LESSON MAKER PRO

Trend Line Detectives

Use lines of best fit to make data-based predictions.

GRADE 8 · 8.FGR.6.4

8.FGR.6.4 "Use appropriate graphical displays from data distributions involving lines of best fit to draw informal inferences and answer the statistical investigative question posed in an unbiased statistical study."

NAME _____ DATE _____

READ THE TREND

A line of best fit shows the overall pattern in a scatter plot. Use a point on the line, or its equation, to estimate a typical y-value for a given x-value. Predictions inside the data range are usually more reliable than predictions far outside the data range.

WORKED EXAMPLE

A scatter plot has the line of best fit $y = 7x + 9$. Estimate y when $x = 8$.

1. Start with $y = 7x + 9$.
2. Replace x with 8: $y = 7(8) + 9$.
3. Multiply and add: $y = 56 + 9 = 65$.

Answer: y = 65

PRACTICE 6 problems

1 A scatter plot has the line of best fit $y = 3x + 4$. Estimate y when $x = 5$.

ANSWER _____

2 On a scatter plot, a line of best fit passes through (0, 12) and (4, 20). Use the line to estimate y when $x = 3$.

ANSWER _____

3 A data set has x-values from 2 to 10. Its line of best fit is $y = -2x + 30$. Estimate y when $x = 6$.

ANSWER _____

4 A scatter plot includes data for x-values from 1 to 6. Its line of best fit is $y = 4x + 5$. Is using the line to predict y when $x = 10$ interpolation or extrapolation?

ANSWER _____

5 A scatter plot of x and y has a line of best fit that rises from left to right. As x increases, what does y tend to do?

ANSWER _____

6 An unbiased random sample of students reports reading minutes, x, and vocabulary scores, y. The scatter plot has the line of best fit $y = 2x + 11$. Estimate the vocabulary score for a student who reads 5 minutes.

ANSWER _____

APPLY IT Show your work

1 A gaming club randomly selects 36 members for a study. The investigative question is, "How is the number of strategy guides read, x, related to tournament points, y?" The scatter plot has a line of best fit y = 4x + 15. Estimate the tournament points for a member who has read 3 strategy guides. Then state whether the association is positive or negative.

WORK SPACE

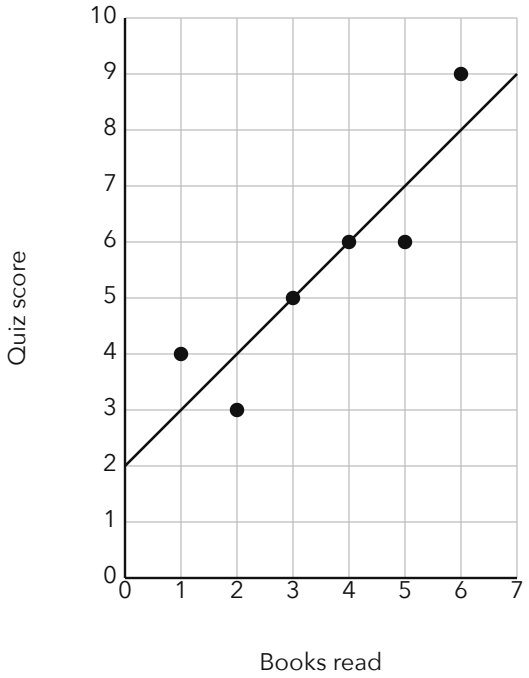
ANSWER _____

2 A library randomly selects 40 students for a study. The investigative question is, "Is there a relationship between books read during a month, x, and reading quiz score, y?" The line of best fit is y = 6x + 22. Estimate the quiz score for a student who reads 4 books. Does this study prove that reading books causes a higher quiz score?

WORK SPACE

ANSWER _____

3 Read the actual scatter plot below. In this classroom-fictional study, six students were selected by a random draw from a class. The question is: How are books read during a month related to a quiz score out of 10? Every selected student is plotted. The horizontal axis is books read; the vertical axis is quiz score. Use the displayed informal line of fit to estimate the score for 4 books. Describe the overall association, and explain how the plot helps answer the study question.



ANSWER _____

CHALLENGE One step up

An unbiased study has data with x-values from 1 to 6, and its line of best fit is y = 3x + 14. A student uses the line to predict y when x = 20. The equation gives 74. Explain why 74 is not a reliable prediction.

WORK SPACE AND ANSWER

ANSWER KEY # Trend Line Detectives

GRADE 8 · 8.FGR.6.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A scatter plot has the line of best fit y = 3x + 4. Estimate y when x = 5.	**19**
2	On a scatter plot, a line of best fit passes through (0, 12) and (4, 20). Use the line to estimate y when x = 3.	**18**
3	A data set has x-values from 2 to 10. Its line of best fit is y = -2x + 30. Estimate y when x = 6.	**18**
4	A scatter plot includes data for x-values from 1 to 6. Its line of best fit is y = 4x + 5. Is using the line to predict y when x = 10 interpolation or extrapolation?	**Extrapolation**
5	A scatter plot of x and y has a line of best fit that rises from left to right. As x increases, what does y tend to do?	**y tends to increase.**
6	An unbiased random sample of students reports reading minutes, x, and vocabulary scores, y. The scatter plot has the line of best fit y = 2x + 11. Estimate the vocabulary score for a student who reads 5 minutes.	**21**

PART 2 · APPLY IT

1. **27 tournament points; positive association.** y = 4(3) + 15 = 27; positive coefficient gives a positive association.
2. **46; no, the study shows an association but does not prove causation.** y = 6(4) + 22 = 46. Association alone does not establish causation.
3. **About 6 out of 10; positive association, with variation around the line.** At x = 4, the displayed line has y = 6. Require reference to the plotted increasing pattern. Association is not proof of causation or a guarantee for one student.

CHALLENGE

74 is not reliable because x = 20 is far outside the data range of 1 to 6. This is extrapolation.

Accept equivalent wording for positive association, increasing trend, and extrapolation. For the causation question, accept answers stating that an association does not prove cause and effect.