

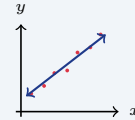
# Scatter Plots and Lines of Best Fit

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 30

## Quick Review and Helpful Hints

A *scatter plot* shows paired data as points. A *positive* association rises (as  $x$  increases,  $y$  increases); a *negative* one falls; *no* association shows no pattern. A *line of best fit* follows the points and can predict  $y$  for a given  $x$ .

▷ **Example:** As study hours increase, test scores increase. What kind of association is this? **Work:** Both quantities go up together, so the points rise from left to right.   
 ★ **Answer:** Positive



Best-fit line follows the trend.

### Practice Problems

Identify the association or use the best-fit line.

- |   |  |
|---|--|
| 1. As $x$ up, $y$ up: association? _____                | 8. Best fit $y = x + 10$ ; predict $y$ at $x = 0$ _____  |
| 2. As $x$ up, $y$ down: association? _____              | 9. Hours studied vs. score: usually? _____               |
| 3. Points scattered randomly: association? _____        | 10. A line of best fit shows the overall? _____          |
| 4. Temperature up, cocoa sales down: association? _____ | 11. Slope of best fit $y = 2x - 3$ _____                 |
| 5. Height up, shoe size up: association? _____          | 12. Predict $y$ at $x = 10$ for $y = \frac{1}{2}x$ _____ |
| 6. Best fit $y = 2x + 1$ ; predict $y$ at $x = 5$ _____ | 13. No pattern in points means? _____                    |
| 7. Best fit $y = 3x$ ; predict $y$ at $x = 4$ _____     | 14. As a car ages, its value: association? _____         |

### Word Problems

15. Ice cream sales rise as the temperature rises. What association is this? \_\_\_\_\_
16. Using  $y = 5x$  (sales vs. ads), predict sales for 6 ads. \_\_\_\_\_
17. The number of absences rises as grades fall. What association is this? \_\_\_\_\_
18. A best-fit line is  $y = 2x + 4$ . Predict  $y$  when  $x = 3$ . \_\_\_\_\_



◆ Illustrated Practice

Use each scatter plot or best-fit line. Look for the overall trend before calculating.



19. What type of association is shown? \_\_\_\_\_



25. Which point does not fit the pattern? \_\_\_\_\_



20. What type of association is shown? \_\_\_\_\_



26. What is the slope of the line? \_\_\_\_\_



21. What type of association is shown? \_\_\_\_\_



27. What association is shown? \_\_\_\_\_



22. Predict  $y$  when  $x = 4$ . \_\_\_\_\_



28. Predict  $y$  when  $x = 6$ . \_\_\_\_\_



23. Predict  $y$  when  $x = 5$ . \_\_\_\_\_



29. Does the best-fit line rise or fall? \_\_\_\_\_



24. Estimate  $y$  when  $x = 3$ . \_\_\_\_\_



30. Predict  $y$  when  $x = 6$ . \_\_\_\_\_



## Answer Keys

- |             |                    |                    |
|-------------|--------------------|--------------------|
| 1. positive | 11. 2              | 21. no association |
| 2. negative | 12. 5              | 22. 9              |
| 3. none     | 13. no association | 23. 15             |
| 4. negative | 14. negative       | 24. 8              |
| 5. positive | 15. positive       | 25. (3, 3)         |
| 6. 11       | 16. 30             | 26. 4              |
| 7. 12       | 17. negative       | 27. negative       |
| 8. 10       | 18. 10             | 28. 110            |
| 9. positive | 19. positive       | 29. rise           |
| 10. trend   | 20. negative       | 30. 20             |

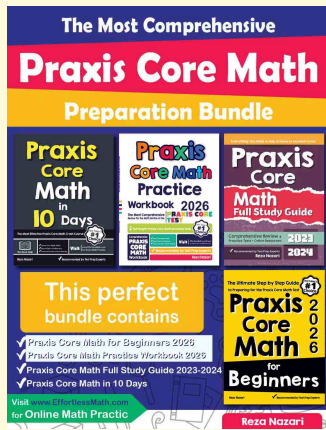
### Step-by-Step Explanations

1. Start by naming the process: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is Both rise together: positive. So the final answer is positive.
2. A good way to think about this is: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is One rises while the other falls: negative. So the final answer is negative.
3. Step by step: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is No pattern: no association. So the final answer is none.
4. Take it one move at a time: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is As one goes up the other goes down: negative. So the final answer is negative.
5. Start by naming the process: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is Both increase together: positive. So the final answer is positive.
6. A good way to think about this is: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is  $y = 2(5) + 1 = 11$ . So the final answer is 11.
7. Step by step: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is  $y = 3(4) = 12$ . So the final answer is 12.
8. Take it one move at a time: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is  $y = 0 + 10 = 10$ . So the final answer is 10.
9. Start by naming the process: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is More study usually means higher scores: positive. So the final answer is positive.
10. A good way to think about this is: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is It shows the overall trend. So the final answer is trend.
11. Step by step: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is The coefficient of  $x$  is 2. So the final answer is 2.
12. Take it one move at a time: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is  $y = \frac{1}{2}(10) = 5$ . So the final answer is 5.
13. Start by naming the process: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is No pattern means no association. So the final answer is no association.
14. A good way to think about this is: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is Older cars are worth less: negative. So the final answer is negative.
15. Step by step: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is Both rise together: positive. So the final answer is positive.
16. Take it one move at a time: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is  $y = 5(6) = 30$ . So the final answer is 30.
17. Start by naming the process: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is As grades fall, absences rise: negative. So the final answer is negative.
18. A good way to think about this is: Look at the overall pattern of the points: rising, falling, or no clear pattern. The setup/work is  $y = 2(3) + 4 = 10$ . So the final answer is 10.
19. The points move upward as you read from left to right. When  $x$  increases and  $y$  also tends to increase, the association is positive.
20. The points move downward from left to right. When  $x$  increases and  $y$  tends to decrease, the association is negative.
21. The points do not make a clear rising or falling pattern. That means there is no association.
22. Use the equation of the best-fit line. Substitute  $x = 4$ :  $y = 2(4) + 1 = 8 + 1 = 9$ .
23. Substitute  $x = 5$  into  $y = 3x$ . That gives  $y = 3(5) = 15$ .
24. Follow the dashed line up from  $x = 3$  until it reaches the best-fit line, then read across to  $y$ . The graph shows about 8.
25. An outlier is far away from the pattern. The highlighted point is at about (3, 3), so that is the point that does not fit.
26. In slope-intercept form  $y = mx + b$ , the slope is the number multiplying  $x$ . In  $y = 4x + 2$ , the slope is 4.
27. As practice increases, the points show errors going down. One variable rises while the other falls, so the association is negative.
28. Use the equation on the graph and plug in  $x = 6$ :  $y = 10(6) + 50 = 60 + 50 = 110$ .
29. The best-fit line goes upward from left to right. That means the line rises.
30. Substitute  $x = 6$  into  $y = 3x + 2$ :  $y = 3(6) + 2 = 18 + 2 = 20$ .



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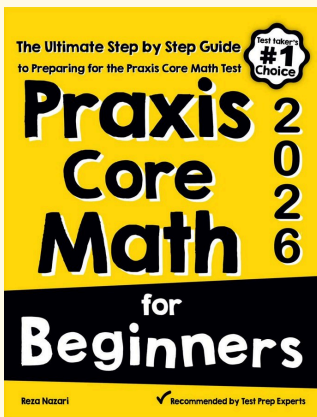
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