Scatter Plots and Line of Best Fit Worksheet

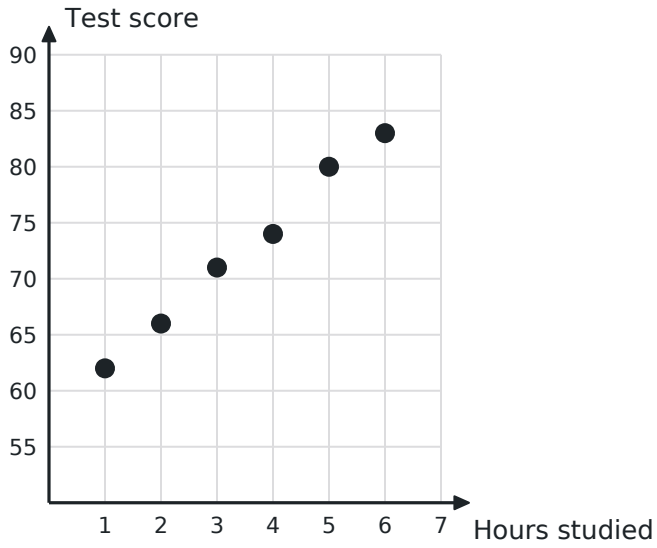
Algebra 1 · Common Core HSS-ID.B.6

> Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.

Practice

Builds the skill step by step.

1. What kind of association does the scatter plot show?



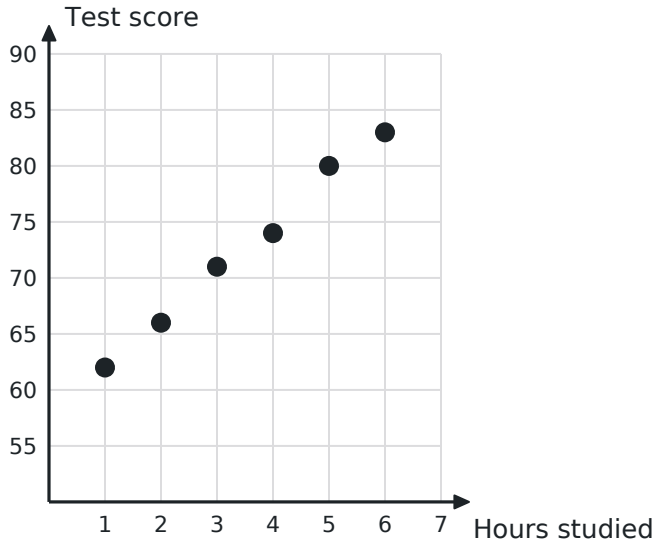
A. positive

B. negative

C. none

D. nonlinear

2. The line of best fit for the scatter plot is y = 4x + 58. What score does it predict for 7 hours of study?



3. Using y = 4x + 58, what is the residual for the student who studied 5 hours and scored 80?

4. What is a residual?

   A. the y-intercept

   B. the slope of the line

   C. predicted value minus observed value

   D. observed value minus predicted value

5. Using y = 4x + 58, what score is predicted for 3 hours?

6. Using y = 4x + 58, what is the residual for the student who studied 3 hours and scored 71?

7. Which pair of variables is likely to have a negative association?

   A. hours worked and pay

   B. height and shoe size

   C. a car's age and its value

   D. study time and test score

8. What is the slope of $y = 4x + 58$?

9. What pattern in a residual plot suggests a linear model fits well?

   A. all residuals positive

   B. residuals scattered randomly around 0

   C. residuals growing steadily

   D. residuals forming a U shape

10. Using $y = 4x + 58$, what score is predicted for 0 hours?

ALBERT

Name _____ Date _____

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On Level

Grade-level practice.

1. A line passes through the data points (2, 66) and (5, 78). What is its slope?

2. Using $y = 4x + 58$, what is the residual for (6, 83)?

3. Using $y = 4x + 58$, the residuals for the six students are 0, 0, 1, 0, 2 and 1. What is their sum?

4. A residual plot shows a U shape. What does this suggest?

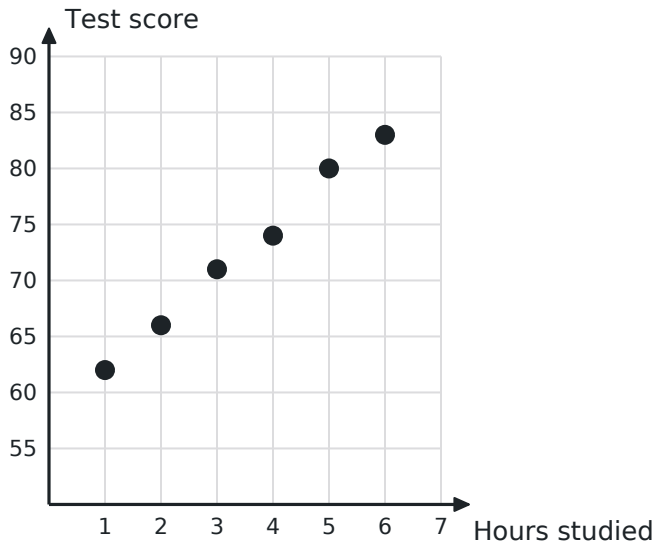
   A. A curved model would fit better.

   B. The linear model is perfect.

   C. There are no outliers.

   D. The slope is negative.

5. Describe the relationship shown in the scatter plot of hours studied and test scores.



6. Bacteria counts fit $y = 100(1.5)^x$. What count does the model predict at $x = 3$?

7. A ball's height fits $y = -2x^2 + 20x$. What height does the model predict at $x = 4$?

8. Using $y = -2x^2 + 20x$, what is the residual for the data point $(4, 50)$?

9. Why is it risky to use $y = 4x + 58$ to predict a score for 20 hours of study?

   A. The slope is too small.

   B. The intercept is too large.

   C. It is far outside the data, and scores can't go past 100.

   D. There is no risk.

10. What does a negative residual mean?

    A. The point is on the line.

    B. The data point is below the line.

    C. The data point is above the line.

    D. The slope is negative.

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Challenge

Multi-step and word problems that stretch it.

1. A line passes through (10, 40) and (30, 20). What value does it predict at x = 25?

2. Using y = −x + 50, the data points (10, 41), (20, 29) and (30, 20) have residuals 1, −1 and 0. What is their sum?

3. Data roughly double with each step in x. Which kind of function fits best?

   A. linear

   B. constant

   C. quadratic

   D. exponential

4. An exponential model passes through (0, 3) and (2, 12). What does it predict at x = 4?

5. Explain how a residual plot helps you decide whether a linear model fits data well.

6. Ice cream sales fit $y = 12x - 300$, where x is the temperature in °F. What sales does the model predict at 80°F?

7. At 80°F, actual sales were 700 (the model $y = 12x - 300$ predicts 660). What is the residual?

8. Which is true of a good line of best fit?

   A. It passes through every point.

   B. About as many points lie above it as below it.

   C. It always starts at the origin.

   D. All residuals are positive.

9. A model predicts 95, and the residual is -3. What was the actual value?

10. Which scatter plot suggests a linear association?

    A. points in two far-apart clusters

    B. points in a U shape

    C. points in a narrow band along a straight line

    D. points spread in a circle