____. This means that if food has zero grams of fat, we can

   predict the number of calories will be _____.

   d. Use your LSRL equation to predict a food's number of calories if that food has 50 grams of fat.

3. The following table shows femur length vs. height (both measured in inches) for a random sample of 10 men.

Femur length	42.5	40.2	44.4	42.8	40	47.3	43.4	40.1	42.1	36
Height	70.8	66.2	71.7	68.7	67.6	69.2	66.5	67.2	68.3	65.6

Suppose a crime scene investigator digs up the femur of a man and finds that it is 38.5 inches long. Based on our regression line for the height vs. femur length data, what would we estimate the man's height to have been?