

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

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

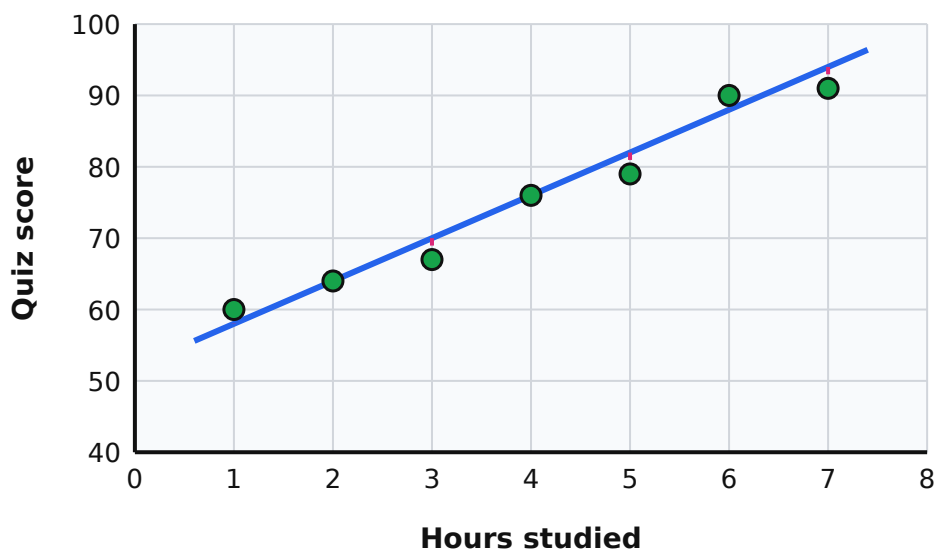
This answer key shows every step for the 22 worksheet problems on lines of best fit. Compare your reasoning, not just your final answers, and use the figures to check where gaps and predictions come from.

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

Problem 1: Judge the fit

The vertical gaps are 2, 0, 3, 0, 3, 2 and 3 points. The largest gap is only 3 points, and points lie both above and below the line.

Yes, the line is a good fit because every point is close to it.



Dashed segments show the gaps, all 3 points or less.

Problem 2: Gap from the line

Student 3: $6(3)+52=70$. The actual score 67 is 3 points **below** the line.

Student 6: $6(6)+52=88$. The actual score 90 is 2 points **above** the line.

Problem 3: Slope from two points

$$m = \frac{17-5}{30-10} = \frac{12}{20}.$$

The slope is 0.6.

Problem 4: Find the y-intercept

Substitute into $y = mx + b$: $64 = 6(2) + b$, so $64 = 12 + b$.

Subtract 12: $b = 52$.

Problem 5: Write the equation

$$\text{Slope: } m = \frac{30-10}{5-1} = \frac{20}{4} = 5.$$

Use (1,10): $10 = 5(1) + b$, so $b = 5$.

Check with (5,30): $5(5) + 5 = 30$. The equation is $y = 5x + 5$.

Problem 6: A poor fit

The gaps are 7, 15, 16, 8, 11, 13 and 3 points, which are large. The points go up and down with no trend.

No, a line is not a good model, and shoe size does not help predict the score.

Problem 7: A curved pattern

The points rise quickly, level off, and then fall, so they form a curve. The line is below the points in the middle (gaps up to 16 feet) and above them at the ends.

A straight line cannot follow a curved pattern, so it is a poor model.

Problem 8: Sign of the slope

The slope is -2 , which is **negative** because the points fall from left to right.

Each extra year of age lowers the predicted value by **\$2,000**.

Problem 9: Meaning of the intercept

When $x = 0$, $y = 26$.

The y-intercept is **26**: a brand-new car is predicted to be worth **\$26,000**.

Problem 10: Predict a score

$$y = 6(4.5) + 52 = 27 + 52 = 79.$$

The predicted score is **79**.

Problem 11: Equation from the graph

The y-intercept is the height at $x = 0$: $b = 4$.

$$\text{Slope: } m = \frac{22-4}{10-0} = \frac{18}{10} = 1.8.$$

The equation is $y = 1.8x + 4$.

Problem 12: Meaning in context

The slope 1.8 means the plant grows about **1.8 cm per day**.

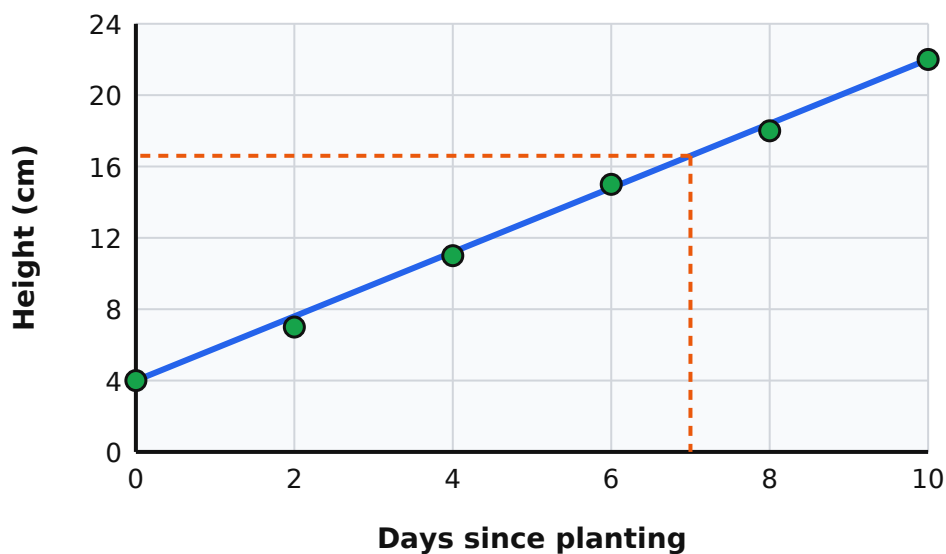
The y-intercept 4 means the plant was about **4 cm tall** when measuring began (day 0).

Problem 13: Predict plant height

$$\text{Day 7: } 1.8(7) + 4 = 12.6 + 4 = 16.6 \text{ cm.}$$

$$\text{Day 15: } 1.8(15) + 4 = 27 + 4 = 31 \text{ cm.}$$

The day 7 prediction is **more reliable** because 7 is inside the data (days 0 to 10), while day 15 is outside it.



Day 7 on the line: 16.6 cm.

Problem 14: Compare two lines

Line P predicts 4, 6.5, 9, 11.5, 14, so the gaps are 0, 0.5, 0, 0.5, 0. The total is **1**.

Line Q predicts 3, 6, 9, 12, 15, so the gaps are 1, 0, 0, 1, 1. The total is **3**.

Line P fits better because its total gap is smaller.

Problem 15: Slope in context

The slope is 2. For each **1°F increase** in temperature, the stand is predicted to sell **2 more cups**.

Problem 16: Is the intercept meaningful?

When $x=0$, $y=-108$.

A stand cannot sell -108 cups, and 0°F is far from the data (60 to 90). **The intercept has no real meaning here.**

Problem 17: Bike ride model

The slope 0.25 means Priya rides about **0.25 mile each minute**. The y-intercept is 0: after 0 minutes she has gone 0 miles, which makes sense.

$0.25 \times 60 = 15$, so her speed is **15 miles per hour**.

Problem 18: Bike predictions

45 minutes: $0.25(45) = 11.25$ miles.

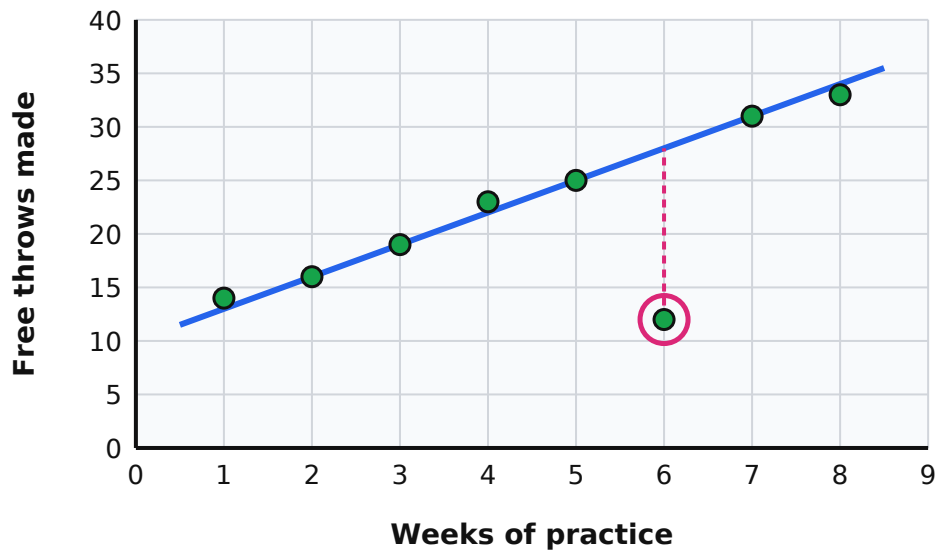
9 miles: $0.25x = 9$, so $x = 9 \div 0.25 = 36$.

She rides **11.25 miles** in 45 minutes and needs **36 minutes** for 9 miles.

Problem 19: Spot the outlier

The point (6,12) is far from the pattern.

The line predicts $3(6)+10=28$ at week 6. The gap is $28-12=16$, so the point is **16 free throws below the line**. All other gaps are 2 or less.



The outlier is circled; the dashed segment shows its gap.

Problem 20: Phone battery

(a) Slope -12 : the battery drops about **12 percentage points each hour**. Intercept 100: the battery starts **full**.

(b) $-12x + 100 = 28$ gives $-12x = -72$, so $x = 6$ **hours**.

(c) At 12 hours, $-12(12) + 100 = -44$. A battery cannot be below 0%, so **no**. The battery would be empty at $x = \frac{100}{12} \approx 8.3$ hours.

Problem 21: Saving for a bike

(a) She saves about **\$15 per week**; she started with **\$40**.

(b) $15(10) + 40 = 190$, so **\$190**.

(c) $15w + 40 = 250$, so $15w = 210$ and $w = 14$ **weeks**.

Problem 22: Hot cocoa sales

(a) Slope -1.5 : for each 1°F rise, sales fall by about **1.5 cups**.

(b) $-1.5(45) + 140 = -67.5 + 140 = 72.5$, so about **72 or 73 cups**.

(c) $-1.5x + 140 = 20$ gives $x = \frac{120}{1.5} = 80$, so 80°F . This is outside the data (30 to 70), so it is **not very reliable**.