

## Test E Regression and Correlation

1. Car dealers across North America use the “Blue Book” to help them determine the value of used cars that customers trade in when purchasing new vehicles. The book lists on a monthly basis the amount paid at recent used-car auctions and indicates *the trade-in values according to condition and optional features*. A study was completed to determine whether the odometer reading would serve as a useful predictor of trade-in value. Five-year-old cars of the same make, model, condition, and options have been randomly selected. The trade-in value and mileage are shown below.

Odometer Reading in miles	Trade-in Value (\$)
58,000	3800
93,100	2400
72,000	3100
52,000	4000
67,700	3200
88,100	2700
62,500	3900
95,100	2500
83,100	2600
43,400	4300
39,000	5500

- a. Use your **calculator to find the regression equation** for the data. **Write down the equation and the correlation. Round all decimals to the nearest hundredth.**

Equation: \_\_\_\_\_

Correlation: \_\_\_\_\_

- b. **What does the correlation** tell you about the relationship between the odometer reading and the trade in value. Make sure you include **direction, and strength**.

- c. What is the slope of the regression line? \_\_\_\_\_ Explain the meaning of the slope in terms of odometer reading and the trade in value.

\_\_\_\_\_

- d. Assuming your odometer says 50000 miles, what would be your trade in value. Use your regression line and your calculator to help you determine your answer.

2. Complete the residuals for the table.

Odometer Reading	Trade-in Value (\$)	Residuals
58,000	3800	
93,100	2400	
72,000	3100	
52,000	4000	
67,700	3200	
88,100	2700	
62,500	3900	
95,100	2500	
83,100	2600	
43,400	4300	
39,000	5500	

a. Which odometer reading had the **largest positive residual**? \_\_\_\_\_

Interpret this residual for this category \_\_\_\_\_

\_\_\_\_\_

b. Which odometer reading had the **largest negative residual**? \_\_\_\_\_

Interpret this residual for this category \_\_\_\_\_

\_\_\_\_\_

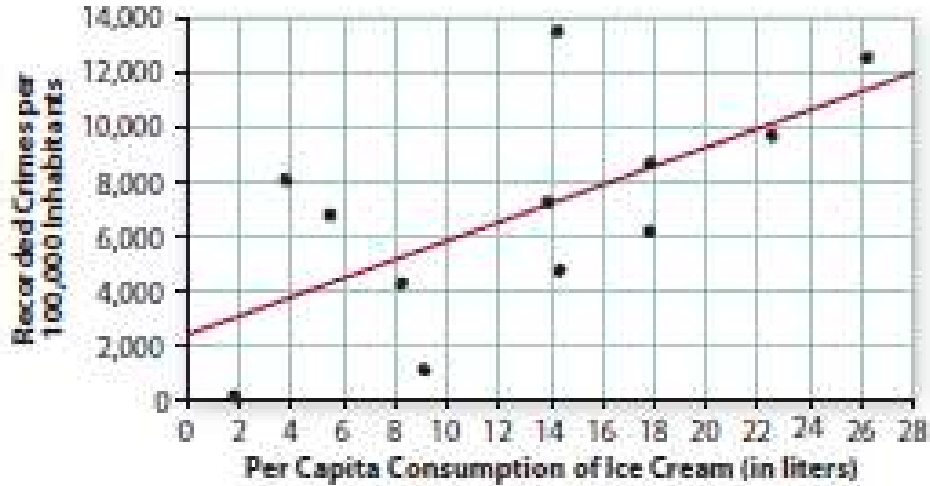
c. Which odometer reading had the **smallest negative residual**? \_\_\_\_\_

Interpret this residual for this category \_\_\_\_\_

\_\_\_\_\_

d. Which odometer reading had the **smallest positive residual**? \_\_\_\_\_

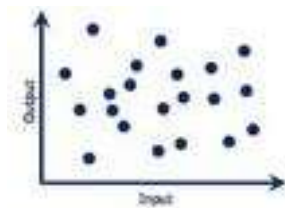
Interpret this residual for this category \_\_\_\_\_



- For which amount of ice cream consumption is the residual the largest?
- Find the value of the residual using the scatter plot. Explain what your answer means.
- How many of the data points have a positive residual? Explain your answer.
- How many of the data points have a negative residual? Explain your answer.
- Are there any data points that have a residual close to zero? Explain your answer.

4. Match the correct approximate correlation to each plot

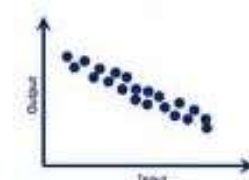
- I.  $r = 0.70$     II.  $r = -0.90$     III.  $r = -0.10$     IV.  $r = 0.10$     V.  $r = -1.0$



$r =$



$r =$



$r =$