

Assignment

Write

Write a definition for each term.

1. residual
2. residual plot

Remember

A residual plot of a linear regression equation is an important tool when determining its appropriateness. The pattern in the residual data indicates whether or not there may be a linear relationship.

Practice

1. A manager of a telemarketing firm is trying to increase his employees' productivity. The table shown indicates the number of months the employees have been working and the number of calls they successfully complete with customers per day.
 - a. Construct a scatter plot of the data.
 - b. Based on the shape of the scatter plot, is a linear regression appropriate? What type of correlation appears to be present?
 - c. Write a function $c(m)$ to represent the line of best fit. Then interpret the function in terms of the problem situation.
 - d. Compute and interpret the correlation coefficient.
 - e. Calculate the residuals for the data and create a residual plot of the data.
 - f. Based on the residual plot, is a linear model appropriate for the data? Explain your reasoning.
 - g. Should the manager use a linear regression equation to predict how many successful calls an employee will make if they have been employed for 36 months? Explain your reasoning.

Employee	Number of Months of Employment	Observed Number of Successful Calls
A	10	19
B	11	22
C	14	23
D	15	25
E	17	27
F	18	28
G	21	31
H	22	32
I	25	33
J	29	33

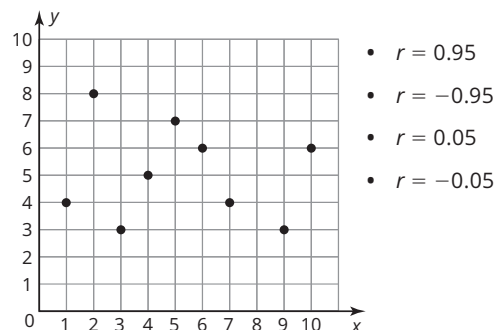
Stretch

1. A table of values is given.
 - a. Generate a line of best fit using the data in the table.
 - b. Determine the residuals for the data.
 - c. Plot the residuals (dependent variable) versus the x -values (independent variable) on one graph, and the residuals (dependent variable) versus the predicted y -values (independent variable) on another graph.
 - d. Compare the shape of the two graphs from part (c).

Point	x	y
A	3	1
B	4	3
C	7	5
D	10	9
E	11	9
F	14	12
G	17	14

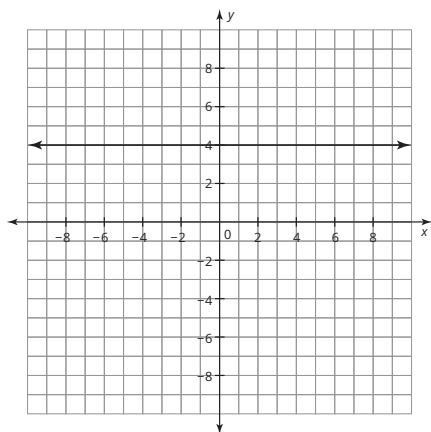
Review

1. Determine whether the points in the scatter plot have a positive correlation, a negative correlation, or no correlation. Four possible r -values are given. Determine which r -value is most appropriate. Explain your reasoning.



2. Stefan has been drinking protein shakes to try to improve his performance in basketball. In the last five games, Stefan's percentage of successful shooting attempts has increased. Stefan concludes that protein shakes have caused him to shoot better. Determine if Stefan reached a valid conclusion. Explain your reasoning.
3. Consider the geometric sequence $5, -15, 45, -135, \dots$. Determine the common ratio and write the next 3 terms of the sequence.
4. Determine the slope, x -intercept, and y -intercept for each linear representation.

a.



b.

x	y
-20	8
-10	10
0	12
10	14
20	16