

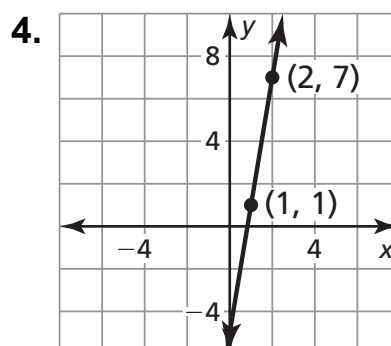
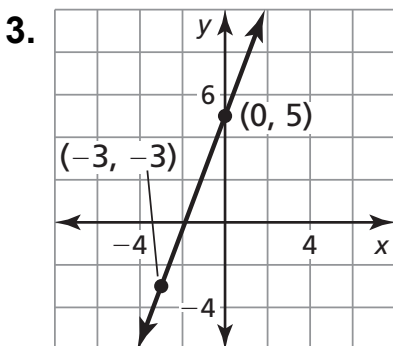
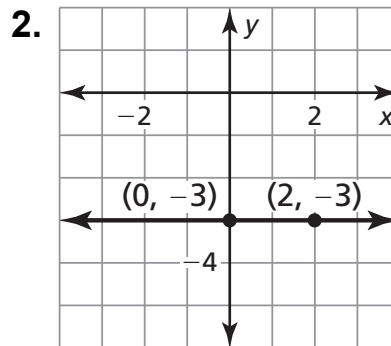
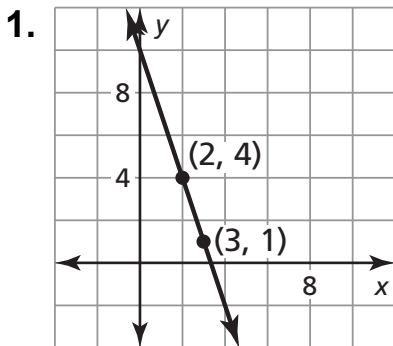
4.4 Start Thinking

Sketch a coordinate plane, showing only the first quadrant. Draw line q with any positive slope, horizontal line r , and line s with any negative slope.

Describe what happens to the y -values as the x -values increase for each line. Give an example of one real-life situation that represents each type of slope.

4.4 Warm Up

Use the graph to write an equation of the line in slope-intercept form.



4.4 Cumulative Review Warm Up

Graph the linear equation. Identify the x -intercept.

1. $y = x - 5$

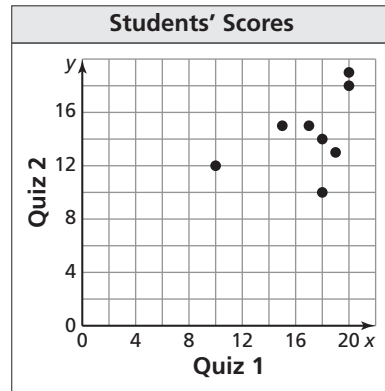
2. $y = 3x$

3. $2x - 2y = -2$

4. $y - 3x = 1$

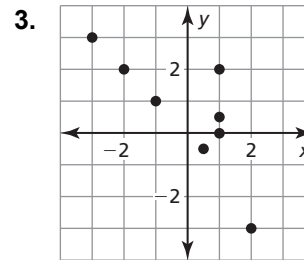
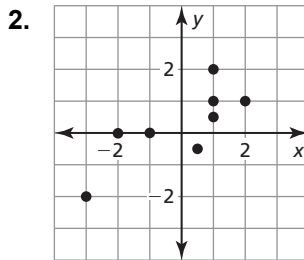
4.4**Practice A**

1. The scatter plot shows students' scores for Quiz 1 and Quiz 2.



- What is the Quiz 1 score for a student who earned a score of 13 on Quiz 2?
- Did any student(s) earn the same score on both Quiz 1 and Quiz 2? Explain.
- Does there appear to be a difference between the Quiz 1 scores and the Quiz 2 scores? Explain.

In Exercises 2 and 3, tell whether x and y show a *positive*, a *negative*, or *no* correlation.



4. The table shows the number y of pineapple plants in a garden x years since 2004.

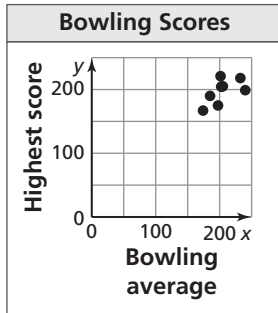
| | | | | | | |
|-----|---|---|---|----|----|----|
| x | 2 | 3 | 4 | 7 | 8 | 9 |
| y | 4 | 7 | 9 | 15 | 16 | 19 |

- Write an equation that models the approximate number of pineapple plants as a function of the number of years since 2004.
- Interpret the slope and y -intercept of the line of fit.

4.4

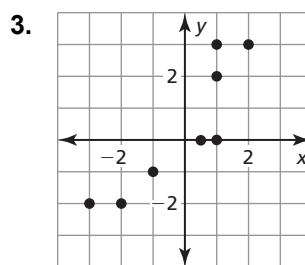
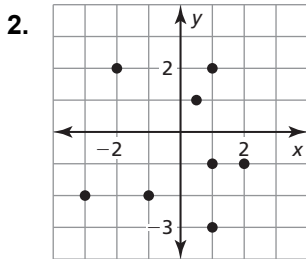
Practice B

1. The scatter plot shows the prior bowling averages of competitors at the bowling tournament and their highest scores during the tournament.



- a. How many competitors bowled above their average during the tournament?
- b. Did any bowler(s) bowl their average as their highest score? Explain.
- c. What are the scores of the competitors with the greatest difference between their bowling average and their highest score?

In Exercises 2 and 3, tell whether x and y show a *positive*, a *negative*, or *no* correlation.



4. The table shows the total number y of rolls of wrapping paper sold by a student after x weeks.

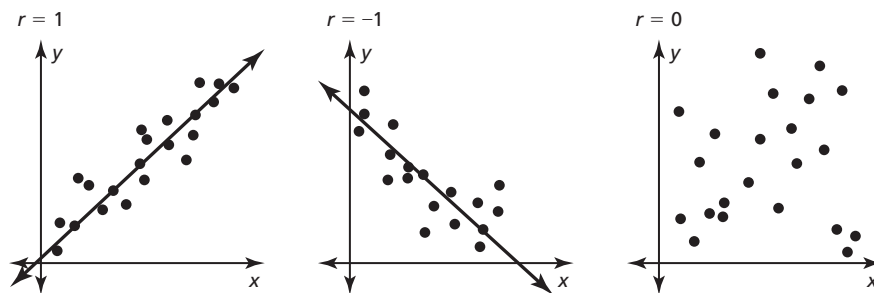
| | | | | | | |
|-----|---|---|---|----|----|----|
| x | 1 | 2 | 3 | 4 | 5 | 6 |
| y | 3 | 5 | 9 | 12 | 17 | 24 |

- a. Write an equation that models the number of rolls of wrapping paper as a function of the number of weeks.
- b. Interpret the slope and y -intercept of the line of fit.

4.4 Enrichment and Extension

Correlation Coefficient

In data analysis, there is a useful number called the *correlation coefficient*. This number gives a measure of how well a group of data is clustered around a line of best fit. If the data points are clustered closely around a line with positive slope, then the correlation coefficient r is close to 1. The value of r is close to -1 when the data points are clustered closely around a line with negative slope. If there is no close correlation, then the value of r is close to 0.



How to calculate the correlation coefficient:

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$$

In Exercises 1 and 2, use the formula to find the correlation coefficient for the set of data.

1. age of Labrador puppies vs. weight
2. hours studying vs. grade on exam

| Weeks | Weight (pounds) |
|-------|-----------------|
| 0 | 0.8 |
| 1 | 1.2 |
| 2 | 2 |
| 3 | 5 |
| 4 | 6.5 |
| 5 | 8 |
| 6 | 10.7 |
| 7 | 12.5 |

| Hours | Grade |
|-------|-------|
| 1 | 75 |
| 1 | 69 |
| 2 | 80 |
| 2 | 81 |
| 2 | 78 |
| 3 | 86 |
| 3 | 71 |
| 4 | 89 |



Puzzle Time

On What Day Do Spiders Eat The Most?

Write the letter of each answer in the box containing the exercise number.

Using a scatter plot of the data, tell whether x and y show a *positive*, a *negative*, or *no* correlation.

1. $(-3, -2), (-2, 0), (-1, 1), (0, 0), (0, 1), (0, 2), (1, 2), (2, 3)$

A. positive correlation B. negative correlation C. no correlation

2. $(-2, 5), (-1, 3), (-1, 4), (0, 2), (0, 4), (1, 2), (2, 1), (3, 0)$

X. positive correlation Y. negative correlation Z. no correlation

3. $(-3, 4.5), (-2, 4), (-2, 3), (-1, 3), (-1, 2), (0, 0), (0, 1), (2, -1)$

K. positive correlation L. negative correlation M. no correlation

4. $(-3, 0), (-3, -4), (-2, -2), (-2, 2), (0, 0), (1, -3), (2, -2), (3, 2)$

B. positive correlation C. negative correlation D. no correlation

5. The table shows the daily ticket sales of the latest movie. Using a scatter plot of the data, write an equation that models ticket sales as a function of the number of days that the movie has been in theaters.

| | | | | | | | | |
|---|----|----|----|----|----|---|---|---|
| Days, x | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Sales (millions), y | 18 | 17 | 15 | 13 | 12 | 9 | 6 | 4 |

E. $y = -2x - 20$

F. $y = -2x + 20$

G. $y = 2x + 20$

6. The table shows the number of vehicles y that were cleaned at the car wash x hours since the car wash opened. Using a scatter plot of the data, write an equation that models the number of vehicles as a function of the number of hours since the car wash opened.

| | | | | | | | | |
|---------------------------------|---|---|---|---|---|----|----|----|
| Hours, x | 1 | 3 | 4 | 6 | 7 | 8 | 9 | 12 |
| Vehicles, y | 2 | 4 | 4 | 7 | 8 | 10 | 11 | 13 |

W. $y = x - 1$

X. $y = -x + 1$

Y. $y = x + 1$

| | | | | | |
|---|---|---|---|---|---|
| 5 | 3 | 6 | 4 | 1 | 2 |
|---|---|---|---|---|---|