

Fitting Lines to Data and Making Predictions

Grade 8 math · Worksheet · Standards: 8.SP.A.2, 8.SP.A.3

Name: _____ Date: _____ Class: _____

These problems fit lines to scatter plots, write linear models, and interpret slope and intercept, covering standards 8.SP.A.2 and 8.SP.A.3. Early problems substitute into a model; later ones build the model from a graph or table and use it for predictions. Always state what the slope and intercept mean in the units of the situation.

Standards: 8.SP.A.2, 8.SP.A.3 · **Level:** Grade 8

Problem 1 Predict with a line (easy)

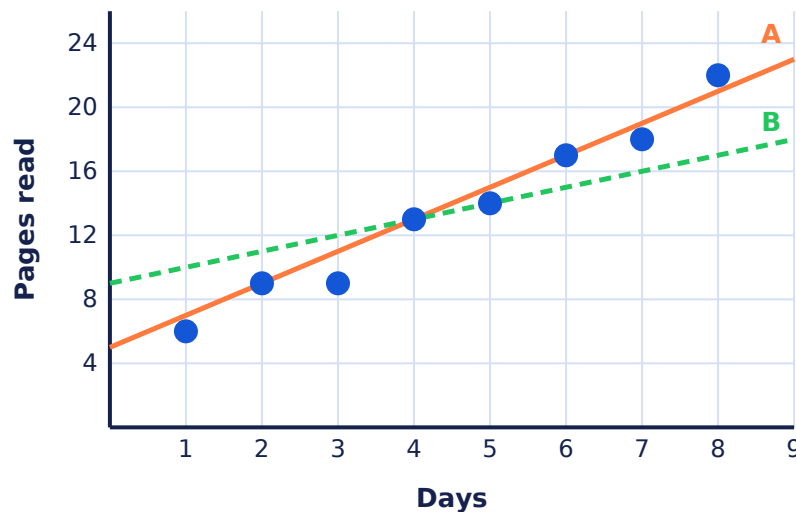
A model for a trend is $y = 3x + 10$. Predict y when $x = 6$.

Problem 2 Plant model (easy)

A plant's height in centimeters is modeled by $y = 2.5x + 12$, where x is the number of weeks since it was measured first. Interpret the slope and the y -intercept.

Problem 3 Which line fits? (medium)

The graph shows pages read over eight days and two lines. Which line is the better fit? Explain.



Line A (solid) and line B (dashed).

Problem 4 Equation from two points (easy)

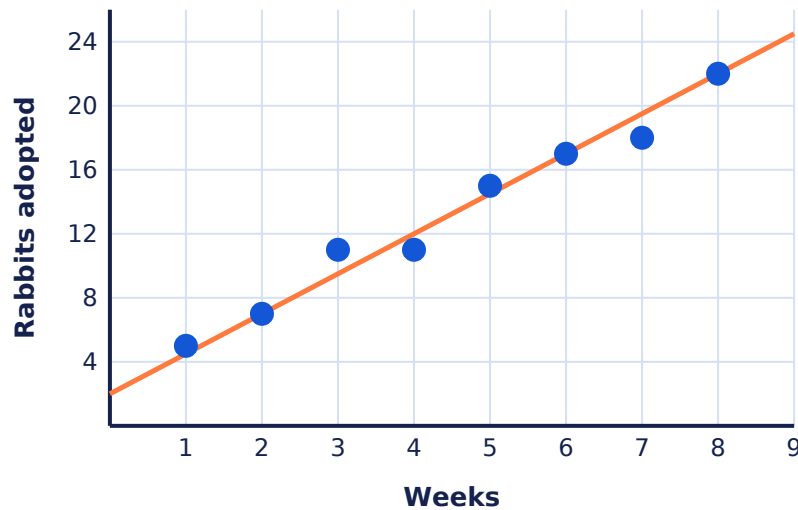
A trend line passes through (2, 11) and (6, 23). Write its equation.

Problem 5 Draining pool (easy)

The amount of water in a pool is modeled by $y = -4x + 90$ gallons, where x is minutes since the drain opened. How much water is left after 7 minutes?

Problem 6 Count the points (medium)

A line $y = 2.5x + 2$ is drawn on the graph. Count the points above, below, and on the line, and decide whether it is a good fit.



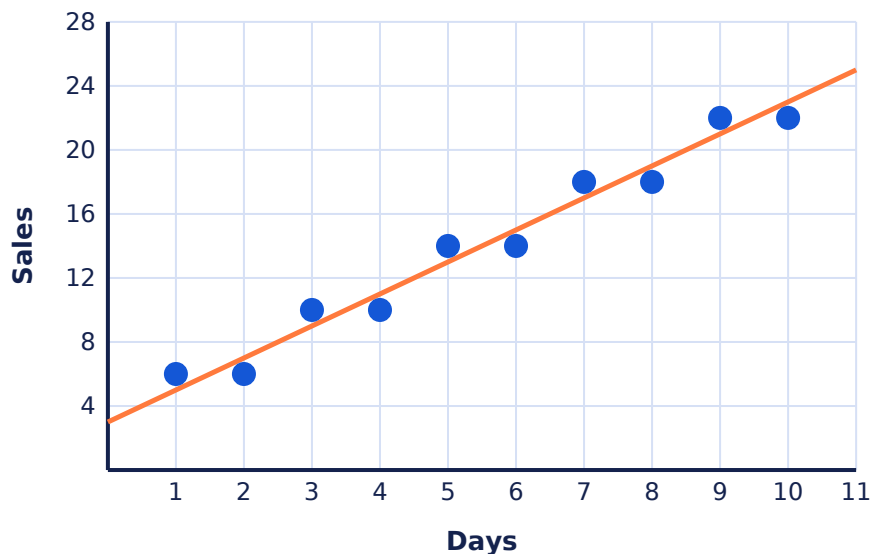
A trend line for adoptions.

Problem 7 Used car model (medium)

The value of a used car, in thousands of dollars, is modeled by $y = -1.7x + 20.6$, where x is its age in years. Interpret the slope and the y-intercept.

Problem 8 Equation from a graph (medium)

The trend line passes through $(0, 3)$ and $(10, 23)$. Write the equation of the line.



A trend line through $(0, 3)$ and $(10, 23)$.

Problem 9 Predict from the model (medium)

Use the model $y = 2x + 3$ to predict the sales on day 7.5.

Problem 10 Reach a target (medium)

In the model $y = 2x + 3$, find x when $y = 21$.

Problem 11 Prediction error (medium)

The study model is $y = 5x + 51$. A student who studied 4 hours scored 70. How far is the actual score from the predicted score?

Problem 12 Is the prediction safe? (medium)

The study model $y = 5x + 51$ is based on data for 1 to 8 hours of study. Predict the score for 3.5 hours and for 20 hours, and say which prediction is reasonable.

Problem 13 Handle the outlier (hard)

A scatter plot has ten points that follow a clear rising line and one point far below the line. Should that one point change where the line of best fit is drawn? Explain.

Problem 14 Equation from a table (hard)

Three points lie on a trend line: (1, 9), (3, 17), and (5, 25). Write the equation, then predict y when $x = 12$.

Problem 15 Bike rental (hard)

A bike shop's charges are modeled by $y = 14x + 30$, where x is the number of hours rented and y is the cost in dollars. Interpret the slope and intercept, then find the cost for 5.5 hours.

Problem 16 Battery life (hard)

A phone battery percentage is modeled by $y = -12x + 100$, where x is hours of use. Find the charge after 5.5 hours, and the time when the battery reaches 20%. Round to the nearest tenth of an hour.

Problem 17 Candle burning (hard)

A candle's height is modeled by $y = -0.8x + 24$ inches, where x is the number of hours it burns. Find the height after 10 hours and the time when it burns out.

Problem 18 Savings plan (hard)

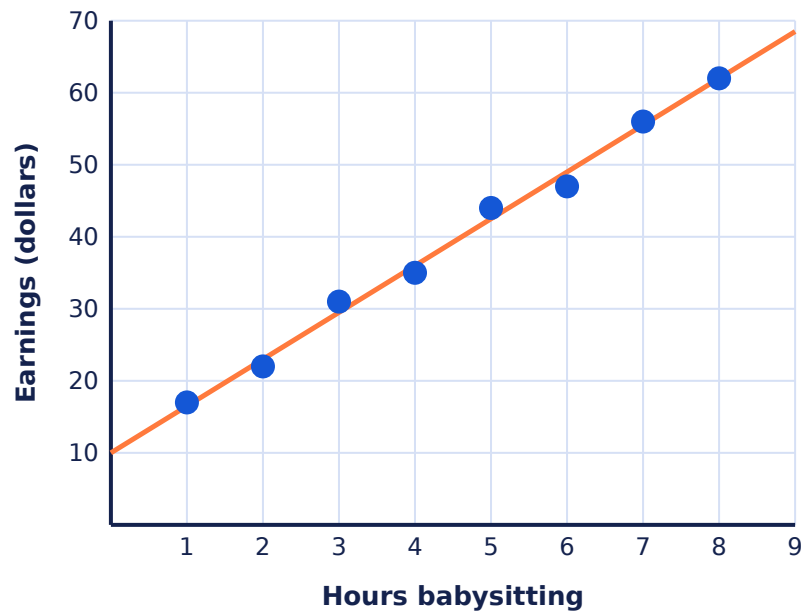
A student's savings, in dollars, are modeled by $y = 12x + 85$, where x is the number of weeks. In which week will the savings first reach at least \$300?

Problem 19 Compare two models (hard)

The data points are (2, 14), (5, 23), and (8, 34). Model A is $y = 3.4x + 7$ and model B is $y = 3x + 8$. Find each model's prediction at the three x-values and decide which model is closer overall.

Problem 20 Babysitting earnings (hard)

A trend line is drawn through (0, 10) and (8, 62). Write its equation, interpret the slope and intercept, and predict the earnings for 10 hours.



A trend line through (0, 10) and (8, 62).