

Linear
Equations

$$ax + by = c$$

Standard form(neither a nor b is 0)Slope is $-a/b$ x -intercept is c/a y -intercept is c/b

$$x = k$$

Vertical line

Undefined slope

 x -intercept is k

$$y = k$$

Horizontal line

Slope is 0

 y -intercept is k

$$y = mx + b$$

Slope-intercept formSlope is m y -intercept is b

$$y - y_1 = m(x - x_1)$$

Point-slope formSlope is m Line passes through (x_1, y_1)

7.3 Exercises

Write the following equations in slope-intercept form, and then find the slope of the line and the y -intercept. See Example 1.

1. $x + y = 8$

2. $x - y = 2$

3. $5x + 2y = 10$

4. $6x - 5y = 18$

5. $2x - 3y = 5$

6. $4x + 3y = 10$

7. $-5x - 3y = 4$

8. $-2x - 7y = 15$

9. $8x + 11y = 9$

10. $4x + 13y = 19$

Find equations of the lines satisfying the following conditions. Write the equations in slope-intercept form. See Example 2.

11. $m = 5$, $b = 4$

12. $m = -2$, $b = 1$

13. $m = -\frac{2}{3}$, $b = \frac{1}{2}$

14. $m = -\frac{5}{8}$, $b = \frac{1}{4}$

15. Slope $\frac{2}{5}$, y -intercept -1

16. Slope $-\frac{3}{4}$, y -intercept 2

17. Slope 0 , y -intercept 4

18. Slope 0 , y -intercept -3

19. Slope -1.573 , y -intercept 4.209

20. Slope -2.334 , y -intercept 0.532

Find equations of the lines satisfying the following conditions. Write the equations in standard form. See Example 3.

21. $m = -\frac{3}{4}$, through $(-2, 5)$

22. $m = -\frac{5}{6}$, through $(4, -3)$

23. $m = -2$, through $(1, 5)$

24. $m = 1$, through $(-2, 3)$

25. $m = \frac{1}{2}$, through (7, 4)

27. Horizontal, through (-3, 2)

29. $m = 4$, x -intercept 3

31. $m = 1.2538$, through (4.1642, 2.9371)

26. $m = \frac{1}{4}$, through (1, -2)

28. Vertical, through (1, 5)

30. $m = -5$, x -intercept -2

32. $m = -0.4093$, through (1.6847, 3.2501)

Find equations for the following lines. (Hint: What kind of line has undefined slope?)

33. Undefined slope, through (2, 8)

34. Undefined slope, through (-4, 1)

35. Vertical, through (-7, 1)

36. Vertical, through (3, -9)

Find equations of the lines passing through the following pairs of points. Write the equations in standard form. See Example 4.

37. (3, 4) and (2, 6)

38. (5, -2) and (-3, 1)

39. (6, 1) and (-2, 5)

40. (4, -2) and (1, 3)

41. (1, 1) and (0, -4)

42. (3, -4) and (-2, 2)

43. $\left(-\frac{2}{5}, \frac{2}{5}\right)$ and $\left(\frac{4}{3}, \frac{2}{3}\right)$

44. $\left(\frac{3}{4}, \frac{8}{3}\right)$ and $\left(\frac{2}{5}, \frac{2}{3}\right)$

45. (2, 5) and (1, 5)

46. (-2, 2) and (4, 2)

47. (1, $\sqrt{5}$) and (3, $2\sqrt{5}$)

48. (-4, $\sqrt{2}$) and (5, $-\sqrt{2}$)

Find equations of the lines satisfying the following conditions. Write the equations in standard form. See Examples 5 and 6.

49. Parallel to $3x - y = 8$ and through (-7, 3)

50. Parallel to $2x + 5y = 10$ and through (4, 7)

51. Parallel to $-x + 2y = 3$ and through (-2, -2)

52. Through (-1, 3) and perpendicular to $3x + 2y = 6$

53. Through (8, 5) and perpendicular to $2x - y = 4$

54. Through (2, -7) and perpendicular to $5x + 2y = 7$

55. Parallel to $y = 4$ and through (-2, 7)

56. Parallel to $x - 2 = 0$ and through (8, 4)

540 Answers to Selected Exercises

Section 7.3 (page 311)

1. $y = -x + 8$; -1; 8

3. $y = (-5/2)x + 5$; -5/2; 5

5. $y = (2/3)x - 5/3$; 2/3; -5/3

7. $y = (-5/3)x - 4/3$; -5/3; -4/3

9. $y = (-8/11)x + 9/11$; -8/11; 9/11

11. $y = 5x + 4$

13. $y = (-2/3)x + 1/2$

15. $y = (2/5)x - 1$

17. $y = 4$

19. $y = -1.573x + 4.209$

21. $3x + 4y = 14$

23. $2x + y = 7$

25. $x - 2y = -1$

27. $y = 2$

29. $4x - y = 12$

31. $1.2538x - y = 2.2840$ (rounded)

33. $x = 2$

35. $x = -7$

37. $2x + y = 10$

39. $x + 2y = 8$

41. $5x - y = 4$

43. $2x - 13y = -6$

45. $y = 5$

47. $\sqrt{5}x - 2y =$

$-\sqrt{5}$

49. $3x - y = -24$

51. $x - 2y = 2$

53. $x + 2y = 18$

55. $y = 7$

57. (a) $y = 640x + 1100$ (b) \$8780

59. (a) $y = \frac{4400}{3}x - \frac{94,100}{3}$ (b) \$12,633.33

61. $(-\infty, 1/2)$

63. $[-2, +\infty)$

65. $(-\infty, -8/5)$