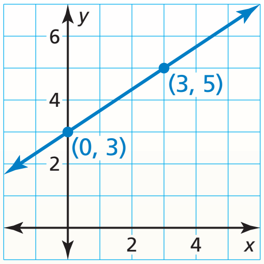
4 Chapter Review

Dynamic Solutions available at *BigIdeasMath.com*

4.1 Writing Equations in Slope-Intercept Form (pp. 165–170)

Write an equation of the line in slope-intercept form.



Find the slope and y-intercept.

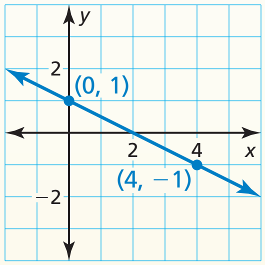
Let $(x_1, y_1) = (0, 3)$ and $(x_2, y_2) = (3, 5)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 3}{3 - 0} = \frac{2}{3}$$

Because the line crosses the y-axis at $(0, 3)$, the y-intercept is 3.

▶ So, the equation is $y = \frac{2}{3}x + 3$.

1. Write an equation of the line in slope-intercept form.



Write a linear function f with the given values.

2. $f(0) = 8, f(4) = 20$

3. $f(0) = 5, f(2) = -3$

4. $f(5) = -1, f(0) = -1$

5. $f(-4) = 0, f(0) = 0$

4.2 Writing Equations in Point-Slope Form (pp. 171–176)

Write an equation in point-slope form of the line that passes through the point $(-1, -8)$ and has a slope of 3.

$y - y_1 = m(x - x_1)$ — Write the point-slope form.

$y - (-8) = 3[x - (-1)]$ — Substitute 3 for m, -1 for x_1, and -8 for y_1.

$y + 8 = 3(x + 1)$ — Simplify.

▶ The equation is $y + 8 = 3(x + 1)$.

6. Write an equation in point-slope form of the line that passes through the point $(4, 7)$ and has a slope of -1.

Write an equation in slope-intercept form of the line that passes through the given points.

7. $(-2, 15), (6, 11)$

8. $(7, -4), (3, -1)$

9. $(-8, -15), (-6, 11)$

Write a linear function f with the given values.

10. $f(10) = 5, f(2) = -3$

11. $f(3) = -4, f(5) = -4$

12. $f(6) = 8, f(9) = 3$

4.3 Writing Equations of Parallel and Perpendicular Lines (pp. 177–182)

Determine which of the lines, if any, are parallel or perpendicular.

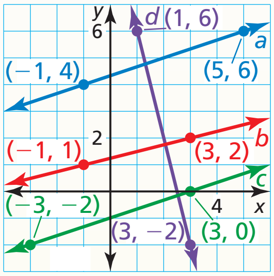
Line a: $y = 2x + 3$ **Line b: $2y + x = 5$** **Line c: $4y - 8x = -4$**

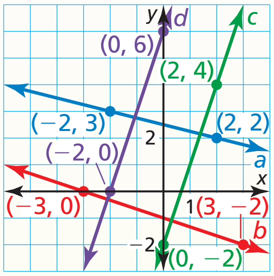
Write the equations in slope-intercept form. Then compare the slopes.

Line a: $y = 2x + 3$ Line b: $y = -\frac{1}{2}x + \frac{5}{2}$ Line c: $y = 2x - 1$

▶ Lines a and c have slopes of 2, so they are parallel. Line b has a slope of $-\frac{1}{2}$, the negative reciprocal of 2, so it is perpendicular to lines a and c.

Determine which of the lines, if any, are parallel or perpendicular. Explain.

13.


14.


15. Line a passes through (0, 4) and (4, 3).
Line b passes through (0, 1) and (4, 0).
Line c passes through (2, 0) and (4, 4).

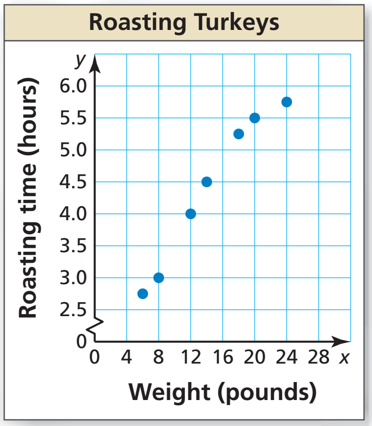
16. Line a: $2x - 7y = 14$
Line b: $y = \frac{7}{2}x - 8$
Line c: $2x + 7y = -21$

17. Write an equation of the line that passes through (1, 5) and is parallel to the line $y = -4x + 2$.

18. Write an equation of the line that passes through (2, −3) and is perpendicular to the line $y = -2x - 3$.

4.4 Scatter Plots and Lines of Fit (pp. 185–190)

The scatter plot shows the roasting times (in hours) and weights (in pounds) of seven turkeys. Tell whether the data show a *positive*, a *negative*, or *no* correlation.



As the weight of a turkey increases, the roasting time increases.

▶ So, the scatter plot shows a positive correlation.

Use the scatter plot in the example.

19. What is the roasting time for a 12-pound turkey?

20. What is the weight of a turkey that has a roasting time of 5.5 hours?

21. Write an equation that models the roasting time as a function of the weight of a turkey. Interpret the slope and y-intercept of the line of fit.

4.5 Analyzing Lines of Fit (pp. 191–198)

The table shows the heights x (in inches) and shoe sizes y of several students. Use a graphing calculator to find an equation of the line of best fit. Identify and interpret the correlation coefficient.

Height, x	Shoe size, y
64	9
62	7
70	12
63	8
72	13
68	9.5
66	9
74	13.5
68	10
59	6.5

Step 1 Enter the data from the table into two lists.

Step 2 Use the *linear regression* feature.

```
LinReg
 y=ax+b
 a=.4989919355
 b=-23.4828629
 r²=.9477256904
 r=.9735120392
```

▶ An equation of the line of best fit is $y = 0.50x - 23.5$. The correlation coefficient is about 0.974. This means that the relationship between the heights and the shoe sizes has a strong positive correlation and the equation closely models the data.

22. Make a scatter plot of the residuals to verify that the model in the example is a good fit.

23. Use the data in the example. (a) Approximate the height of a student whose shoe size is 9. (b) Predict the shoe size of a student whose height is 60 inches.

24. Is there a causal relationship in the data in the example? Explain.

4.6 Arithmetic Sequences (pp. 199–206)

Write an equation for the nth term of the arithmetic sequence $-3, -5, -7, -9, \ldots$. Then find a_{20}.

The first term is –3, and the common difference is –2.

$a_n = a_1 + (n - 1)d$ — Equation for an arithmetic sequence

$a_n = -3 + (n - 1)(-2)$ — Substitute -3 for a_1 and -2 for d.

$a_n = -2n - 1$ — Simplify.

Use the equation to find the 20th term.

$a_{20} = -2(20) - 1$ — Substitute 20 for n.

$= -41$ — Simplify.

▶ The 20th term of the arithmetic sequence is -41.

Write the next three terms of the arithmetic sequence.

25. $15, 4, -7, -18, \ldots$

26. $2.1, 2.8, 3.5, 4.2, \ldots$

27. $\frac{7}{8}, \frac{3}{4}, \frac{5}{8}, \frac{1}{2}, \ldots$

Write an equation for the nth term of the arithmetic sequence. Then find a_{30}.

28. $11, 10, 9, 8, \ldots$

29. $6, 12, 18, 24, \ldots$

30. $-9, -6, -3, 0, \ldots$