LESSON MAKER PRO

# Data Detectives

*Summarize data and use models to make predictions.*

**HIGH SCHOOL · MA.912.DP.2**

**MA.912.DP.2** "Solve problems involving univariate and bivariate numerical data."

NAME _____ DATE _____

## DESCRIBE AND PREDICT

For one-variable data, use the mean or median to describe a typical value and use range or interquartile range to describe spread. The interquartile range is the upper quartile minus the lower quartile. For two-variable data, use y = mx + b to predict y from x, and find a residual by subtracting predicted y from actual y.

## WORKED EXAMPLE

Find the mean and range of 31, 35, 39.

1. Add the values: 31 + 35 + 39 = 105.
2. Divide by the number of values: 105 / 3 = 35.
3. Subtract the least value from the greatest value: 39 - 31 = 8.

**Answer: Mean = 35; range = 8**

## PRACTICE 6 problems

**1** 1. Find the mean of 11, 13, 17, and 19.

**ANSWER** _____

**2** 2. Find the interquartile range of 2, 6, 10, 14, 18. Use the median-of-halves method.

**ANSWER** _____

**3** 3. Which set has the greater range? Set A: 4, 9, 11, 16. Set B: 5, 7, 13, 15.

**ANSWER** _____

**4** 4. A model is y = 2x + 5. Find the predicted value of y when x = 7.

**ANSWER** _____

**5** 5. A model is y = 4x + 1. When x = 6, the actual value of y is 29. Find the residual.

**ANSWER** _____

**6** 6. Model A is y = 5x + 2. Model B is y = 4x + 7. When x = 5, which model predicts the greater y-value?

**ANSWER** _____

## APPLY IT Show your work

**1** 1. A student records these lap times, in minutes, during track practice: 41, 43, 45, 47. Find the mean time. Then a slower lap time of 71 minutes is added. Find the new mean and decide whether the mean or median better describes a typical lap time for all five laps.

WORK SPACE

**ANSWER** _____

**2** 2. A student council models ticket sales y from the number of social-media posts x with y = 7x + 9. After 11 posts, the council sells 90 tickets. Find the predicted number of tickets, the residual, and what the residual means.

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

A trend line passes through the points (1, 10) and (5, 26). Find the equation of the line. Use it to predict y when x = 7. If the actual value is 36, find the residual and state whether the model overpredicts or underpredicts.

WORK SPACE AND ANSWER

**ANSWER KEY** # Data Detectives

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## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | 1. Find the mean of 11, 13, 17, and 19. | **15** |
| 2 | 2. Find the interquartile range of 2, 6, 10, 14, 18. Use the median-of-halves method. | **12** |
| 3 | 3. Which set has the greater range? Set A: 4, 9, 11, 16. Set B: 5, 7, 13, 15. | **Set A, with a range of 12** |
| 4 | 4. A model is y = 2x + 5. Find the predicted value of y when x = 7. | **19** |
| 5 | 5. A model is y = 4x + 1. When x = 6, the actual value of y is 29. Find the residual. | **4** |
| 6 | 6. Model A is y = 5x + 2. Model B is y = 4x + 7. When x = 5, which model predicts the greater y-value? | **Neither model. Both predict 27.** |

## PART 2 · APPLY IT

1. **Original mean: 44 minutes. New mean: 49.4 minutes. The median, 45 minutes, better describes a typical lap time.** The original total is 176, so 176 / 4 = 44. With 71 included, the total is 247 and 247 / 5 = 49.4; the high time pulls the mean upward, so use the median.
2. **Predicted sales: 86 tickets. Residual: 4 tickets. Actual sales were 4 tickets greater than predicted.** Substitute 11 for x: 7(11) + 9 = 86. The residual is actual minus predicted, so 90 - 86 = 4.

## CHALLENGE

**y = 4x + 6; predicted y = 34; residual = 2; the model underpredicts.**

Accept equivalent wording for comparisons and interpretations. For residuals, use actual value minus predicted value; for the interquartile range item, use the median-of-halves convention that excludes the overall median.