

# Lines of Best Fit and Predictions

Algebra 1 • Section 10.4

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 12

## Quick Review and Helpful Hints

Data questions are about choosing the right summary. Read the labels carefully, identify the total or condition being used, and connect each statistic to what it tells about the data.

**Q Example:** Find the mean of 6, 8, 10, 12.

**Work:** Add the values to get 36, then divide by 4 values.

**Answer:** 9

## Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

- Use  $y = 2x + 5$  to predict  $y$  when  $x = 10$ .  
\_\_\_\_\_
- Use  $y = -3x + 40$  to predict  $y$  when  $x = 7$ .  
\_\_\_\_\_
- What does slope mean in a line of best fit?  
\_\_\_\_\_
- What does the intercept mean?  
\_\_\_\_\_
- Is predicting inside the data range interpolation or extrapolation?  
\_\_\_\_\_
- Is predicting beyond the data range interpolation or extrapolation?  
\_\_\_\_\_
- A best-fit line is  $y = 4x + 12$ . What is the slope?  
\_\_\_\_\_
- A residual is actual minus predicted. Actual 30, predicted 26. Find residual.  
\_\_\_\_\_
- If residuals are mostly positive for large  $x$ , what may be wrong?  
\_\_\_\_\_
- Use  $y = 1.5x + 20$  to predict at  $x = 8$ .  
\_\_\_\_\_

## Word Problems

- A plant model is  $h = 3d + 4$ . Predict height at day 12.  
\_\_\_\_\_
- A line of best fit predicts sales  $S = 250 - 8p$ . Interpret slope.  
\_\_\_\_\_



## Answer Keys

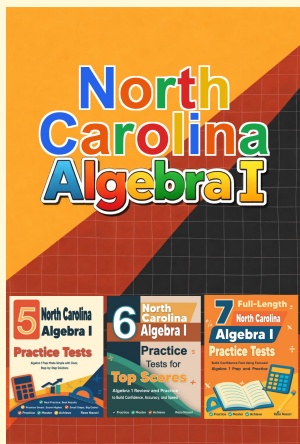
- |                                 |  |
|---------------------------------|--|
| 1. 25                           | 7. 4   |
| 2. 19                           | 8. 4   |
| 3. Average rate of change       | 9. The model may underpredict for large $x$                  |
| 4. Predicted value when $x = 0$ | 10. 32   |
| 5. Interpolation                | 11. 40   |
| 6. Extrapolation                | 12. Sales decrease by about 8 for each 1-unit price increase |

### Step-by-Step Explanations

1. Substitute 10:  $2(10) + 5 = 25$ .
2.  $-3(7) + 40 = 19$ .
3. It estimates how much  $y$  changes for each 1-unit increase in  $x$ .
4. The intercept is the model's starting prediction.
5. Interpolation stays within the observed input range.
6. Extrapolation goes outside the observed data range.
7. The coefficient of  $x$  is the slope.
8.  $30 - 26 = 4$ .
9. Positive residuals mean actual values are above predictions.
10.  $1.5(8) + 20 = 12 + 20 = 32$ .
11. Substitute 12:  $3(12) + 4 = 40$ .
12. The negative slope shows the predicted decrease per unit of price.



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