

Line Fit Detective

Use straight lines to model scatter plot data.

GRADE 8 • 8.SP.A.2

CCSS.Math.Content.8.SP.A.2 "Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line..."

NAME _____

DATE _____

MODELING WITH LINES

When points form a pattern that rises or falls at a steady rate, a straight line can model them. Choose a line that runs through the middle of the points, then compare its predicted y-values with the actual y-values. Small vertical differences mean the model is a close fit.

WORKED EXAMPLE

The points are (4,19), (6,27), and (8,35). Test whether $y=4x+3$ is a close model.

1. For $x=4$, $4(4)+3=19$.
2. For $x=6$, $4(6)+3=27$.
3. For $x=8$, $4(8)+3=35$.
4. Each prediction matches the actual y-value.

Answer: $y=4x+3$ is an exact fit for the data.

PRACTICE 6 problems

- 1** The data points are (1,5), (3,9), and (5,13). Does $y=2x+3$ fit exactly? Check the point where $x=3$.

ANSWER _____

- 2** For the data points (2,7), (4,13), and (6,19), which model is better: $y=3x+1$ or $y=2x+3$? Use $x=4$ to decide.

ANSWER _____

- 3** For the point (5,14), the model $y=3x$ predicts what y-value? What is the vertical distance from the point to the line?

ANSWER _____

- 4** The points are (3,4), (5,7), (7,8), and (9,10). For the model $y=x+1$, which point is farthest from the line? Give its vertical distance.

ANSWER _____

- 5** Data Set A has points (1,1), (2,2), and (3,4). Data Set B has points (1,0), (2,4), and (3,1). For the model $y=x$, find each set's total vertical distance. Which set fits better?

ANSWER _____

- 6** The data points are (2,11), (4,13), and (6,15). Choose the better model: $y=x+9$ or $y=2x+7$.

ANSWER _____

APPLY IT Show your work

- 1** A gamer records practice sessions, x , and points scored in a game, y : $(1,6)$, $(2,8)$, $(3,10)$, and $(4,12)$. Write a line model. Use it to predict the score after 6 practice sessions. Is the model a close fit?

WORK SPACE

ANSWER _____

- 2** A video creator tracks the number of short clips posted, x , and new followers, y : $(1,7)$, $(2,10)$, $(3,13)$, and $(4,15)$. Use the first three points to write a line model. For the fourth point, find the model's prediction and vertical distance. Then predict y when $x=5$.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

The data points are $(1,3)$, $(2,5)$, $(3,7)$, $(4,20)$, and $(5,11)$. Fit a line that represents most of the data. Explain in 1 or 2 sentences why you would not change the line to go through $(4,20)$.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	The data points are (1,5), (3,9), and (5,13). Does $y=2x+3$ fit exactly? Check the point where $x=3$.	Yes. When $x=3$, $y=2(3)+3=9$, which matches the point.
2	For the data points (2,7), (4,13), and (6,19), which model is better: $y=3x+1$ or $y=2x+3$? Use $x=4$ to decide.	$y=3x+1$ is better. At $x=4$, it predicts 13, while $y=2x+3$ predicts 11.
3	For the point (5,14), the model $y=3x$ predicts what y -value? What is the vertical distance from the point to the line?	The model predicts 15. The vertical distance is 1.
4	The points are (3,4), (5,7), (7,8), and (9,10). For the model $y=x+1$, which point is farthest from the line? Give its vertical distance.	(5,7) is farthest from the line, with a vertical distance of 1.
5	Data Set A has points (1,1), (2,2), and (3,4). Data Set B has points (1,0), (2,4), and (3,1). For the model $y=x$, find each set's total vertical distance. Which set fits better?	Data Set A has total vertical distance 1. Data Set B has total vertical distance 5. Data Set A fits better.
6	The data points are (2,11), (4,13), and (6,15). Choose the better model: $y=x+9$ or $y=2x+7$.	$y=x+9$ is the better model because it goes through all three data points.

PART 2 • APPLY IT

- A line model is $y=2x+4$. For $x=6$, $y=16$. The model is an exact fit because every data point is on the line.** The y -value increases by 2 for each increase of 1 in x , and the line has y -intercept 4. Substituting $x=6$ gives $y=16$.
- A line model is $y=3x+4$. At $x=4$, the model predicts 16, so the vertical distance is 1. At $x=5$, the model predicts 19.** The first three points increase by 3 in y for each increase of 1 in x , giving $y=3x+4$. The fourth point is only 1 unit from the line, so the model is close.

CHALLENGE

A reasonable line is $y=2x+1$. It matches four points, and (4,20) is 11 units above the line, so that point does not follow the main pattern.

Accept equivalent wording for close fit, such as small vertical differences or points near the line. For total vertical distance, use positive distances, not signed differences.