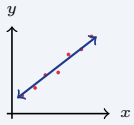
Scatter Plots and Lines of Best Fit

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.

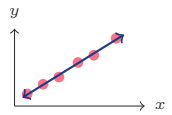
1. As x up, y up: association? _____
2. As x up, y down: association? _____
3. Points scattered randomly: association? _____
4. Temperature up, cocoa sales down: association? _____
5. Height up, shoe size up: association? _____
6. Best fit $y = 2x + 1$; predict y at $x = 5$ _____
7. Best fit $y = 3x$;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

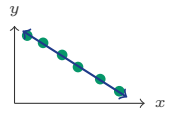
Illustrated Practice

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



19. What type of association is shown?

_____



20. What type of association is shown?

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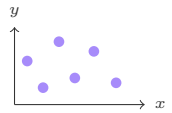
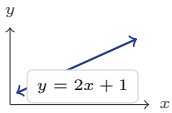


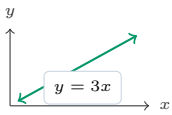
21. What type of association is shown?

_____



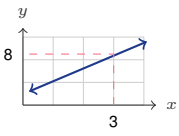
22. Predict y when $x = 4$.

_____



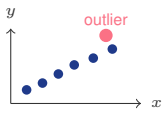
23. Predict y when $x = 5$.

_____



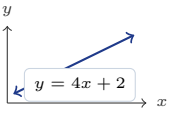
24. Estimate y when $x = 3$.

_____



25. Which point does not fit the pattern?

_____



26. What is the slope of the line?

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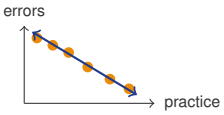
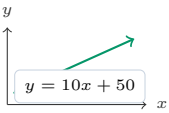


27. What association is shown?

_____

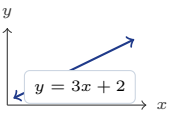


28. Predict y when $x = 6$.

_____

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

_____



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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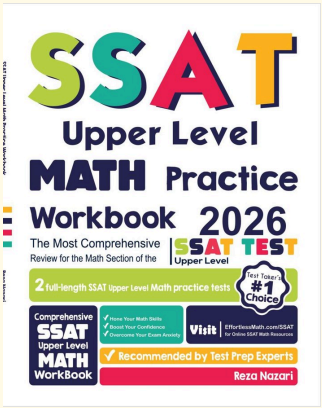

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