

50 points total

Key

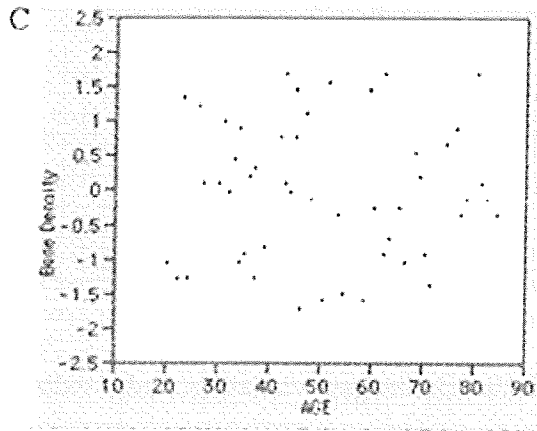
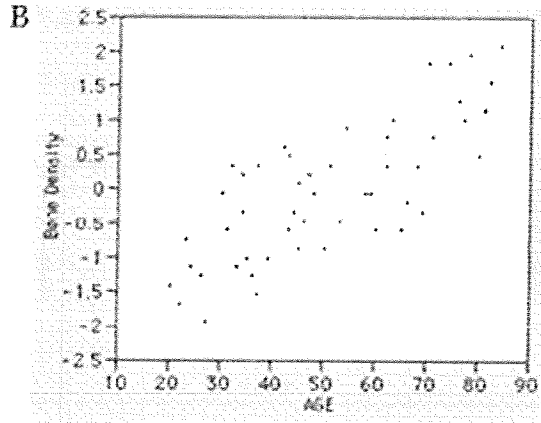
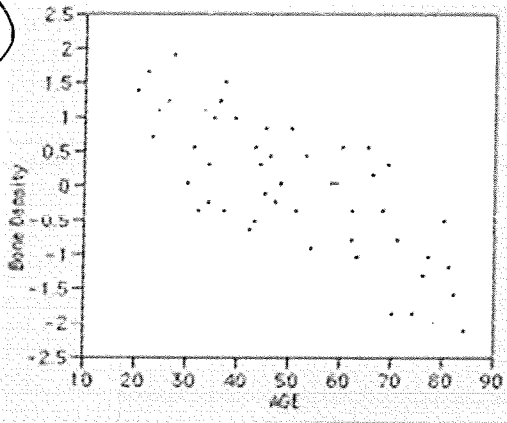
Chapter 3 Test

Section 1: Multiple Choice

Take your time and read ALL the choices before making a decision. Put the capital letter corresponding to the best answer on the **answer sheet** provided.

1. Below are scatterplots that show bone densities and age for a group of women. Use your knowledge about scatterplots and decide which of the following graphs shows that as women grow older they tend to have lower bone density?

A



- a. Graph A
b. Graph B
c. Graph C

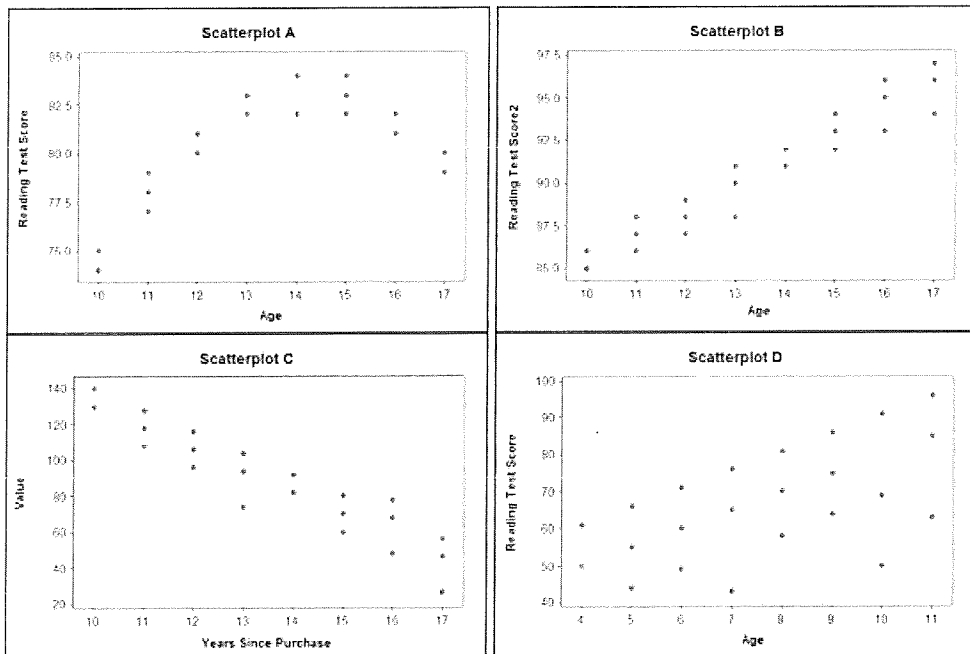
2. In question 1 above, what does each dot represent?

- a. age
b. a woman
c. bone density

3. Which of the following statements is true about the slope of the least squares regression line when there is a negative correlation, or r - value, between two variables?

- a. the slope is negative
- b. the slope is positive
- c. the slope is zero
- d. none of the above

Items 4 and 5 refer to the following scatterplots:



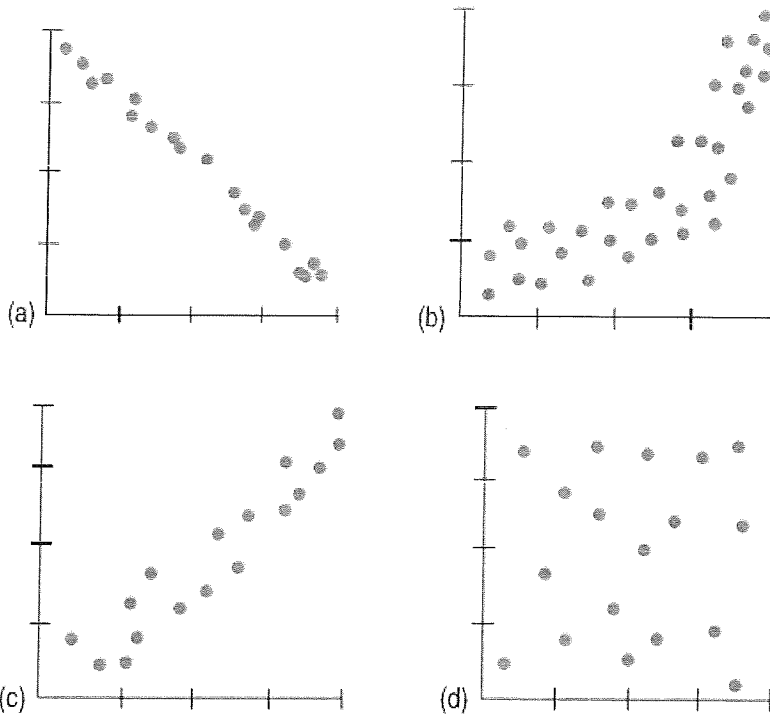
4. Which scatterplot shows the largest variation and r -value closest to 0?

- a. Scatterplots A
- b. Scatterplots B
- c. Scatterplots C
- d. Scatterplots D

5. If scatterplot B has an r -value of 0.964 and scatterplot C has an r -value of -0.964 , which one is displaying the strongest association?

- a. Scatterplot B
- b. Scatterplot C
- c. They are equally as strong
- d. There's not enough information to tell

Items 6 to 9 refer to the four scatterplots that are shown below:



6. The scatterplot that shows a correlation of -0.977 is:

- a. Scatterplot A b. Scatterplot B
 c. Scatterplot C d. Scatterplot D

7. The scatterplot that shows a correlation of 0.951 is:

- a. Scatterplot A b. Scatterplot B
 c. Scatterplot C d. Scatterplot D

8. The scatterplot that shows a correlation of -0.021 is:

- a. Scatterplot A b. Scatterplot B
 c. Scatterplot C d. Scatterplot D

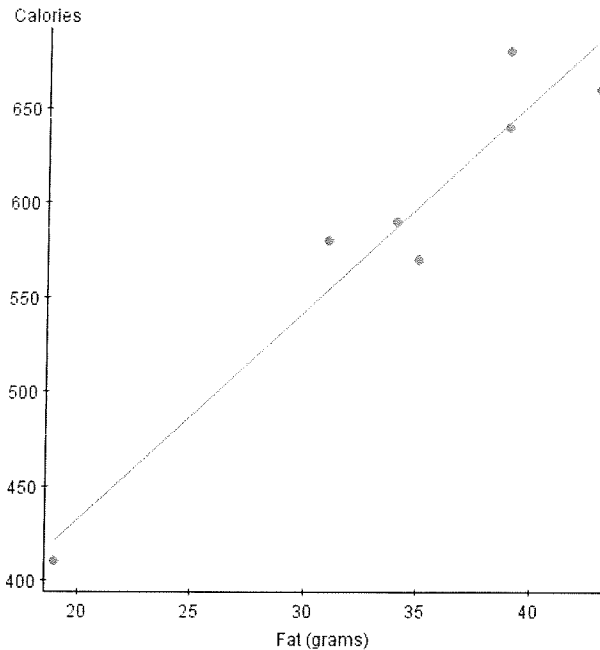
9. The scatterplot that appears to show a relationship that may be non-linear in form is:

- a. Scatterplot A b. Scatterplot B
 c. Scatterplot C d. Scatterplot D

10. In a study of countries worldwide, data showed there was a strong positive correlation between the number of TVs per household and life expectancy. In fact, the correlation coefficient was $r = 0.89$. What can we conclude?
- a. Since the r - value is so high we can conclude that having more TVs per household causes your life expectancy to increase.
 - b. This is evidence that instead of providing medical insurance, governments should distribute TVs to families.
 - c. There is a lurking variable in this study: countries that are wealthier will have better medical care.

Section 2: Free Response

1. The scatterplot below examines the relationship between Fat (grams) and Calories in fast-food hamburgers. The data is provided in the table to the right.



L1	L2
Fat (grams)	Calories
19	410
31	580
34	590
35	570
39	640
39	680
43	660

- a) Use your calculator to find the linear regression line that would be used to predict the number of calories in a fast-food hamburger using the fat content (in grams). Also give the correlation coefficient. You may round all numbers to two decimal places.

④ Equation: $\hat{y} = 11.06x + 210.95$

② $r = 0.96$

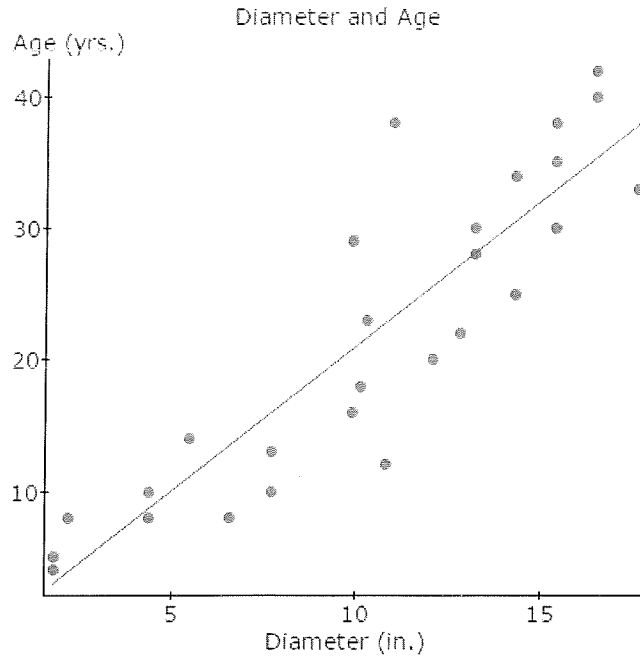
- b) Suppose a new burger restaurant is opening up near you. You are interested in trying them out but are watching your calorie intake. Use the regression equation to predict the number of calories for a burger on their menu that has 35 grams of fat? Show what you calculate.

④ $\hat{y} = 11.06(35) + 210.95$
 $\hat{y} = 598.05$ calories

- c) Calculate the residual for the predicted value you calculated in part (b). Show what you calculate.

④ $\text{residual} = \text{actual} - \text{predicted}$
 $= 570 - 598.05 = -28.05$

2. How old is that tree? One can determine the age of a tree by counting its rings, but that requires cutting the tree down. Can we estimate the tree's age simply from its diameter? A forester measured 27 trees of the same species that had already been cut down and counted the rings to determine the ages of the trees. The scatterplot below shows the diameter of the tree (in inches) and the age of the tree (in years).



$$\text{Predicted Age} = -0.97 + 2.21(\text{Diameter})$$

$$y = \text{age}$$

$$x = \text{diameter}$$

- a) What is the y-intercept in this equation? $(0, -0.97)$

④

$$y = -0.97$$

- b) Write a sentence explaining the y-intercept in the context of this problem. Is it reasonable? Explain.

④

When the diameter of the tree is 0 inches, the predicted age is -0.97 years old. Not reasonable

- c) Identify the slope of this equation.

④

$$m = 2.21$$

$$m = \frac{+2.21 \text{ years}}{+1 \text{ inch}}$$

- d) Write a sentence explaining the slope in the context of this problem.

④

For each increase of 1 ~~year~~ inch in diameter, the predicted age increases by 2.21 years.

Answer Sheet for Multiple Choice Section

Name _____

1. A

2. B

2 points each

3. A

4. D

5. C

6. A

7. C

8. D

9. B

10. C

~~11. _____~~

~~12. _____~~

~~13. _____~~

~~14. _____~~

~~15. _____~~

