Write *true* or *false* for each statement.

1. $6 + 3 = 18$

2. $2 \cdot 6 = 12$

3. $\frac{40}{8} = 32$

4. $25 - 13 = 38$

5. $21 \div 3 = 7$

Classify each expression, name the operation, and identify any variables.

6. $20 + 4$

7. $8y$

8. $2d - 14$

9. $n \div 3$

10. $4 \cdot 6$

Find the absolute value.

11. $|5|$

12. $|-22|$

13. $|+18|$

14. $|-16|$

15. $|25|$

Find each sum.

16. $-8 + 15$

17. $9 + 12$

18. $-5 + (-11)$

19. $3 + (-10)$

20. $-4 + 7$

Find each difference.

21. $5 - (-6)$

22. $7 - 9$

23. $-3 - 4$

24. $-2 - (-8)$

25. $+10 - 1$

Find each product.

26. $(7)(4)$

27. $(6)(-5)$

28. $(-3)(-9)$

29. $(11)(-3)$

30. $(-12)(2)$

Find each quotient.

31. $36 \div (-6)$

32. $-72 \div (-9)$

33. $27 \div 3$

34. $-80 \div 10$

35. $-49 \div (-7)$

Simplify each expression.

36. $3n + n$

37. $4v - 14 + 12v$

38. $-5x + 3 + 10x$

39. $b + 4b - 8$

40. $6g + (-8g) - 18$

Combine like terms to simplify each expression.

41. $2y + 3y + 4 + 6c$

42. $7r - 4f + 8 + 6r - 3f$

43. $t + 4t - 9 + 2b - 4b$

44. $3x + (-5b) + (-2x) + 15 + 5b$

45. $6 + d - 8s - 4d + 5$

Simplify each expression.

46. $a^5 \cdot a^4$

47. $c^7 \cdot c \cdot c^3$

48. $m^{10} \div m^5$

49. $z^9 \cdot z \cdot z^5 \cdot z^3$

50. $\dfrac{y^{15}}{y^2}$

Solve each problem using a formula.

51. Perimeter formula for a square: $P = 4s$. Find the perimeter, when $s = 12$ cm.

52. Perimeter formula for a regular nonagon: $P = 9s$. Find the perimeter, when $s = 13$ m.

53. Perimeter formula for a regular decagon: $P = 10s$. What is the length of each side, when the perimeter is 120 km?

54. Perimeter formula for an equilateral triangle: $P = 3s$. What is the length of each side, when the perimeter is 72 dm?

55. Perimeter formula for a triangle: $P = a + b + c$. What is the length of side b, when the perimeter is 132 mm, $a = 38$ mm, and $c = 59$ mm?

Find each sum using expanded notation.

1. $6y + 9y$

2. $15a - 2a$

3. $x + 4x$

4. $13n + 21n$

5. $7j + 7j$

Rewrite each expression showing the commutative property of multiplication.

6. mq

7. $(2s)(5c)$

8. $3(6t)$

9. $(7k)(10e)$

10. $(12v)(i)$

Rewrite each expression showing the associative property of addition.

11. $(5 + 4z) + 3$

12. $(3d + f) + 7$

13. $25g + (2w + 14)$

14. $(8 + r) + k$

15. $6b + (9c + 11e)$

Copy the problems. Find the products by multiplying the factors in parentheses first.

16. $(4 \cdot 25)3 = 4(25 \cdot 3)$

17. $40(2 \cdot 5) = (40 \cdot 2)5$

18. $(9 \cdot 2)50 = 9(2 \cdot 50)$

19. $6 (2 \cdot 10) = (6 \cdot 2)10$

20. $5(5 \cdot 4) = (5 \cdot 5)4$

Use the distributive property to simplify each expression.

21. $3(x - j)$

22. $4(7w + -5)$

23. $-6(2 + z)$

24. $8(-f + -g)$

25. $-2(-k + 4)$

Use the distributive property to factor each expression.

26. $15m + 5y$

27. $-9n - 7n$

28. $mc - mh$

29. $qy^4 + qs^2$

30. $-wr - wh^3$

Copy and fill in the missing number or letter.

31. $6 + \blacksquare = 0$

32. $9 - \blacksquare = 0$

33. $-c^3 + \blacksquare = 0$

34. $u + \blacksquare = 0$

35. $-2 + \blacksquare = 0$

What is the reciprocal of each term? Check by multiplying.

36. 4

37. $\dfrac{1}{p}$

38. m^5

39. $\dfrac{1}{h}$

40. 15

Use your calculator to find the square root of each term.

41. $\sqrt{5.0625}$

42. $\sqrt{985.96}$

43. $\sqrt{335.9889}$

44. $\sqrt{320.41}$

45. $\sqrt{27.3529}$

Use your calculator to simplify each term.

46. $(3u)^4$

47. $(-5y)^3$

48. $(2a)^6$

49. $(-16d)^2$

50. $(-11n)^3$

Use the order of operations to simplify.

51. $4x + 3x(4)$

52. $3h(4 + 7) - 6h$

53. $10s - s(4) + 7s$

54. $g^3 + 6(g^3 + 2g^3)$

55. $5m^2 + (3m)(2m)$

Find the root of each equation by writing T (true) or F (false) for each value.

1. $5p = 25$ $\qquad$ $p = 4, 5, 8, 20$

2. $7n = 42$ $\qquad$ $n = 6, 10, 25, 42$

3. $3x = 12$ $\qquad$ $x = 1, 3, 4, 9$

4. $8k = 40$ $\qquad$ $k = 2, 3, 4, 5$

5. $6y = 18$ $\qquad$ $y = 2, 3, 12, 18$

Find the solution for each equation.

6. $a - 3 = 15$

7. $p - 20 = 39$

8. $w - (-6) = 5$

9. $f - 13 = 20$

10. $n - (-8) = 6$

11. $g + 15 = 23$

12. $y + 2.4 = 8$

13. $u + (-6) = 17$

14. $c + 16.9 = 29.7$

15. $t + (-13) = 42$

16. $5h = 35$

17. $2q = 48$

18. $-8.6v = 77.4$

19. $-19.3i = -115.8$

20. $7.6d = 60.8$

21. $\frac{3}{4}j = 6$

22. $\frac{8}{9}j = 16$

23. $-\frac{2}{5}c = -10$

24. $\frac{7}{16}m = -21$

25. $\frac{1}{8}b = 2$

26. $3f - 2 = 13$

27. $2y - 10 = 14$

28. $\frac{5}{7}r + (-6) = 29$

29. $8t + 0 = 0$

30. $\frac{2}{3}m - (-4) = 8$

31. $P = 5s$ for s

32. $V = lwh$ for l

33. $C = 2\pi r$ for r

34. $s = \frac{P}{10}$ for P

35. $A = \frac{1}{2}(bh)$ for h

Use the Pythagorean theorem to solve each problem.

36. $a = 6$, $b = \blacksquare$, $c = 10$

37. $a = 15$, $b = 20$, $c = \blacksquare$

38. $a = \blacksquare$, $b = 40$, $c = 50$

39. $a = 18$, $b = \blacksquare$, $c = 30$

40. $a = \blacksquare$, $b = 28$, $c = 35$

Graph each of the equalities or inequalities on a number line.

41. $x > 0$

42. $x \leq 2$

43. $-2 \leq x \leq 2$

44. $x \geq -4$

45. $x \neq 1$

Solve each inequality.

46. $b + 3 < 6$

47. $\frac{3}{5}e \geq 9$

48. $t + (-9) > -3$

49. $-4m < 16$

50. $-\frac{1}{5}g \leq 3$

Write an equation and solve each question.

1. Five times a number decreased by 4 is 26. What is the number?

2. The sum of two consecutive integers is −21. What are the integers?

3. The sum of three consecutive odd integers is 51. What are the integers?

4. Sixty subtracted from eight times some number is 4. What is the number?

Use the 1% solution to solve each problem.

5. Aaron earns $3,000 a month. He invests $45 a month in a mutual fund. What percent of his income is invested in a mutual fund?

6. Sarah wants to buy a CD player that costs $300. She has already saved $231. What percent of the total has she saved?

7. Juan has an annual income of $42,000. He saves 4% of his income. How much does he save?

8. Linda has 24 classical music CDs in her collection. 12% of her CDs are classical music. How many CDs does she have in her collection?

Find the percent of each number.

9. 26% of 88

10. 37% of 950

11. 64% of 25

12. 81% of 515

Solve each problem using kilometers or miles.

13. Michelle rides her bike for $3\frac{1}{3}$ hours at a speed of $15\frac{1}{2}$ kilometers per hour. How far does she travel?

14. DeNorris drives $162\frac{1}{2}$ miles in $2\frac{1}{2}$ hours. What is his average speed?

15. Maria and Patty jog for $1\frac{3}{4}$ hours at a rate of 18 kilometers per hour. How many kilometers do they jog?

16. Eliza and Mike walk at a rate of 4 miles per hour for $1\frac{1}{2}$ hours and 6 miles per hour for $\frac{1}{2}$ hour. What is their average speed?

Use your calculator to tell how many nickels and dimes are in each problem.

17. $1.75, three times more dimes than nickels

18. $3.00, three times more nickels than dimes

19. $11.25, four times more dimes than nickels

20. $1.20, six times more nickels than dimes

Find the interest, principal, or rate of interest. ($I = prt$)

21. Principal: $2,500   Rate: 6%   Time: 2 years   Interest: ■

22. Principal: ■   Rate: 8%   Time: 4 years   Interest: $200

23. Principal: $900   Rate: ■   Time: 3 years   Interest: $135

24. Principal: $800   Rate: 13%   Time: 5 years   Interest: ■

Solve each problem.

25. Cashews cost $3 per pound and peanuts cost $2.50 a pound. Three pounds of cashews and three pounds of peanuts are mixed. What is the cost for one pound of the mixture?

26. Walnuts cost $6 per pound and peanuts cost $3.50 a pound. Four pounds of walnuts and three pounds of peanuts are mixed. What is the cost for one pound of the mixture?

27. A mixture of peanuts and walnuts sells for $3.00 per pound. How many pounds of peanuts at $1.50 per pound should be mixed with 12 pounds of walnuts at $4.00 per pound?

28. The price for one pound of a mixture of cashews and walnuts is $5.75. The total cost of the mixture is $34.50. What is the total number of pounds in the mixture?

Find the missing term in each proportion

29. $\dfrac{3}{x} = \dfrac{18}{24}$

30. $\dfrac{6}{9} = \dfrac{14}{y}$

31. $\dfrac{m}{8} = \dfrac{20}{32}$

32. $\dfrac{4}{7} = \dfrac{32}{w}$

33. $\dfrac{z}{20} = \dfrac{6}{12}$

34. $\dfrac{12}{c} = \dfrac{24}{64}$

35. $\dfrac{6}{18} = \dfrac{b}{36}$

Show why these statements are true.

1. $(y^3)^3 = y^9$

2. $(a^2)^4 = a^8$

3. $[(x + y)^3]^2 = (x + y)^6$

Find the quotient.

4. $(9^9) \div (9^6)$

5. $\dfrac{7^8}{7^4}$

6. $\dfrac{n^5}{n^3}, n \neq 0$

7. $(5g + 3y)^{10} \div (5g + 3y)^4, 5g + 3y \neq 0$

8. $\dfrac{(h - i)^8}{(h - i)^3}, h - i \neq 0$

Write the following numbers in scientific notation.

9. 0.00000000554

10. 9,000,000

11. 0.00000078

Write the following numbers in standard notation.

12. $2.6(10^5)$

13. $3.14(10^{-3})$

14. $5.21(10^6)$

Find the sum, difference, product, or quotient. Be sure your answers are in scientific notation.

15. $2.7(10^{-3}) + 3.4(10^{-3})$

16. $8.3(10^8) - 4.9(10^8)$

17. $1.3(10^{-2}) \cdot 2.1(10^{-6}) \cdot 2(10^{10})$

18. $1.6(10^3) \div 3.2(10^{-8})$

19. $2.2(10^{-7}) \cdot 2.1(10^{-3}) \cdot 4.0(10^8)$

Find the sum and difference for each pair of polynomials.

20. $2x^2 + 5x + 1$

$-2x^2 + 6x + 3$

21. $c^4 + c^2 + 3c + 1$

$2c^4 + 3c^2 + c + 5$

22. $-3w^5 - 6w^4 - 2w^3 - w^2 - w - 5$

$w^5 + 6w^4 + 2w^3 + w^2 - w + 5$

23. $k^5 + k^3 + 3$

$k^4 + w^2 + 5$

24. $n^5 + n^3 + n - 3$

$n^7 + n^2$

25. $8d^7 + 3d^6 + 9d^3$

$d^2 + d - 8$

Find the product.

26. $(y + 4)(y + 3)$

27. $(b - 4)(b + 4)$

28. $3n^3(n^2 + 2n - 8)$

29. $(-4x^2 - 5)(x^2 - 5)$

30. $(c^3 + c^2)^2$

31. $(3z + 1)(z - 2)$

32. $(u^3 + 3)(2u^2 + 5u + 4)$

33. $(3y^3 - 6)(4y^5 - y)$

Find the quotients. Identify any remainder. Use multiplication
to check your answer.

34. $\dfrac{(24x^2 + 32x - 24)}{8}$

35. $\dfrac{(30y^3 - 36y^2 + 42y + 48)}{-6}$

36. $\dfrac{(h^2 - 2h)^2}{(h^2 - 2h)}$

37. $\dfrac{(4s^2 - 12s)}{2s(s - 3)}$

38. $(42t^3 + 70t^2 - 21t) \div 7t$

39. $(2y^2 + 2y) \div (y + 1)$

40. $(25x^3 - 5x^2 + x - 2)(7x^3 - 4x^2) \div (7x^3 - 4x^2)$

Find the GCF for these groups.

1. $25, 75$

2. $22, 121$

3. $36, 27$

4. $16x, 20x^2, 12x^3$

5. $15a^3d, 25ad^3$

Find the GCF for these expressions.

6. $20j^4 + 10$

7. $18x^3 + 24x^2 + 42x$

8. $25c^4 - 35c^3 - 45c^2 - 55$

9. $-21x^5y^5 - 63x^4y^2 - 56x^2y^2 + 14xy^2$

10. $13w^3t^2 - 26wt$

Factor the following expressions. Check by multiplying.

11. $x^2 - x - 56$

12. $c^2 + 6c + 9$

13. $y^2 - y - 12$

14. $3m^2 + 24m + 36$

15. $5x^4 + 5x^3 - 60x^2$

16. $6e^2 + 33e + 42$

17. $12n^2 - 26n + 10$

18. $3z^2 + 35z - 52$

19. $10s^2 + 17s + 6$

20. $3v^4 + 15v^3 + 18v^2$

21. $b^2 - 81$

22. $q^2 - 400$

23. $36g^2 - 49$

24. $81r^2 - 16$

25. $25w^4 - 9x^2$

Find the factors of these perfect square trinomials.

26. $i^2 - 26i + 169$

27. $y^2 + 16y + 64$

28. $k^2 - 20k + 100$

29. $p^2 + 22p + 121$

30. $m^2 - 44m + 484$

Find the value of the variable in each expression.

31. $3d = 0$

32. $6(x + 4) = 0$

33. $(h - 4)(h + 6) = 0$

34. $(2y - 4)(3y + 6) = 0$

35. $6(3b - 12)(b + 9) = 0$

Solve each of these quadratic equations. Be sure to check your work.

36. $x^2 + 10x + 24 = 0$

37. $y^2 - 9y + 18 = 0$

38. $b^2 + 11b + 28 = 0$

39. $6s^2 - 12s + 6 = 0$

40. $10x^2 + 60x + 80 = 0$

Use the following words to fill in the ■: *box-and-whiskers plot, dependent, frequency, fundamental principle of counting, histogram, impossible, independent, mean, mode, probability, range, sample space,* and *stem-and-leaf plot.*

1. A ■ table is a method used to summarize data.

2. When data is organized and displayed using stems and leaves, it is called a ■.

3. A bar graph that uses intervals is called a ■.

4. The difference between the highest and lowest values is the ■ of data.

5. The sum of the values in a set of data divided by the total number of values is called the ■.

6. The value that occurs the most is called the ■.

7. To show the concentration and spread of data in a set, one uses a ■.

8. The chance that an outcome will occur is called ■.

9. An event that has a probability of zero is called an ■ event.

10. The set of all possible outcomes of an experiment is called a ■.

11. The outcome of one event affects the outcome of another event in ■ events.

12. The outcome of one event has no effect on the outcome of another event in ■ events.

13. A general rule that states you can multiply the numbers of choices to find the total number of choices is called the ■.

Use the chart on English test scores for problems 14–21.

English Test Scores							
59	73	87	59	90	80	58	69
60	63	78	96	59	68	81	85
90	73	64	98	97	75	77	91

14. Display the data in a stem-and-leaf plot.

15. How many students had scores lower than 60?

16. How many students scored 75 or higher?

17. What score occurred the most?

18. What was the lowest score?

19. What was the highest score?

20. How many students received scores between 62 and 76?

21. Display the data in a histogram using intervals of 10.

Use this data set {$3.39, $4.77, $9.07, $1.40, $6.23, $7.25, $2.23, $4.77, $5.01}
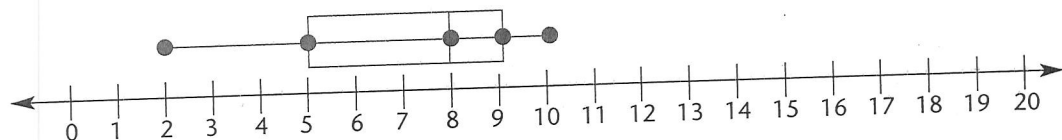for problems 22–25.

22. Find the range.

23. Find the mean.

24. Find the median.

25. Find the mode.

Use the box-and-whiskers plot for problems 26–30.

26. What is the upper extreme?

27. What is the lower extreme?

28. What is the median?

29. Where is the middle cluster of data?

30. What is the range?

A 1–6 number cube is rolled once. Find the theoretical probability (P)
of each event. Express your answer as a fraction in simplest form.

31. $P(3)$

32. P(even number)

33. $P(0)$

34. P(a factor of 6)

Suppose you roll a 1–6 number cube and toss a coin. Use a tree
diagram to determine the probability of each event.

35. P(heads and 2)

36. P(tails and a number less than 4)

37. P(not heads and not 3)

A bag contains 10 marbles of equal size. One marble is blue, one is white,
three are yellow, and five are red. A marble is taken from the bag two times.
Each time a marble is taken, it is not replaced.

38. Find P(red and red)

39. Find P(blue and white)

40. Find P(yellow and blue)

Reduce each fraction to its lowest terms.

1. $\dfrac{35}{45}$

2. $\dfrac{200}{250}$

3. $\dfrac{16}{24}$

4. $-\dfrac{12}{144}$

5. $\dfrac{21}{42}$

6. $\dfrac{c^8}{c^3}$

7. $\dfrac{24s^7}{6s^2}$

8. $\dfrac{45hg^3}{63h^4g^5}$

9. $\dfrac{18x^5y^3}{81x^5y}$

10. $\dfrac{(p^2 - 16)}{(p + 4)}$

11. $\dfrac{(y^2 + 7y + 12)}{(y + 4)}$

12. $\dfrac{(m + 6)}{(m^2 + 2m - 24)}$

13. $\dfrac{(x^4 + 15x^3 + 56x^2)}{(2x^3 + 30x^2 + 112x)}$

Multiply or divide. Reduce your answers to lowest terms.

14. $5\dfrac{1}{3} \cdot 6\dfrac{2}{9}$

15. $\dfrac{7}{8} \div \dfrac{2}{5}$

16. $\dfrac{1}{(y^2 - 16)} \cdot \dfrac{(y + 4)}{(y - 4)}$

17. $\dfrac{(d + 6)}{(d - 6)} \div \dfrac{(d + 6)}{(d^2 - 36)}$

18. $e^2f^3 \div ef^2$

19. $3\dfrac{3}{4} \cdot \dfrac{7}{8}$

Simplify these complex fractions. Write your answers in lowest terms.

20. $\dfrac{\dfrac{9}{3}}{4}$

21. $\dfrac{\dfrac{3}{16}}{\dfrac{15}{16}}$

22. $\dfrac{\dfrac{c}{u}}{\dfrac{u}{d}}$

23. $\dfrac{\dfrac{x^2}{w^3}}{\dfrac{x^3}{w^2}}$

Find each sum or difference.

24. $\left(\dfrac{5}{8}\right) - \left(\dfrac{5}{16}\right)$

25. $\left(\dfrac{2}{y}\right) + \left(\dfrac{y}{3^2}\right)$

26. $\dfrac{5}{(b-1)} + \dfrac{4}{(b-1)^2}$

27. $\dfrac{2}{(k + 2)} - \dfrac{1}{(k - 3)}$

28. $\dfrac{3x}{(x - 8)} - \dfrac{6x}{(x + 8)}$

29. $\dfrac{9}{(v^2 - 9)} - \dfrac{3}{(v + 3)}$

Solve for each variable.

30. $\frac{n}{16} = \frac{75}{80}$

31. $\frac{g}{8} = \frac{72}{64}$

32. $\frac{13}{11} = \frac{p}{65}$

33. $\frac{5}{7}a = -35$

34. $3\frac{1}{2}t = 5\frac{1}{4}$

35. $\frac{7}{8}x - \frac{3}{4}x = 15$

36. $\frac{3}{2}d = \cdot -9$

37. $\frac{(2c - 6)}{3} = 7$

38. $\frac{2(r - 4)}{5} = -3$

39. $\frac{1}{2} + \frac{9}{16} = \frac{n}{4}$

40. $\frac{3}{8} - \frac{5}{8} = \frac{q}{3}$

Solve these problems. Make sure your answers are in lowest terms.

41. Gloria received four-fifths of the election votes. 385 students voted. How many votes did Gloria receive?

42. The Washington High School football team's winning ratio is 4 to 3. They won 12 games. How many games did they lose?

43. George has $\frac{3}{4}$ pounds of raspberries. Each jelly recipe needs $\frac{3}{16}$ pounds of raspberries. How many recipes can he make?

44. The scale drawing of Jefferson Park reads 2 cm : 7 km. The width of the park is $3\frac{9}{10}$ cm. How many kilometers wide is the park?
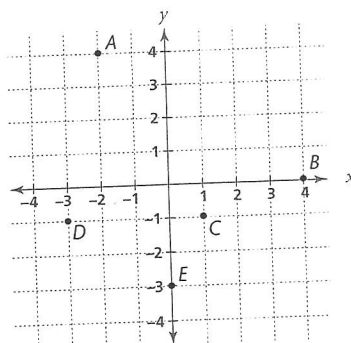
45. Jenny's survey reveals that $\frac{5}{8}$ of the students at Washington High School watch $2\frac{1}{2}$ hours of television on Friday night. There are 648 students at the high school. How many hours of television do they watch altogether on Friday night?

Write the ordered pair that represents the location of each point.

1. Point B

2. Point D

3. Point A

4. Point E

5. Point C

Draw a coordinate system and graph the following points.

6. Point X at $(2, -1)$

7. Point V at $(-4, 1)$

8. Point S at $(0, 4)$

9. Point M at $(-3, -5)$

Copy and complete the table of values for each equation.

10.

$y = x - 2$	
x	y
-1	
0	
1	

11.

$y = 3x + 1$	
x	y
-1	
0	
1	

Find the x-intercept and the y-intercept of each graph.

12. $y = x + 1$

13. $y = x - 4$

14. $y = -2x + 3$

15. $y = 5x - 2$

Find the slope of the line that passes through the following points.

16. $(3, 6)(-2, -4)$

17. $(2, 5)(-1, -4)$

18. $(0, 2)(-6, 8)$

19. $(2, -2)(1, -3)$

Graph the line that passes through the following points.
Then write the equation of each line.

20. $(0, -3)(2, -1)$ **22.** $(4, 3)(-2, 0)$

21. $(5, -3)(-1, 3)$ **23.** $(0, 0)(-2, 4)$

Write the equation of the line that has the given slope and passes
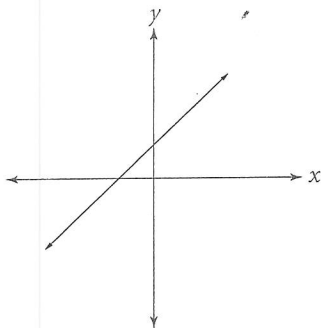through the given point.

24. $m = 3; (2, 7)$ **26.** $m = 4; (3, 8)$

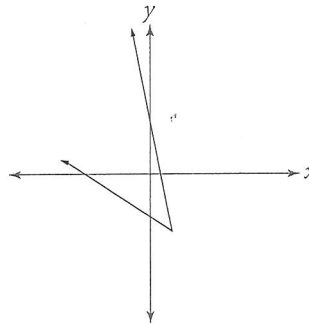**25.** $m = -1; (4, -5)$ **27.** $m = \frac{1}{2}; (-4, -1)$

Is each graph an example of a function? Write *yes* or *no*.

28.

29.

Evaluate each function two times. Use $x = 3$ and $x = -2$.

30. $f(x) = -x^2 + x$ **31.** $f(x) = 2x^2 + x$ **32.** $f(x) = x^2 + 2x$

Graph the region represented by each line.

33. $y > -3x$ **34.** $y \leq x - 3$ **35.** $y < x - 1$