



UNIT OVERVIEW

Unit 3 — Bivariate Data & Trend Lines

Scatterplots, Association, and Trend Lines



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This overview guide contains...

The unit calendar — every objective and scheduled assessment across the rest of the quarter

Vocabulary — the terms you must build into your artifacts

Check Your Understanding problem sets — an extra tool to monitor your progress. Completing all questions is not required, but a guide kept up with, completed in full, and turned in at the end of the quarter raises your Standards Mastery Check score by **5%**. Answer keys for every question are posted on the class website.

Since this guide contains so much foundational information vital to success in this course, it is **essential** to keep up with it. It's **THE most important document** needed for success.

Unit Calendar

Friday, November 13th – Friday, December 11th

ARTIFACT 18 · Scatterplots and Association

WEEK 5 NOVEMBER 9–13

FRIDAY

NOV 13

I can identify and construct a scatterplot that shows the relationship of a bivariate set of data such as linear, non-linear, and no association. **8.11A**

WEEK 6 NOVEMBER 16–20

BLOCK 1

MON–TUE, NOV 16–17

I can identify and construct a scatterplot that shows the relationship of a bivariate set of data such as linear, non-linear, and no association. **8.11A**

I can determine a set of points that could be added to the graph of a bivariate set of data so that the relationship remains linear. **8.5C**

I can describe the relationship of a bivariate set of data graphed on the coordinate grid as linear or non-linear. **8.5C**

I can construct a trend line through a scatterplot and use it to predict the value of either variable when given the value of the other, for a bivariate set of data with a positive or negative linear association. **8.5D**

ARTIFACT 19 · Trend Lines and Predictions

BLOCK 2

WED–THU, NOV 18–19

Block 1, objective 4, continued. **8.5D**

Performance Task 3.1 · Trend Lines and Scatterplots

in class Wed–Thu, Nov 18–19 · revisions due Thursday, Dec 10

Public Presentations · Cost Analysis

Friday, Nov 20 through Wednesday, Dec 2

Q2 Mathematical Process · Weeks 13–15

Friday, Nov 20

THANKSGIVING BREAK NOVEMBER 23–27

WEEK 7 NOVEMBER 30–DECEMBER 4

Unit 2 Assessment revisions due Thursday, Dec 3

MOY iReady

RLA Monday, Nov 30 · Mathematics Tuesday, Dec 1 · no class those days

REVIEW

WED–FRI, DEC 2–4

Review for SMC 2.

Unit 3 End-of-Unit Assessment

Friday, Dec 4 · revisions due Monday, Dec 14

WEEK 8 DECEMBER 7–11

Performance Task 3.1 revisions due Thursday, Dec 10

MONDAY

DEC 7

SMC 2 review · Growth Portfolio Entry 1 introduced · go over the Unit 3 Assessment.

District testing

Tue–Wed, Dec 8–9 · no math class

THU–FRI

DEC 10–11

Growth Portfolio Entry 1, continued.

Friday, Dec 11

due this day: Growth Portfolio Entry 1 · Q2 Mathematical Process, Weeks 16–18 · Q2 Mathia End-of-Quarter Check

WEEK 9 DECEMBER 14–18

Unit 3 Assessment revisions due Monday, Dec 14

Standards Mastery Check 2

December 14–18 · administered by class period Mon–Thu · make-ups Friday · no new content

Vocabulary

All of these terms must be eventually added to at least one artifact (Artifact 18 and/or 19!)

bivariate data	data that records two variables for each person or thing measured, written as ordered pairs (x, y)
scatterplot	a graph of plotted points that shows the relationship between a bivariate set of data
association	the overall pattern between the two variables in a scatterplot
positive association	as x increases, y tends to increase; the points rise from left to right
negative association	as x increases, y tends to decrease; the points fall from left to right
no association	the points show no pattern; knowing x tells you nothing about y
linear association	the points cluster around a straight line
nonlinear association	the points follow a pattern that is not a straight line (often a curve)
trend line	a straight line drawn through a scatterplot that approximates the linear relationship of the data; also called a line of best fit
prediction	a value estimated from the trend line rather than read from a single data point
slope of the trend line	how much the trend line predicts y to change for each increase of 1 in x
y-intercept of the trend line	the value the trend line predicts when $x = 0$; where the line crosses the vertical axis

Check Your Understanding

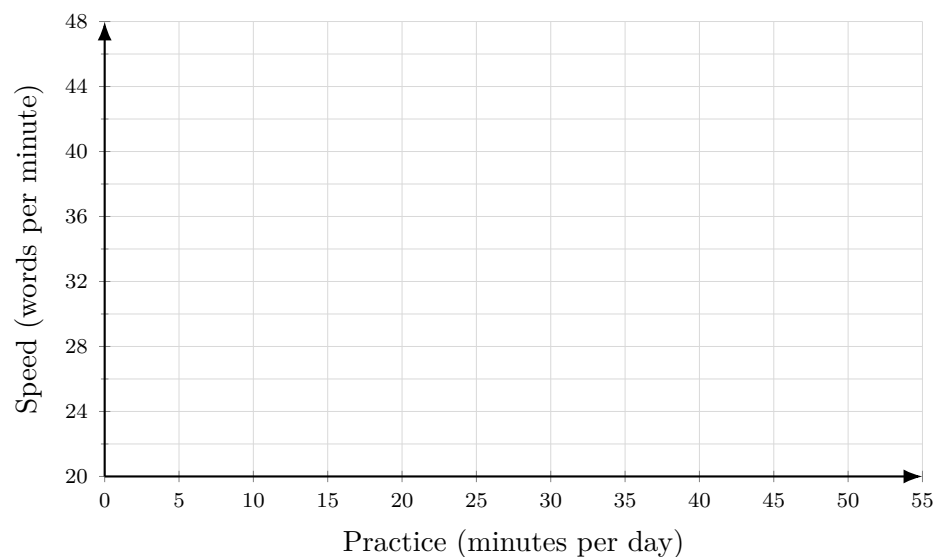
Unit 3 – Bivariate Data & Trend Lines

Scatterplots, Association, and Trend Lines

Questions 1–14 cover Artifact 18 (Scatterplots and Association)

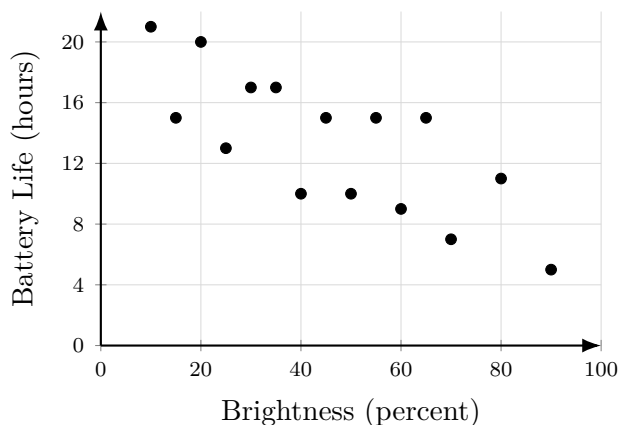
1. The table shows the minutes ten students practiced typing each day and each student's typing speed. Construct a scatterplot of the data on the grid. Then describe the association shown by the data.

Practice (min/day)	5	10	15	20	25	30	35	40	45	50
Speed (words/min)	30	24	34	28	36	32	44	38	46	44



Association:

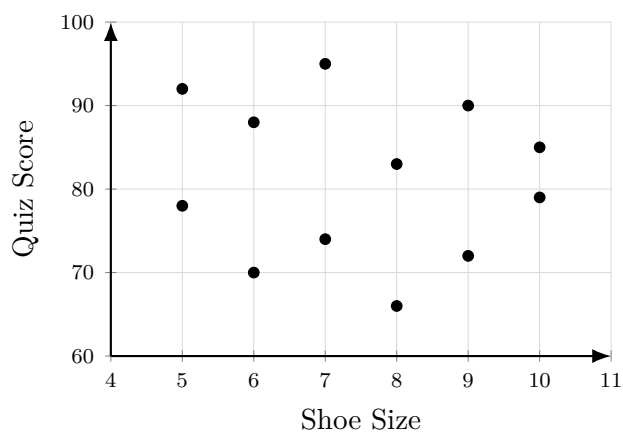
2. The scatterplot shows the screen brightness setting of several tablets and the number of hours each battery lasted.



Which best describes the association between brightness and battery life?

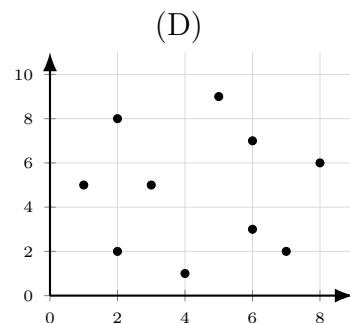
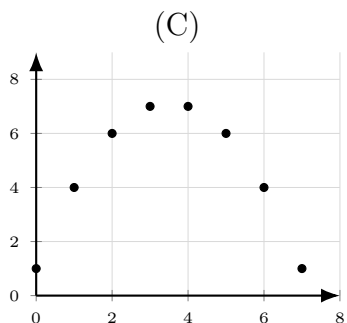
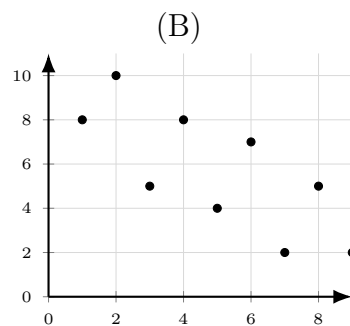
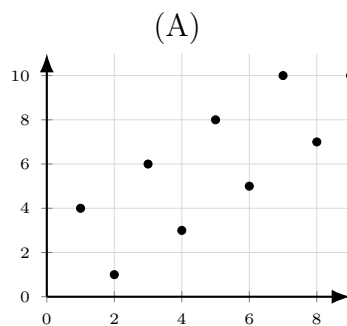
- (A) Positive linear association
- (B) Negative linear association
- (C) Nonlinear association
- (D) No association

3. The scatterplot shows the shoe size and the last quiz score of twelve students.

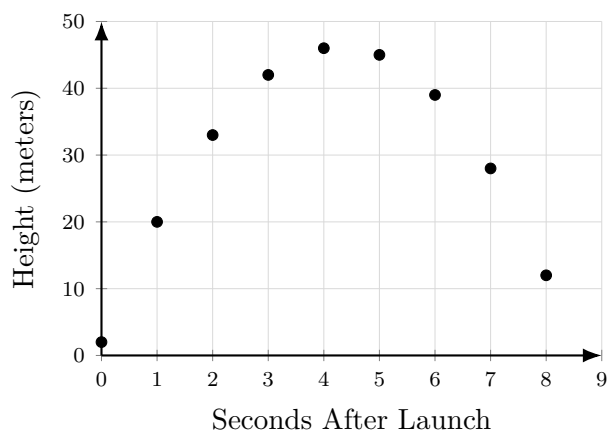


Describe the relationship shown by the data.
Explain how you decided.

4. Which scatterplot shows a nonlinear association?

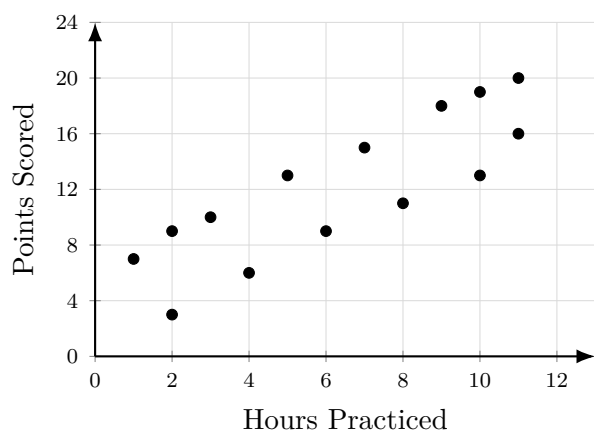


5. The scatterplot shows the height of a model rocket at each second after launch.



Describe the relationship shown by the data as linear or non-linear. Explain how you decided.

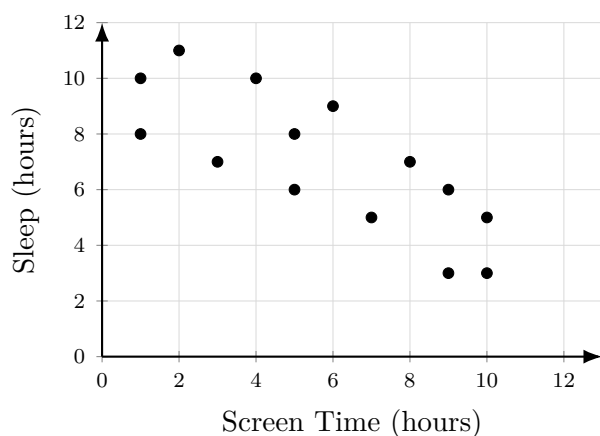
6. The scatterplot shows the hours several players practiced and the points each scored.



Which point, if added to the data, would best maintain the linear association?

- (A) (12, 20)
- (B) (2, 18)
- (C) (9, 5)
- (D) (12, 4)

7. The scatterplot shows the daily hours of screen time and the hours of sleep for fourteen students.

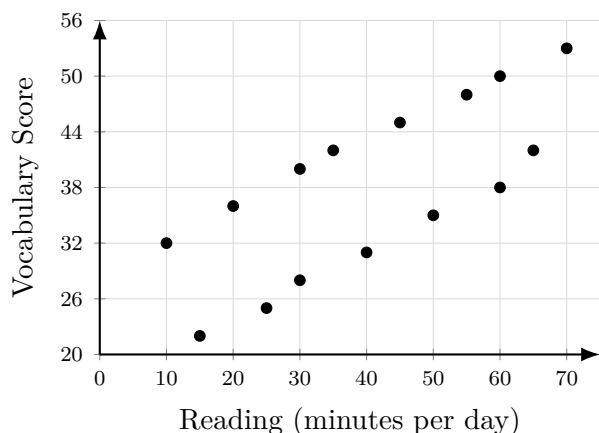


Give the coordinates of two points that could be added to the scatterplot so that the relationship stays linear. Explain how you chose them.

8. Determine the association each situation would most likely show. Place a check in the correct column for each row.

	Positive	Negative	None	Nonlinear
Minutes spent running and calories burned	☐	☐	☐	☐
A car's age and its resale value	☐	☐	☐	☐
A student's locker number and quiz score	☐	☐	☐	☐
A thrown ball's height and its seconds in the air	☐	☐	☐	☐

9. The scatterplot shows the minutes fifteen students read each day and each student's score on a vocabulary test.

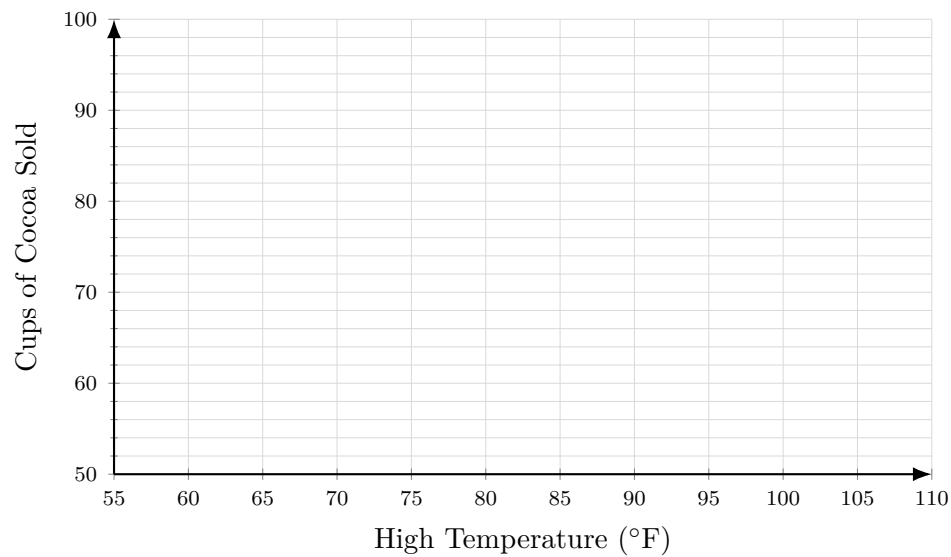


Which statement best describes the association shown?

- (A) As reading time increases, the score tends to decrease.
- (B) The data shows no association.
- (C) The data follows a nonlinear pattern.
- (D) As reading time increases, the score tends to increase in a linear pattern.

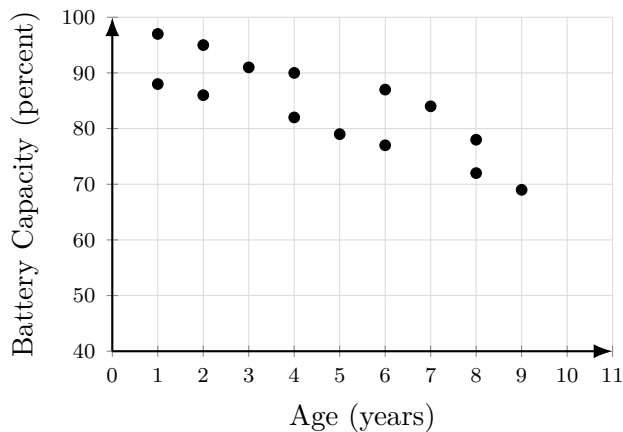
10. The table shows the high temperature on ten days and the cups of hot cocoa a stand sold each day. Construct a scatterplot of the data on the grid. Then describe the association shown by the data.

High temp ($^{\circ}\text{F}$)	60	65	70	75	80	85	90	95	100	105
Cups sold	98	82	92	76	82	66	76	60	68	56



Association:

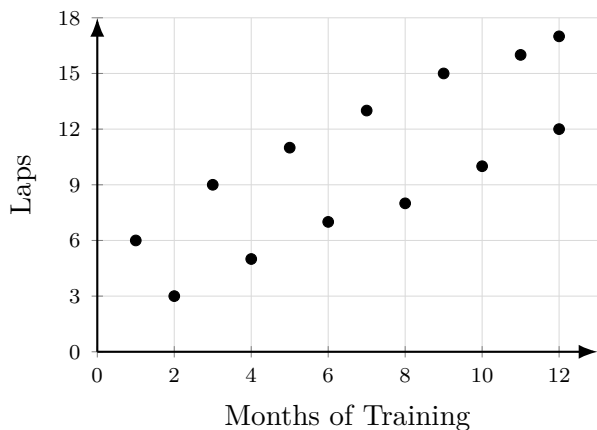
11. The scatterplot shows the age of several laptops and each battery's capacity.



Which point, if added to the data, would best maintain the linear association?

- (A) (2, 60)
- (B) (10, 70)
- (C) (10, 95)
- (D) (5, 50)

12. The scatterplot shows the number of months twelve club members have trained and the laps each can swim.



Describe the relationship of the data as linear or non-linear, and justify your decision.

13. The table shows the number of weeks a phone has been used and its battery life.

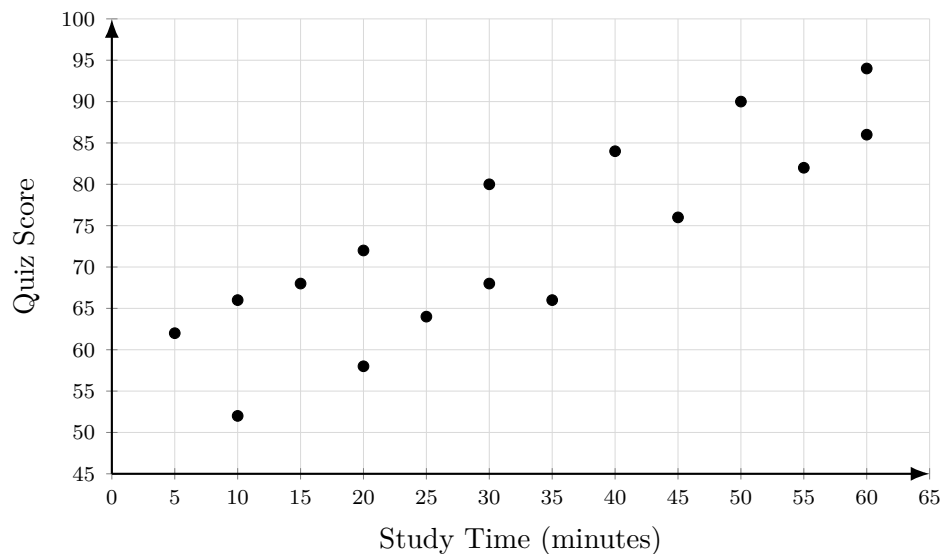
Weeks used	2	4	6	8	10	12
Battery life (hours)	18	15	14	11	10	7

Would a scatterplot of this data show a positive association, a negative association, or no association? Explain how you can tell without graphing.

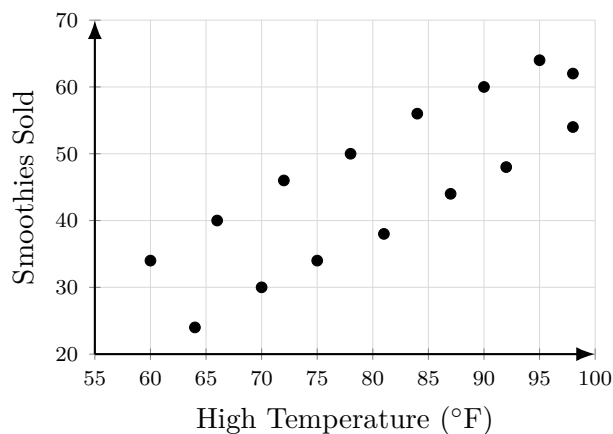
14. A student looks at a scatterplot in which the points rise from left to right but do not all line up, and says, “The data shows no association because the points are not on a line.” Decide whether the student is correct. Use the words association and trend in your justification.

Questions 15–25 cover Artifact 19 (Trend Lines and Predictions)

15. The scatterplot shows the minutes sixteen students studied and each student's quiz score. Draw a trend line through the scatterplot. Then use your line to predict the score of a student who studies 35 minutes, and show or explain how you used the line.



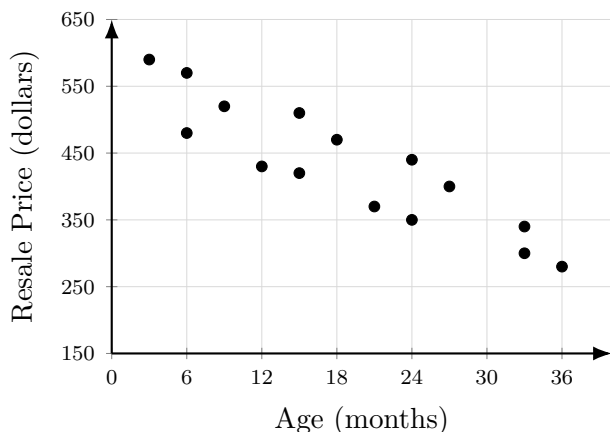
16. The scatterplot shows the high temperature and the number of smoothies a shop sold on fifteen days.



Based on the data, what is the best prediction for the number of smoothies sold on a day when the high temperature is 85 °F?

- (A) 54
- (B) 62
- (C) 49
- (D) 38

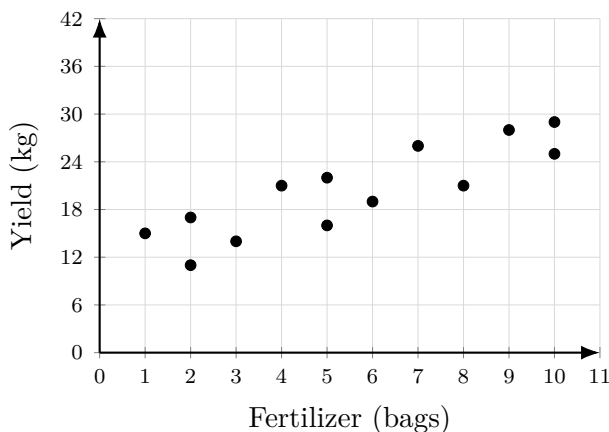
17. The scatterplot shows the age of several used phones and the price each sold for.



Based on the data, what is the best prediction for the price of a phone that is 30 months old?

- (A) \$350
- (B) \$300
- (C) \$410
- (D) \$230

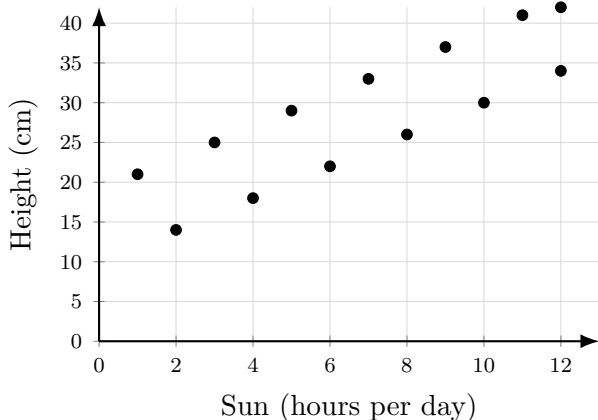
18. The scatterplot shows the bags of fertilizer used on thirteen tomato plots and each plot's yield.



Draw a trend line through the scatterplot. Use your line to predict the number of bags of fertilizer used on a plot whose yield is 24 kg, and show or explain how you used the line.

19. The trend line for a scatterplot of hours worked x and dollars earned y has the equation $y = 2.5x + 12$. Use the equation to predict the dollars earned in 20 hours. Then predict the number of hours worked when the earnings are \$87. Show your work.

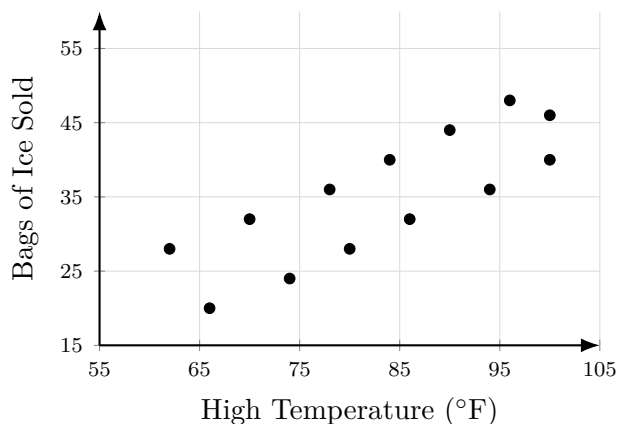
20. The scatterplot shows the hours of sun thirteen plants received and each plant's height.



Which equation best represents a trend line for the data?

- (A) $y = 15x + 2$
- (B) $y = 2x - 15$
- (C) $y = x + 15$
- (D) $y = 2x + 15$

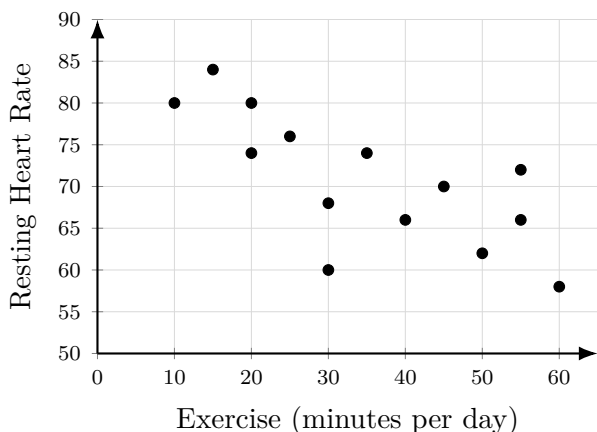
21. The scatterplot shows the high temperature and the bags of ice a store sold on thirteen days.



(a) Draw a trend line through the scatterplot, and use your line to predict the bags of ice sold on a day when the high temperature is 88°F.

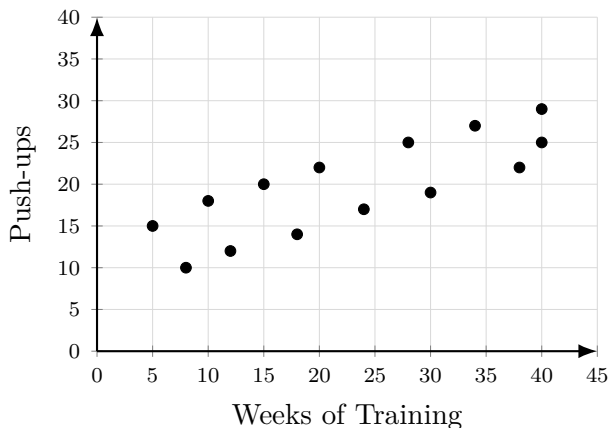
(b) State what the slope of your trend line means in this situation.

22. The scatterplot shows the minutes of daily exercise and the resting heart rate of fourteen adults. To estimate the resting heart rate of an adult who exercises 38 minutes a day, a student finds the plotted point with the exercise time closest to 38 and reads that point's heart rate.



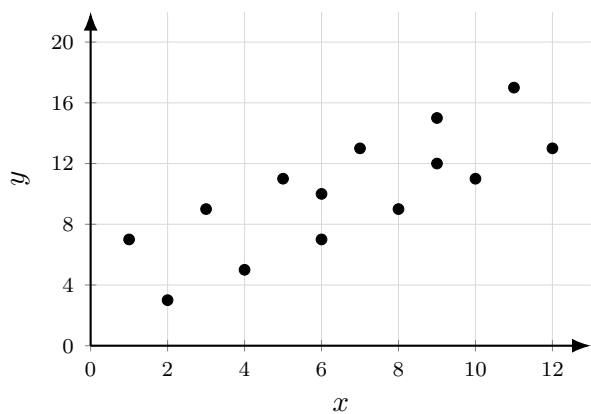
Estimate the resting heart rate using a trend line instead. Then decide whether the student's method is reliable. Explain why or why not.

23. The scatterplot shows the weeks of training and the number of push-ups for fourteen students. The training program lasts 40 weeks.



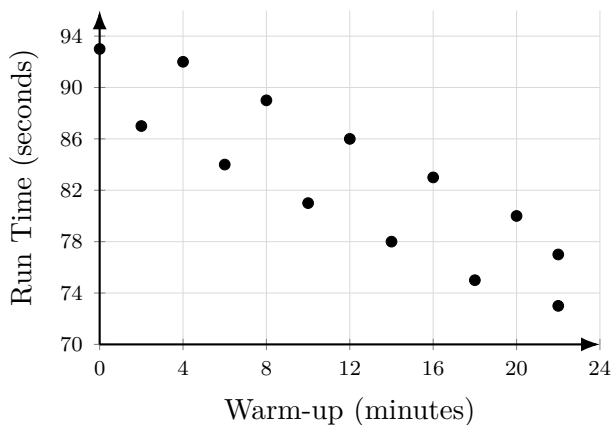
A student uses a trend line for this data to predict the push-ups after 90 weeks of training. Give the student's prediction, then state one reason this prediction is less reliable than a prediction made at 25 weeks.

24. The scatterplot shows a data set.



A student says a trend line for this data must pass through as many of the data points as possible. Decide whether the student is correct. Draw a trend line through the scatterplot and use it to justify your decision.

25. The scatterplot shows the minutes of warm-up time and the 400-meter run time for twelve runners. A trend line for the data crosses the vertical axis at about 91.



What does the value 91 represent in this situation?

- (A) Each minute of warm-up adds about 91 seconds to the run time.
- (B) A runner who warms up for 91 minutes runs the fastest race.
- (C) A runner with no warm-up time is predicted to run the 400 meters in about 91 seconds.
- (D) The fastest possible run time is 91 seconds.