Exercises

**For Exercises 1–4, graph each integer on a number line.
Then identify any opposites.**

1. $^-1, 4, 2, ^-4, 3, 1$

2. $2, 0, ^-3, 4, ^-1, 3$

3. $^-5, 10, ^-2, 4, 0, ^-10$

4. $^-5, 8, ^-7, ^-10, 5, 10$

5. Use an integer to represent each play in a football game.

   a. The fullback carries the ball for a gain of 6 yards.

   b. The quarterback is sacked for a loss of 3 yards.

   c. The play stops at the line of scrimmage for no gain.

6. Use an integer to represent each change to a bank account.

   a. A deposit of $20 is made on Monday.

   b. A check for $4 is written on Tuesday.

   c. A check for $6 is written on Wednesday.

   **d.** No transactions are made on Thursday.

7. Use an integer to represent each position of an elevator.

   a. The elevator leaves the ground floor and arrives at the 12th floor.

   b. The elevator leaves the ground floor and arrives at the second basement level.

   c. The elevator leaves the ground floor, arrives at the 7th floor, and then travels down 3 floors.

8. Use an integer to represent time in seconds for a space-ship launch.

   a. Lift off.

   b. The countdown begins with 10 seconds before lift off.

   c. The space ship has been in the air for one minute.

   d. Why do you think a launch countdown starts at *T-minus ten seconds?*

9. Use the number line below.
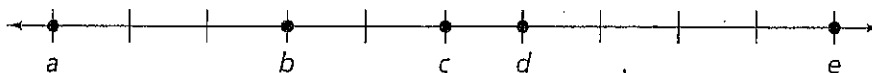
   a. If *a* and *e* are opposites, what integer would you use to represent *c*? Assign integer values to *a* and *e*.

   b. If *a* and *d* are opposites, is *c positive* or *negative*? Explain.

10. Multiple Choice Which list shows the numbers ordered from least absolute value to greatest absolute value?

    A. $^-4, ^-2, 6$

    B. $^-2, ^-4, 6$

    C. $6, ^-2, ^-4$

    D. $6, ^-4, ^-2$

11. Write a mixed number that is greater than $^-2$ and less than $^-1$.

12. Write a decimal that is less than $|^-18|$ and greater than 17.

13. a. Order the numbers $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$, and $\frac{1}{5}$ from least to greatest.

    b. As the denominator of a fraction increases, does the resulting positive fraction get larger or smaller?

    c. Does your rule apply for $\frac{^-1}{2}, \frac{^-1}{3}, \frac{^-1}{4}, \frac{^-1}{5}$? Explain.

For Exercises 14–21, plot the points on a coordinate plane.

14. $A(^-5, 3)$ **15.** $B(^-3, ^-1)$ **16.** $C(0, 0)$ **17.** $D(^-1, 0)$

18. $E(3, 3)$ **19.** $F(0, 2)$ **20.** $G(4, ^-2)$ **21.** $H(^-2, ^-4)$

For Exercises 22–31, identify the location (quadrant number or axis) of each point.

22. $(^-36, ^-11)$ **23.** $(^-15, 35)$ **24.** $(0, ^-100)$ **25.** $(820, 657)$

26. $(^-721, ^-42)$ **27.** $(549, ^-90)$ **28.** $(^-246, 280)$ **29.** $(333, 0)$

30. a point with a positive x-coordinate and a positive y-coordinate

31. a point with a negative x-coordinate and a negative y-coordinate

32. Multiple Choice Where does point $Z(0, 0)$ lie?

    A. quadrant I   **B.** quadrant II   **C.** quadrant IV   **D.** origin

For Exercises 33–34, write a possible set of coordinates of each point.

33. a point in quadrant IV

34. a point on both the x- and y-axis

35. Are $(^-5, 5)$ and $(5, ^-5)$ in the same quadrant? Explain.

36. Explain how you can tell whether a point lies on either the x- or y-axis by looking at its coordinates.

37. Sam says that all points on a coordinate plane lie in a quadrant. Do you agree or disagree? Explain.

For Exercises 38–46 below, determine if the line segment joining the two points is *horizontal*, *vertical*, or *neither*. If the points are horizontal or vertical, find the length of the line segment joining the two points.

38. $(2,5),(9,5)$

39. $(4,0),(4,^-12)$

40. $(^-7.5,^-6.25),(19.5,^-6.25)$

41. $\left(\frac{1}{2},\frac{1}{2}\right),\left(\frac{1}{3},\frac{^-1}{2}\right)$
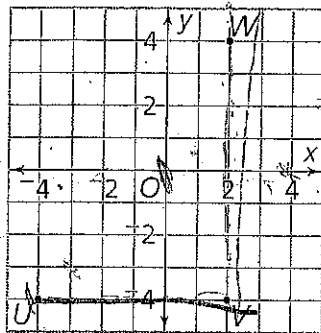
42. $(5,9),(5,2)$

43. $(0,0),(0,^-7)$

44. $(9.25,1.5),(^-9.25,1.5)$

45. $(^-1.2,^-1.2),(^-1.2,3.6)$

46. $(0,0),(^-7,0)$

47. Use the coordinate grid below.

a. Find the length of a line segment joining points U and V.

b. Find the length of a line segment joining points W and V.

For Exercises 48–51, do parts (a)–(d).

    a. Graph the given ordered pairs and connect them with a line segment.

    b. Find a point that can connect to make a right triangle.

    c. Find two points that can connect to make a square.

    d. Find two points that can connect to make a rectangle that is not also a square.

48. $(3,0),(6,0)$

49. $(^-2,1),(^-2,4)$

50. $(^-1,0),(^-5,0)$

51. $(0,^-3),(4,^-3)$

For Exercises 52–55, the two given points are connected to form the diagonal of a rectangle. Find the other two vertices of the rectangle.

52. $(4,5),(^-4,^-5)$

53. $(3,3),(^-3,^-3)$

54. $(^-1,2),(1,^-2)$

55. $(^-5,5),(5,^-5)$

For Exercises 56–61, write an inequality to describe the situation.

56. Ivan chooses a number greater than 7.

57. Ella chooses a number less than or equal to ⁻6.

58. Chen can spend at most $50 on groceries.

59. Juliet wants to get a score of at least 90 on her exam.

60. Michael swam more than 150 laps at practice.

61. The sleeping bag will keep a person warm in temperatures down to ⁻20°F.

62. **Multiple Choice** How many solutions are there to the inequality $x \geq 4$?
    A. 4
    B. 0
    C. 5
    D. an infinite number

For Exercises 63–66, graph the inequality on a number line.

63. $b < 2$

64. $^-1 \leq j$

65. $b \geq {}^-2$

66. $0 > f$

67. Carlos is trying to get to a movie that starts in 45 minutes. Write an inequality that shows how long Carlos can take if he wants to make it before the start of the movie. Graph the solution. Explain your choice of an open circle or a closed circle in the graph.

68. Etta is planning a trip to Canada, but does not want to visit when the low temperature will be below ⁻10°C. Write an inequality to show temperatures that Etta does not want. Graph the solution. Explain your choice of an open circle or a closed circle in the graph.

69. Ishwar has $6.75 he can spend on lunch. Write an inequality to show how much Ishwar can spend. Graph the solution. Give 3 solutions to the inequality that are not whole numbers.