

Grade 8 · Lines of Best Fit and Linear Models · Test

Common Core 8.SP.A.2, 8.SP.A.3 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

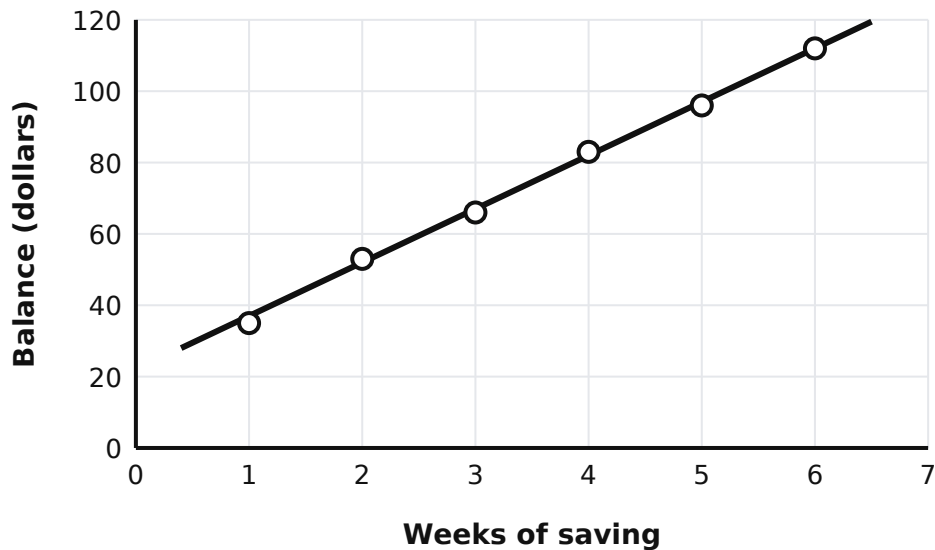
This test has nine questions worth 20 points in total and should take about 45 minutes. Show every step. Calculators are not needed. Questions cover judging fit, writing equations of lines, interpreting slope and intercept, and making predictions.

Test information

- **Grade:** Grade 8
- **Chapter:** Lines of Best Fit and Linear Models
- **Common Core:** 8.SP.A.2, 8.SP.A.3
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 2 pts; Question 4: 2 pts; Question 5: 2 pts; Question 6: 2 pts; Question 7: 3 pts; Question 8: 3 pts; Question 9: 2 pts)

Question 1: Judge the fit (2 points)

Maya tracks her savings. The graph shows her balance after each week and the line $y = 15x + 22$.

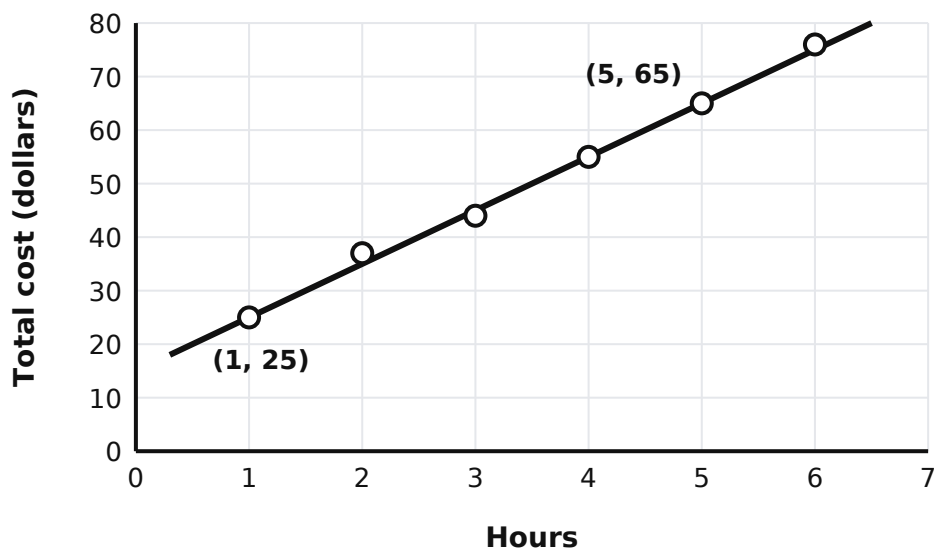


Maya's balance over 6 weeks.

- How many points are above the line, below the line, and on the line? (1 point)
- Is the line a good fit? Explain. (1 point)

Question 2: Equation of the line (2 points)

The graph shows the cost of a pottery class. The line passes through the two labeled points. Write the equation of the line in the form $y = mx + b$.



Hours and total cost.

Question 3: Meaning in context (2 points)

The cost C in dollars of renting a kayak for h hours is modeled by $C = 12h + 8$.

- a. Explain what 12 means. (1 point)
- b. Explain what 8 means. (1 point)

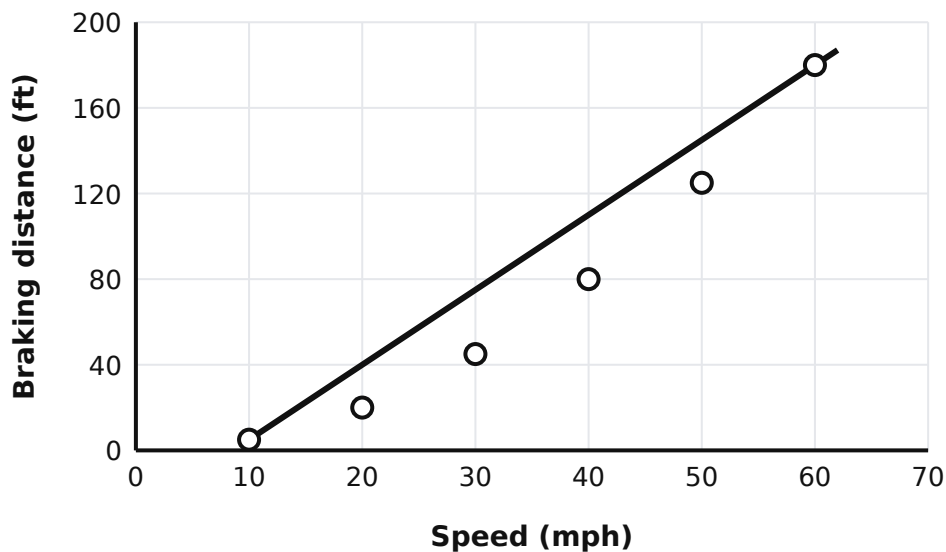
Question 4: Predict and compare (2 points)

The line $V = -2x + 26$ models the value V (in thousands of dollars) of a car that is x years old.

- a. Find the predicted value of a 6-year-old car. (1 point)
- b. A 6-year-old car actually sold for \$15,000. Is that above or below the prediction, and by how much? (1 point)

Question 5: Is a line appropriate? (2 points)

The graph shows speed and braking distance for a car. The straight line passes through the first and last points.



Speed and braking distance.

- a. Describe how the middle points compare with the line. (1 point)
- b. Is a linear model appropriate? Explain. (1 point)

Question 6: Better line (2 points)

A data set has the points (1,5), (2,9), (3,12), (4,17) and (5,20). Jamal proposes $y = 4x + 1$. Aisha proposes $y = 5x$. Which line fits better? Justify with the vertical gaps.

Question 7: Candle model (3 points)

The length L of a candle in inches after burning t hours is modeled by $L = -0.8t + 12$, based on data from 0 to 10 hours.

- a. Explain what the slope and y-intercept mean. (1 point)
- b. Predict the length after 7.5 hours. (1 point)
- c. After how many hours does the model predict the candle is gone? (1 point)

Question 8: Gaps and outlier (3 points)

Ethan records the hours x he spends on screens and his score y on a short quiz: (1,91), (2,84), (3,80), (4,60), (5,71), (6,64). A line of fit is $y = -5x + 95$.

- a. Find the predicted score and the gap (actual minus predicted) for each point. (2 points)
- b. Identify the outlier. (1 point)

Question 9: Reliable prediction? (2 points)

After 1 to 8 weeks of training, Noah's 5K time T in minutes fits the model $T = -0.5w + 30$, where w is the number of weeks.

- a. Predict the time after 70 weeks. (1 point)
- b. Explain why this prediction is not reasonable. (1 point)