

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

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

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

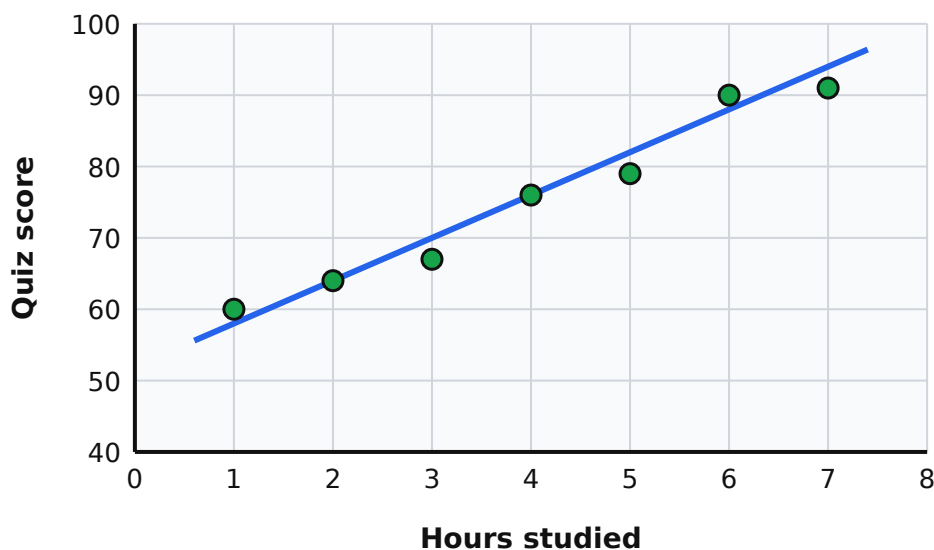
These 22 problems practice Common Core standards 8.SP.A.2 and 8.SP.A.3. Judge how well a line fits a scatter plot, find the equation of a line from two points, and interpret slope and y-intercept in context.

The last six problems are word problems about predictions, outliers and models that stop making sense. Work from easiest to hardest.

Grade 8 Common Core: 8.SP.A.2 · 8.SP.A.3

Problem 1: Judge the fit

The scatter plot shows hours studied and quiz score for seven students. The line $y = 6x + 52$ is drawn. Is the line a good fit? Explain.



Seven students, with the line $y = 6x + 52$.

Problem 2: Gap from the line

A line of fit for the study data is $y = 6x + 52$. Student 3 studied 3 hours and scored 67. Student 6 studied 6 hours and scored 90. For each student, find the predicted score and say whether the

actual score is above or below the line.

Problem 3: Slope from two points

A line of fit passes through (10,5) and (30,17). Find its slope.

Problem 4: Find the y-intercept

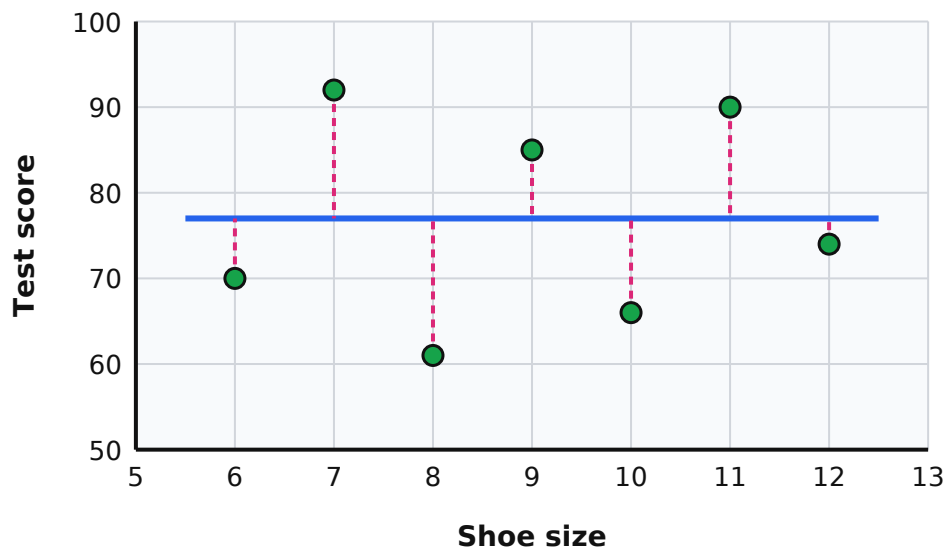
A line of fit has slope 6 and passes through (2,64). Find its y-intercept.

Problem 5: Write the equation

A line of fit passes through (1,10) and (5,30). Write its equation in the form $y = mx + b$.

Problem 6: A poor fit

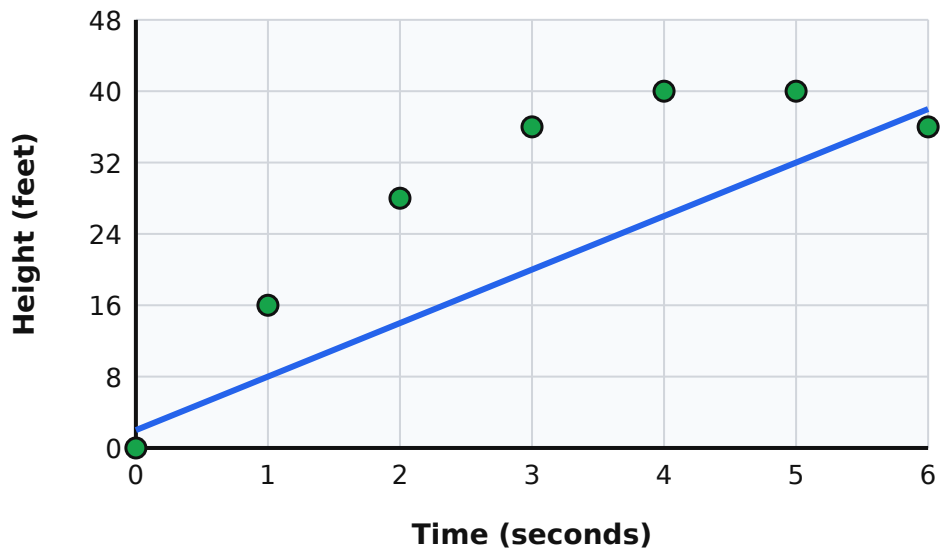
The plot shows shoe size and test score for seven students, with the flat line $y = 77$ and dashed gaps. Is a line a good model for these data? Explain.



Shoe size and test score.

Problem 7: A curved pattern

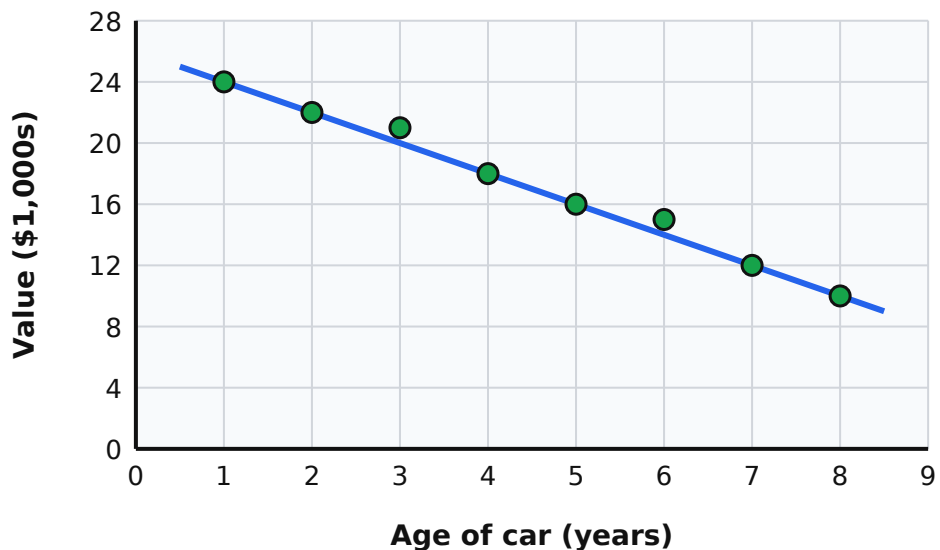
The plot shows the height of a ball at different times, with the line $y = 6x + 2$. Explain why a straight line is a poor model.



Height of a ball over 6 seconds.

Problem 8: Sign of the slope

The line $y = -2x + 26$ models the value y (in thousands of dollars) of a used car that is x years old. Is the slope positive or negative? What does it mean?



Car age and value.

Problem 9: Meaning of the intercept

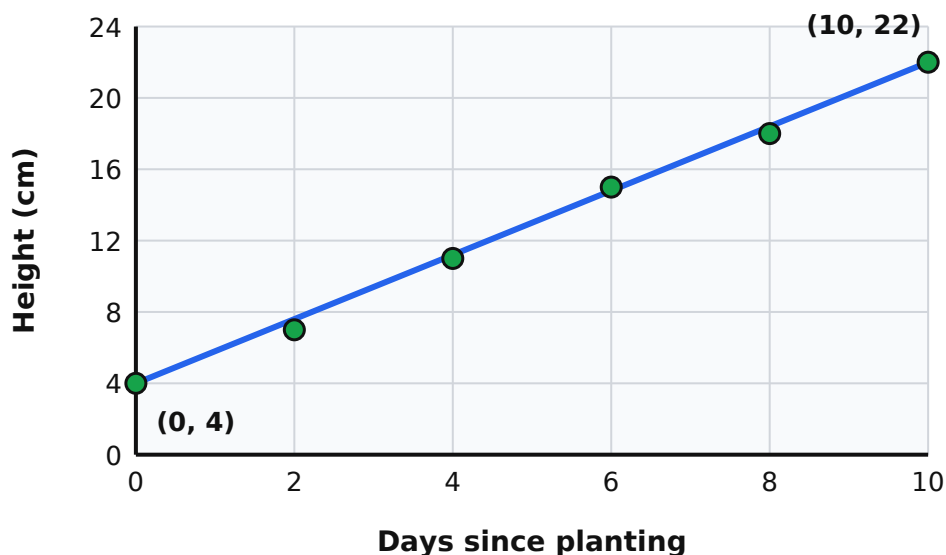
For the model $y = -2x + 26$ in the car problem, find the y-intercept and explain what it means.

Problem 10: Predict a score

Use $y = 6x + 52$ to predict the quiz score of a student who studies 4.5 hours.

Problem 11: Equation from the graph

The line of fit for a plant's growth passes through $(0,4)$ and $(10,22)$. Write its equation, where x is days since planting and y is height in centimeters.



Plant height over 10 days.

Problem 12: Meaning in context

The plant model is $y = 1.8x + 4$. Explain what the slope and the y-intercept mean for the plant.

Problem 13: Predict plant height

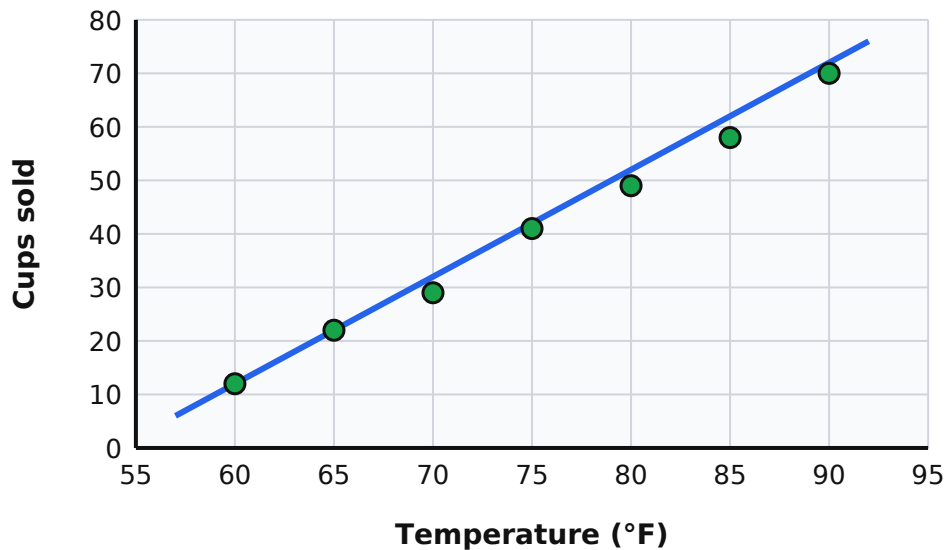
Use $y = 1.8x + 4$ to predict the plant's height on day 7 and on day 15. Which prediction is more reliable? Explain.

Problem 14: Compare two lines

A data set has the points $(1,4)$, $(2,6)$, $(3,9)$, $(4,11)$ and $(5,14)$. Line P is $y = 2.5x + 1.5$ and line Q is $y = 3x$. Add up the vertical gaps for each line. Which line fits better?

Problem 15: Slope in context

The model $y = 2x - 108$ relates the temperature x (in $^{\circ}\text{F}$) to the cups of lemonade y sold. Explain what the slope means.



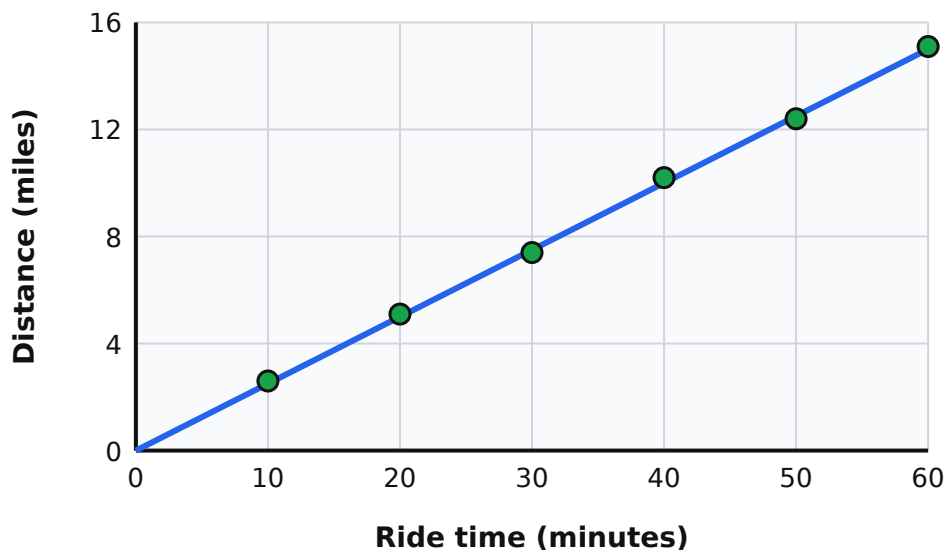
Temperature and lemonade sales.

Problem 16: Is the intercept meaningful?

Find the y-intercept of $y = 2x - 108$ and decide whether it makes sense for the lemonade stand.

Problem 17: Bike ride model

Priya's bike ride data fit the line $y = 0.25x$, where x is minutes and y is miles. Explain what the slope and the y-intercept mean. Then convert the slope to miles per hour.



Ride time and distance.

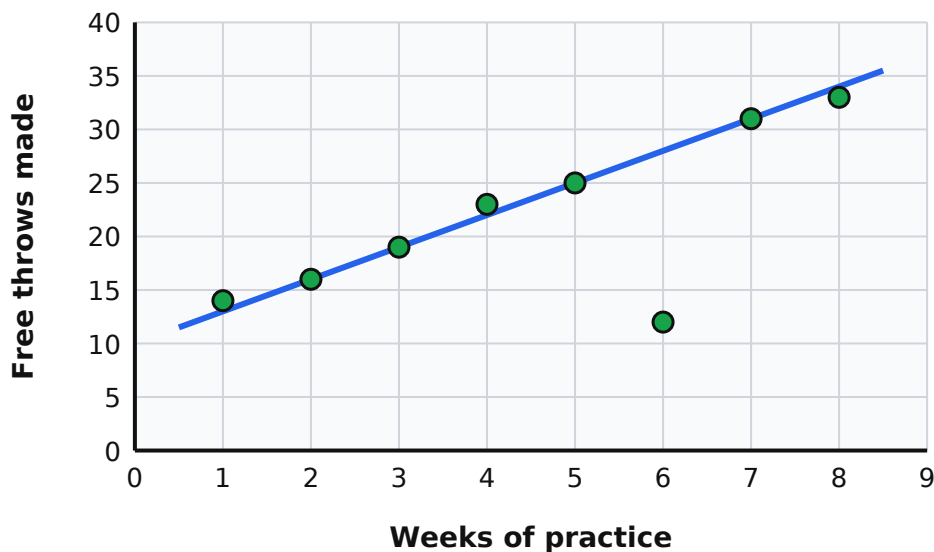
Problem 18: Bike predictions

Use $y = 0.25x$ to predict how far Priya rides in 45 minutes. Then find how long she needs to ride

9 miles.

Problem 19: Spot the outlier

The plot shows weeks of practice and free throws made (out of 40) for a player. The line is $y = 3x + 10$. Identify the outlier and find its vertical gap from the line.



Free throws made over 8 weeks.

Problem 20: Phone battery

A phone's battery percent y after x hours of video fits the model $y = -12x + 100$. (a) Explain the slope and intercept. (b) After how many hours does the model predict 28%? (c) Is the model reasonable for 12 hours? Explain.

Problem 21: Saving for a bike

Sofia's savings fit the model $s = 15w + 40$, where w is the number of weeks and s is dollars saved. (a) What does 15 mean? What does 40 mean? (b) Predict her savings after 10 weeks. (c) In how many weeks does the model predict \$250?

Problem 22: Hot cocoa sales

A cafe recorded temperature x (in $^{\circ}\text{F}$) and cups of hot cocoa sold y : (30,95), (40,78), (50,66), (60,48), (70,36). A line of fit is $y = -1.5x + 140$. (a) Explain the slope. (b) Predict sales at 45°F . (c) The model predicts 20 cups at what temperature? Is that prediction reliable?