Chapter 7

Exercise Set 7.1

Construct a table containing the given point and at least four other points on the line as in Example 2. Sketch its graph.

1. A line of slope 1 passing through the point $(2,1)$.

2. A line of slope -1 passing through the point $(3,1)$.

3. A line of slope -2 passing through the point $(4,-1)$.

4. A line of slope 0 passing through $(-1,-2)$.

5. A line with no slope passing through $(4,5)$.

6. A line of slope 0 passing through $(4,5)$.

7. A line of slope $\dfrac{1}{2}$ passing through $(2,4)$.

8. A line of slope $-\dfrac{1}{2}$ passing through $(0,0)$.

9. A line of slope $\dfrac{2}{3}$ passing through $(0,0)$.

10. A line of slope -1 passing through $(-2,3)$.

11. A line of slope $-\dfrac{1}{4}$ passing through $(0,1)$.

12. A line of slope 3 passing through $(-1,-3)$.

Find the slope of the line (if it exists) through the given pair of points and sketch its graph. Find two additional points on the line and place the coordinates of all four points on the graph as in Example 3.

13. $(0,0),(2,1)$ **14.** $(1,2),(2,1)$

15. $(0,0),(3,-1)$ **16.** $(2,3),(2,5)$

17. $(-1,0),(-1,3)$ **18.** $(3,1),(6,4)$

19. $(-4,0),(0,2)$ **20.** $(0,0),(4,3)$
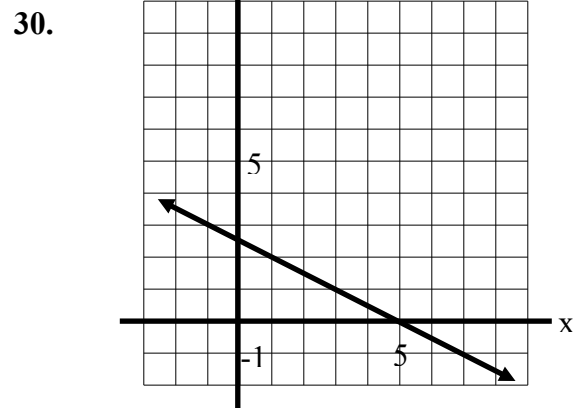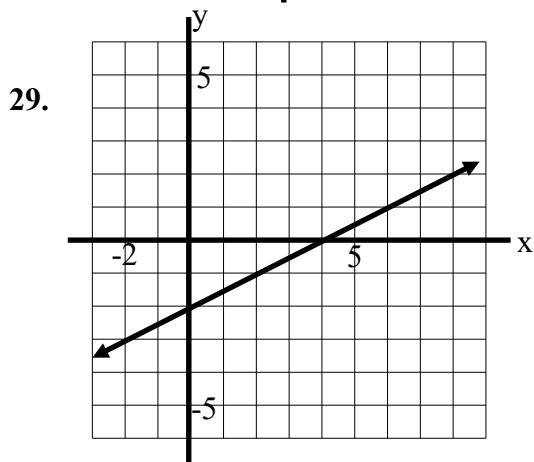
21. $(3,-5),(3,2)$ **22.** $(4,-2),(4,3)$

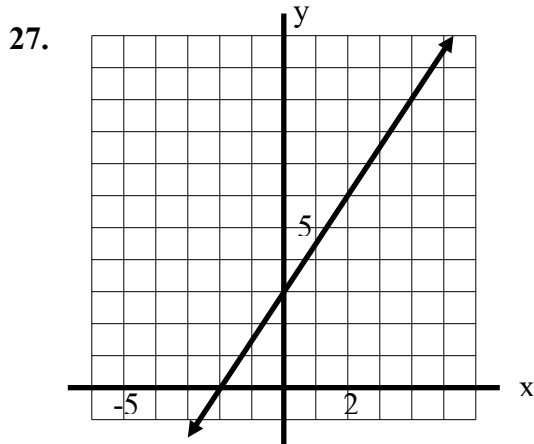**23.** $(-1,0),(-3,0)$ **24.** $(-2,3),(3,-2)$

25. $(-3,-1),(1,-2)$ **26.** $(1,1),(4,3)$

Find the slope of the line whose graph is shown.

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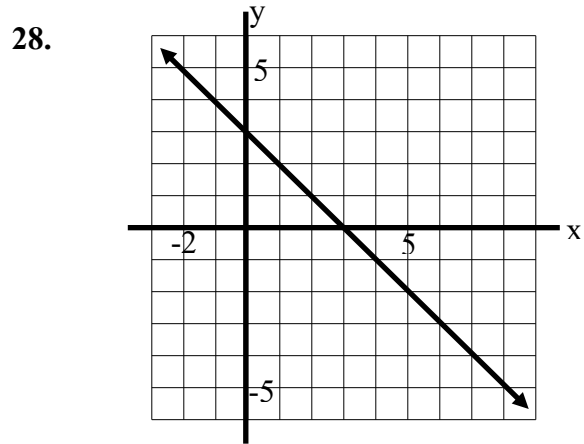
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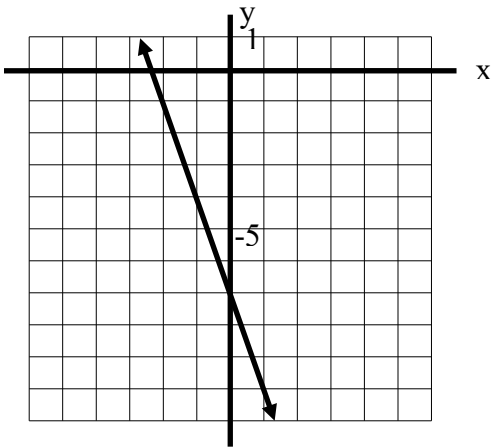
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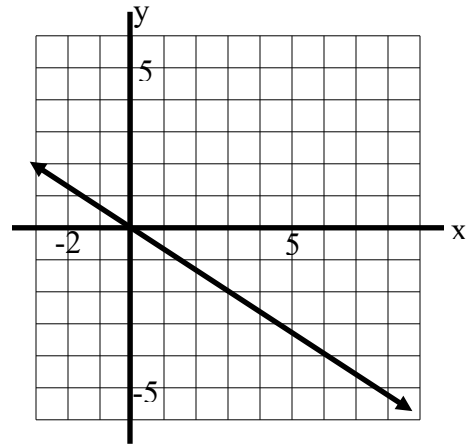
Exercise Set 7.2

Find the x- and y-intercepts of the line with the given equation and sketch its graph.
Calculate the slope of the line using the two points where the line intersects the axes.
Check your answer by placing the equation of the line in slope-intercept form.

1. $2x+3y=6$ **2.** $3x-4y=12$

3. $-3x+2y=18$ **4.** $x+2y=8$

5. $2x+y=-4$ **6.** $x-3y=-9$

Find the equation of the line in slope-intercept form that satisfies the given conditions.

6. Through $(3,2)$, with slope 2 **7.** Through $(-4,4)$, with slope -1

8. Through $(1,3)$ and $(5,1)$ **9.** Through $(-2,3)$ and $(3,-5)$

9. Through $(-3,-1)$ and $(1,5)$ **10.** Through $(-1,2)$ and $(6,4)$

11. Through $(-1,-2)$, with slope $\dfrac{2}{5}$ **12.** Through $(4,-5)$, with slope $-\dfrac{3}{4}$

13. Slope 2, with x-intercept: -3 **14.** Slope $\dfrac{7}{3}$, with y-intercept: 1

15. x-intercept -1 and y-intercept 4 **16.** x-intercept 3 and y-intercept 5

Sketch the graph of the line. Find at least three points on the line and place the coordinates of these points on your graph.

17. $y=-x+3$ **18.** $y=2x-5$

19. $y=-\dfrac{1}{3}x$ **20.** $y=\dfrac{5}{2}x+1$

21. $y=\dfrac{2}{3}x-4$ **22.** $y=-\dfrac{3}{5}x-2$

Find the slope and the x- and y-intercepts of the line and sketch its graph. Find at least three points on the line and place the coordinates of these points on your graph.

23. $x+y=4$ **24.** $3x-2y=6$

25. $2x - 5y = 0$

26. $y = -3$

27. $5x + 3y + 15 = 0$

28. $5x + 8 = 0$

29. $-2x + 3y + 9 = 0$

30. $4x + 5y - 10 = 0$

31. $3y - 7 = 0$

32. $3y - 7x = 0$

33. $\dfrac{1}{3}x + \dfrac{1}{2}y = 1$

34. $\dfrac{3}{4}x - \dfrac{1}{2}y = 6$

35. $\dfrac{2}{5}x - y = 1$

36. $2x + \dfrac{1}{3}y + 4 = 0$

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37. A line has equation $y = mx + 1$, where m is a real number. What is the slope of the line if it passes through the point $(3, -1)$?

38. A line has equation $y = mx - 5$, where m is a real number. What is the slope of the line if its x-intercept is 2?

39. A line has equation $ax + 3y = 5$, where a is a real number. What is the x-intercept of the line if it passes through the point $(2, -1)$?

40. A line has equation $2x + by = 3$, where b is a real number. What is the slope of this line if it passes through the point $(-1, 2)$?

41. A line has equation $y = -2x + b$, where b is a real number. What is the y-intercept of the line if its x-intercept is 3?

42. A line has equation $-2x + 4y = c$, where c is a real number. What is the slope of the line if it passes through the point $(-1, -3)$?

43. A line with slope 2 passes through the point $(-3, -1)$. What is its y-intercept?

**44.** A line with slope -2 passes through the point $(2, 3)$. What is its x-intercept?

45. A line with y-intercept -3 passes through the point $(-3, 4)$. What is its slope?

46. A line with x-intercept 4 passes through the point $(3, 5)$. What is its slope?
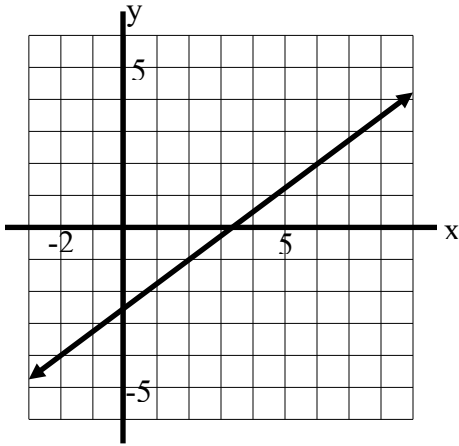
47. A line with x-intercept -2 passes through the point $(3, 3)$. What is its y-intercept?

48. A line with y-intercept -5 passes through the point $(-2, 2)$. What is its x-intercept?
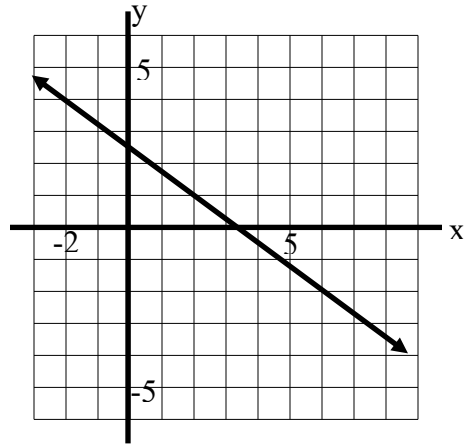
Find the slope-intercept form of the equation of the line whose graph is shown.

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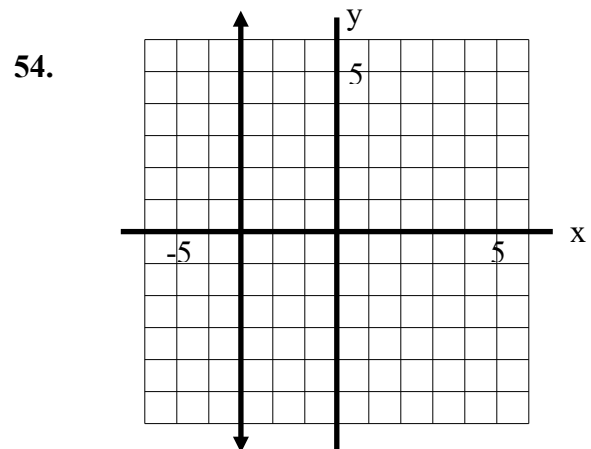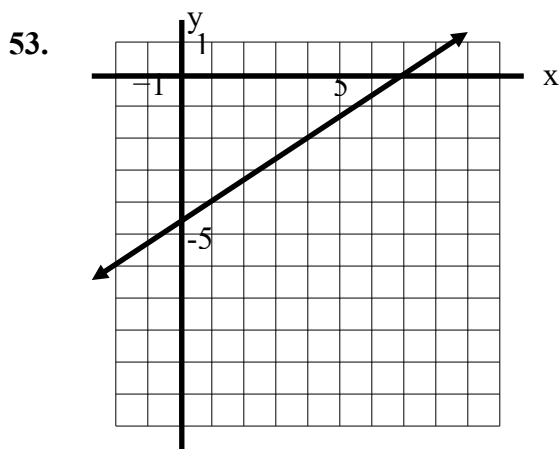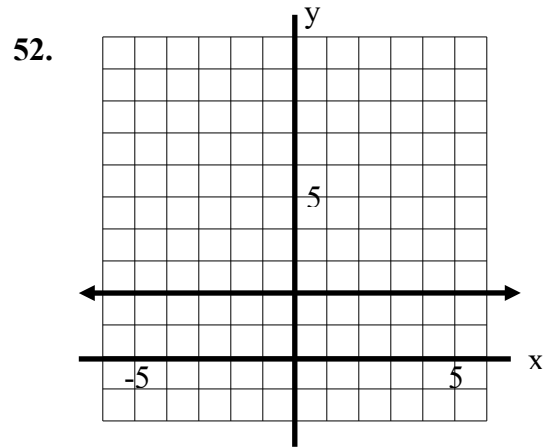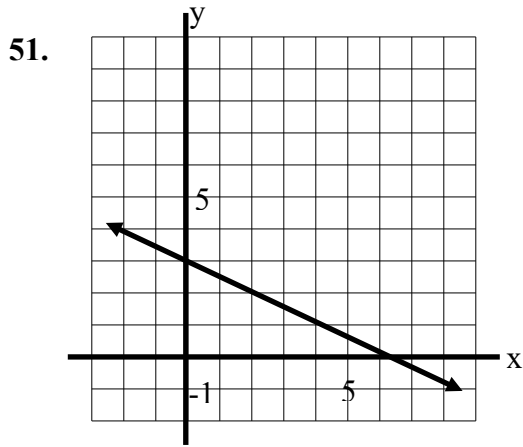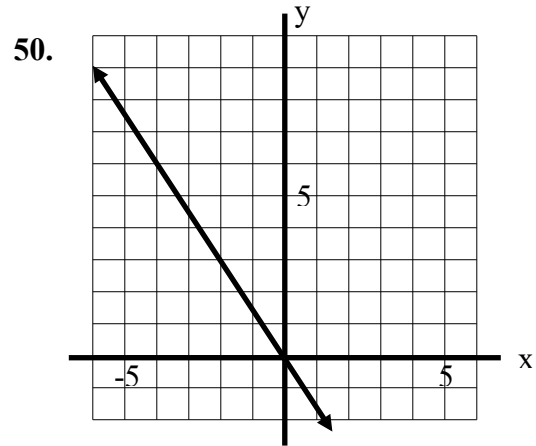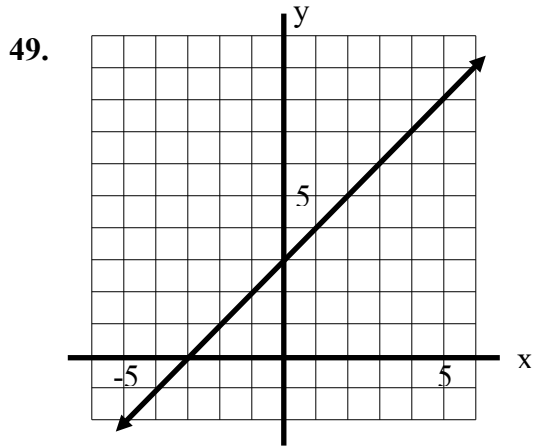
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Exercise Set 7.3

In exercises 1-8, determine whether the given lines are parallel, perpendicular, or neither. Justify your answer.

1. $x-4y=6$ *and* $-2x+8y=12$

2. $x+3y=9$ *and* $-2x-3y=18$

3. $4x+2y=10$ *and* $x-2y=4$

4. $3x-4y=12$ *and* $4x-3y=24$

5. $2x-3y=6$ *and* $y=\dfrac{3}{2}x+5$

6. $7x-5y=35$ *and* $y=-\dfrac{5}{7}x$

7. $3x+5y=15$ *and* $y=-\dfrac{3}{5}x+7$

8. $8x-3y=0$ *and* $y=-\dfrac{3}{8}x-12$

9. Find an equation of the line through $(-1,4)$ that is parallel to the line $y=3x-2$.

10. Find an equation of the line through $(-2,3)$ that is parallel to the line $y=7$.

11. Find an equation of the line through $(-2,3)$ that is parallel to the line $x=-5$.

12. Find an equation of the line through $(2,1)$ that is perpendicular to the line $y=\dfrac{2}{3}x+1$.

13. Find an equation of the line with x-intercept -5 that is parallel to the line $2x+3y=6$.

14. Find an equation of the line with y-intercept 2 that is perpendicular to the line $3x-4y=0$.

15. Find an equation of the line through $(1,2)$ that is parallel to the line $y=-\dfrac{3}{5}x-4$.

16. Find an equation of the line through $(-4,5)$ that is perpendicular to the y-axis.

17. Find an equation of the line through $(-4,5)$ that is perpendicular to the x-axis.

18. Find an equation of the line through $(4,3)$ that is parallel to $x+3y+1=0$.

19. Find an equation of the line through $(-1,-3)$ that is perpendicular to $-5x+3y-15=0$.

20. Find an equation of the line through $(0,0)$ that is parallel to the line through $(4,-1)$ and $(-6,5)$.

21. Find an equation of the line through $(5, 4)$ that is perpendicular to the line through $(-1, 2)$ and $(3, 7)$.

22. Find an equation of the line through $(-3, -4)$ that is perpendicular to the line through $(2, 5)$ and $(2, 0)$.

23. Find an equation of the line through $(-3, -4)$ that is parallel to the line through $(2, 5)$ and $(2, 0)$.

24. Find an equation of the line with x-intercept 2 that is parallel to the line through $(-1, -2)$ and $(3, 5)$.

25. Find an equation of the line with y-intercept 3 that is perpendicular to the line through $(2, -3)$ and $(-2, 2)$.

26. Find an equation of the line with x-intercept 2 perpendicular to the line through $(-1, 4)$ and $(3, 4)$.

27. A quadrilateral has vertices $(2, 2)$, $(8, 2)$, $(10, 5)$ and $(4, 5)$. Plot these points and sketch the quadrilateral. Use slopes to determine whether the quadrilateral is a parallelogram. Justify your answer.

28. A quadrilateral has vertices $(1, 1)$, $(7, 4)$, $(5, 10)$ and $(-1, 7)$. Plot these points and sketch the quadrilateral. Use slopes to determine whether the quadrilateral is a parallelogram. Justify your answer.

29. A quadrilateral has vertices $(-1, -2)$, $(6, 0)$, $(8, 7)$ and $(1, 4)$. Plot these points and sketch the quadrilateral. Use slopes to determine whether the quadrilateral is a parallelogram. Justify your answer.

30. A triangle has vertices $(0, 0)$, $(4, 1)$ and $(-2, 8)$. Plot these points and sketch the triangle. Use slopes to determine whether the triangle is a right triangle. Justify your answer.

31. A triangle has vertices $(-3, -1)$, $(3, 3)$ and $(-9, 8)$. Plot these points and sketch the triangle. Use slopes to determine whether the triangle is a right triangle. Justify your answer.

32. A triangle has vertices $(2, 1)$, $(4, -1)$ and $(4, 5)$. Plot these points and sketch the triangle. Use slopes to determine whether the triangle is a right triangle. Justify your answer.

33. A quadrilateral has vertices $(1,1)$, $(3,3)$, $(2,4)$ and $(0,2)$. Plot these points and sketch the quadrilateral. Use slopes to determine whether the quadrilateral is a rectangle. Justify your answer.

34. Plot the points $(1,0)$, $(3,4)$ and $(6,10)$. Use slopes to determine whether these points lie on the same line. Justify your answer.

35. Plot the points $(1,4)$, $(3,2)$ and $(6,-2)$. Use slopes to determine whether these points lie on the same line. Justify your answer.