Algebra Final Exam
Study Guide

Date:_____   Chapters to Study:_____

· Plan ahead
· Create a study schedule
· Check off what you know well, make note of what you need to go back and practice or ask questions on.

Concepts to Focus On:

(2.7)	* Estimating Square Roots
(3.1-3.4)	* Solving equations: Multi-step, variables on both sides, "no solution" vs. "all real numbers/any number"
(3.5-3.7)	* Proportions and percents
(11.2)	* Simplifying radicals
(11.4)	* Pythagorean Theorem: Find missing sides, and can three sides form a right triangle
(4.4)	* Slope: Find slope of a graphed line, or slope between two points.
(4.3)	* Finding x and y intercepts and graph a line using them.
(4.5)	* Graph a line using slope-intercept form
(4.4/5.5)	* Parallel and perpendicular lines
(5.1-5.2)	* Writing equations of lines in slope-intercept form.
(6.1-6.3)	* Solve linear inequalities and graph on a number line
(6.7)	* Graph linear inequalities in two variables
(7.1-7.5)	* Write and solve linear systems by graphing, substitution, and elimination.
(7.6)	* Write and solve linear systems of inequalities
(8.1-8.3)	* Rules of exponents (multiplying, dividing, powers, negative and zero)
(9.1-9.3)	* Add, subtract and multiply polynomials
(9.4-9.8)	* Factor polynomials completely
(9.4-9.8)	* Solve polynomial equations by factoring

Accelerated Only

(9.4-9.8)	* Solve problems involving vertical motion
(10.1-10.2)	* Graph quadratic equations and identify axis of symmetry and vertex
(10.3-10.6)	* Solve quadratic by graphing, square roots and quadratic formula
(10.7)	* Understand and apply discriminant

Name _____

CHAPTERS 1-7 **Cumulative Test**
For use after Chapters 1–7

Review Problems

Answers

Evaluate the expression.

1. $7 + 6^2 \div 3$

2. $4 \cdot 5^2 - 18$

3. $4[32 - (17 - 12)^2]$

4. $\frac{2}{3}[(5 + 3)^2 - 31]$

5. $3(5m - 4); m = -2$

6. $9x^2 - 4; x = 3$

Write an algebraic expression, an equation, or an inequality.

7. The sum of 5 times a number x and 17

8. The difference of 21 and the product of 5 and a number y is less than 7.

9. The quotient of 75 and the quantity of a number z and 2 is 25.

10. A family goes to an amusement park. Adult tickets cost $21. Children under 10 years of age pay $15. Write an algebraic expression for the total cost. Then find the total cost of 4 adult tickets and 3 children's tickets.

11. Order the numbers from least to greatest: $-1.6, \sqrt{4}, 0, 3.1, -\sqrt{5}$.

Find the sum, difference, product, or quotient.

12. $-11 + (-7)$

13. $27 + (-32)$

14. $17 - (-6)$

15. $-\frac{2}{3} - \frac{1}{12}$

16. $15(-6)$

17. $3(-7)(-2)$

18. $-21 \div (-7)$

19. $-14 \div \frac{2}{7}$

20. $\frac{3}{5} \div (-30)$

Evaluate the expression.

21. $-5x + 14 - 2x^2$ when $x = 3$

22. $11 + \frac{18}{y}$ when $y = 3$

23. $7(3w - 5)$ when $w = 4$

24. $15 + |1 - k|$ when $k = 8$

Simplify the expression.

25. $-3(-x + 6)$

26. $7(3y - 4) - 18y$

27. $\frac{-8w + 12}{-4}$

Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____

Additional Practice
Can be found in your text
on pages 938-946 !

CHAPTERS 1–7	**Cumulative Test** *continued*
	For use after Chapters 1–7

Answers

Solve the equation.

29. $\dfrac{m}{-6} = 8$

30. $17 = 4x - 7$

31. $9 - \dfrac{n}{3} = 28$

32. $16w - 10w + 13 = -5$

33. $4h - 13 = 7h + 2$

34. $\dfrac{2}{5}(25z - 30) = \dfrac{3}{4}(12z + 16)$

The perimeter *P* of a rectangle is given by the formula $P = 2\ell + 2w$ where *l* is the length and *w* is the width.

35. Solve the formula for *l*.

36. Use the rewritten formula to find the length of a rectangle with a width of 9 inches and a perimeter of 40 inches.

Solve the proportion.

37. $\dfrac{x}{8} = \dfrac{12}{32}$

38. $\dfrac{12}{3w} = \dfrac{36}{63}$

39. $\dfrac{21}{15} = \dfrac{3k - 2}{5}$

40. A high school track team has 40 athletes. Eleven members of the team run hurdles. What percent of the team runs hurdles?

Write the equation in function form.

41. $-12x + 3y = 15$

42. $5x = -10y + 30$

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

43. $(-7, 3)$ and $(3, 8)$

44. $(-2, -9)$ and $(-5, 6)$

Graph the equation.

45. $y = \dfrac{1}{4}x - 5$
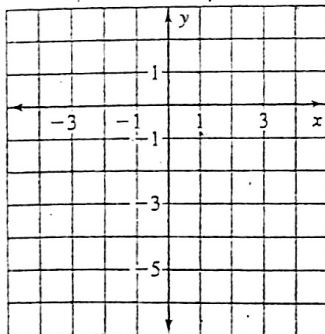
46. $2x + 5y = 20$
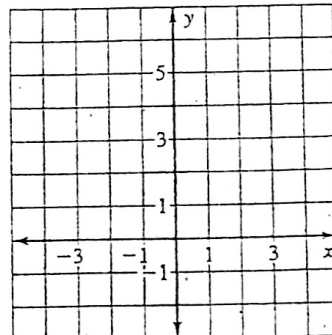
29. _____

30. _____

31. _____

32. _____

33. _____

34. _____

35. _____

36. _____

37. _____

38. _____

39. _____

40. _____

41. _____

42. _____

43. _____

44. _____

②

Cumulative Test *continued*
For use after Chapters 1–7

Answers

48. Graph the function $h(x) = x - 4$.
Compare the graph with the graph
of $f(x) = x$.

48. _____

_____

_____

_____

_____
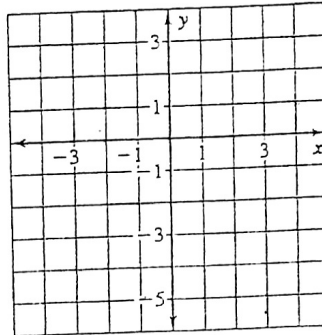
**Write an equation in slope-intercept form of the line with the
given characteristics.**

49. slope 3; y-intercept 5

50. $m = -2$; passes through $(-1, 5)$

51. passes through $(3, 2)$
and $(-5, -8)$

52. perpendicular to $y = -3x + 1$;
passes through $(2, 2)$

49. _____

50. _____

51. _____

52. _____

3

CHAPTERS 1–7	**Cumulative Test** *continued*

For use after Chapters 1–7

Solve the inequality, if possible. Graph your solution.

Answers

55. $x + 5.1 \geq 9.4$

```
<---+---+---+---+---+---+---+--->
    0   1   2   3   4   5   6
```

56. $\dfrac{x}{-7} < -3$

```
<---+---+---+---+---+---+---+--->
    0   7  14  21  28  35  42
```

57. $5 + 2x \leq -4x + 23$

```
<---+---+---+---+---+---+---+--->
  -2  -1   0   1   2   3   4
```

55. _____

56. _____

57. _____
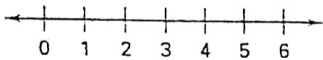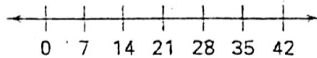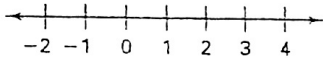
63. The sum of the weight w (in pounds) of passengers p and gear g in a canoe can be no more than 500 pounds. Write and graph an inequality that describes the possible weights of the people and the gear. Identify and interpret one of the solutions.

```
Weight of gear (pounds)
  g
500 |
400 |
300 |
200 |
100 |
  0 +----+----+----+----
    0  100  300  500 p
      Weight of
    passengers (pounds)
```
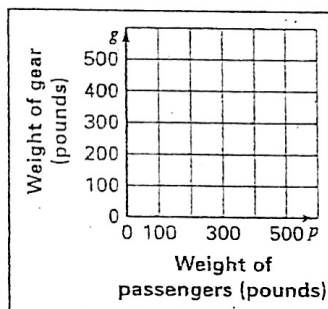
Solve the linear system.

64. $2x + 5y = -16$
$6x + y = -20$

65. $7x + 4y = 26$
$3x - 8y = -18$

66. $5x + 3y = 19$
$2y = 5x + 21$

67. $3x - 9y = 3$
$5x - 8y = 12$

Tell whether the linear system has *one solution, no solution,* or *infinitely many solutions*.

68. $4x - 3y = 6$
$8x = 6y + 10$

69. $3x + 7y = 8$
$21y = -9x + 24$

70. Graph the system of linear inequalities.

$y > \dfrac{4}{7}x - 2$

$y < 3x + 4$

```
        y
        6
        
        2
  -6  -2   2   6  x
       -2
       
       -6
```

63. _____
   _____
   _____

64. _____

65. _____

66. _____

67. _____

68. _____

69. _____
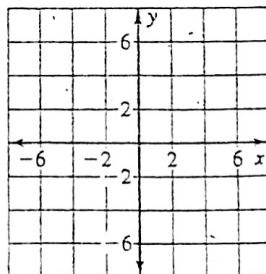
CHAPTERS 8-13 Cumulative Test
For use after Chapters 8–13

Simplify the expression. Write your answer using exponents.

Answers

1. $(-2)^2(-2)(-2)^5$ 2. $(6^3)^5$ 3. $\dfrac{4^{11}}{4^7}$

1. _____

2. _____

Simplify the expression.

3. _____

4. $\dfrac{1}{5^{-8}}$ 5. $(4m^2n)^2$ 6. $\left(-\dfrac{3}{r}\right)^3$

4. _____

5. _____

Simplify the expression. Write your answer using only positive exponents.

6. _____

7. $\left(\dfrac{2x^{-2}}{yz^{-3}}\right)^2$ 8. $\left(\dfrac{1}{2a}\right)^2 \cdot \dfrac{3ab}{c^2}$ 9. $(6m)^{-2} \cdot (2m^3)^4$

7. _____

8. _____

9. _____

14. _____

15. _____

16. _____

Find the sum or difference.

17. _____

14. $(3x^3 + 7x^2 - 5x + 3) + (x^3 - 3x)$

18. _____

15. $(17y^2 - 6y + 5) - (11y^2 - 2y + 8)$

19. _____

Find the product.

20. _____

16. $(9r + 3)(2r - 1)$ 17. $(7t + 2)(t^2 - 5t - 3)$

21. _____

18. $(3a - 5b)^2$ 19. $(9z + 2)(9z - 2)$

22. _____

Factor the polynomial.

23. _____

20. $x^2 + 10x + 21$ 21. $4y^2 + 23y - 6$

24. _____

22. $5x^2 + 20x + 20$ 23. $x^2 - 121$

25. _____

24. $-14n^2 - 17n + 6$ 25. $t^3 + 2t^2 - 9t - 18$

CHAPTERS 8–13 Cumulative Test *continued*
For use after Chapters 8–13

Solve the equation.

26. $x^2 + x - 56 = 0$

27. $z^2 + 169 = 26z$

28. $11n^2 + 21n = 2$

29. $r^3 = 36r$

In Exercises 30 and 31, use the following information.

A kangaroo jumps off the ground with an initial velocity of 18 feet per second.

30. Write an equation that gives the height (in feet) of the kangaroo as a function of time (in seconds) since it jumps.

31. After how many seconds does the kangaroo land on the ground?

Graph the function. Label the vertex and axis of symmetry.

34. $y = x^2 - 5$

35. $y = 2x^2 - 8x + 3$
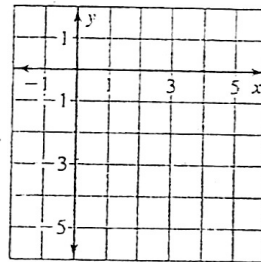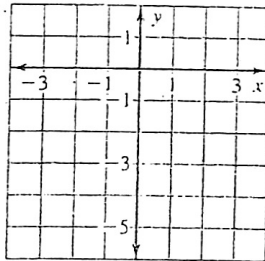
Solve the equation. Round the solutions to the nearest hundredth, if necessary.

36. $x^2 - 225 = 0$

37. $81x^2 - 18 = 7$

Use the quadratic formula to solve the equation. Round the solutions to the nearest hundredth, if necessary.

38. $9x^2 - 11x + 3 = 0$

39. $7x^2 = 2x - 5$

Tell whether the equation has *two solutions, one solution,* or *no solution.*

40. $-4x^2 + 12x - 9 = 0$

41. $2w^2 + 9w = 2w - 4$

Answers

26. _____
27. _____
28. _____
29. _____
30. _____
31. _____

36. _____
37. _____
38. _____
39. _____
40. _____
41. _____

✱ Acc. Only

Answers

42. The distance d (in feet) that it takes a roller coaster train to come to a complete stop can be modeled by the equation $d = 0.7s^2 + 0.5s$ where s is the speed of the train (in feet per second). If the train has 30 feet to come to a complete stop, find the speed at which the train should be traveling. Round your answer to the nearest tenth of a foot per second.

42. _____

45. _____

46. _____

47. _____

Simplify the expression.

48. _____

45. $\sqrt{\dfrac{108}{4x^2}}$ 46. $\sqrt{18x} \cdot 2\sqrt{x^3}$

49. _____

50. _____

Let a and b represent the lengths of the legs of a right triangle, and c represent the length of the hypotenuse. Find the unknown length.

51. _____

49. $b = 12, c = 15$

48. $a = 11, b = 8$

50. A 12-foot long sliding board is attached to an 8-foot high platform. How far is the bottom of the sliding board from the base of the platform? Round your answer to the nearest tenth of a foot.

51. A treasure hunt is mapped out on a coordinate grid. The first clue is located at $(2, 5)$. The second clue is located at $(-3, 7)$. What is the distance between clues if the distance between grid lines represents 25 feet? Round your answer to the nearest tenth of a foot.

CHAPTERS 1-13 End-of-Course Test
For use after Chapters 1–13

Answers

Evaluate the expression.

1. $35 - [6 + (4^2 \div 2)]$

2. $\dfrac{27 - 13}{4^2 - 9}$

3. $7x^2 - 4x$ when $x = 3$

4. $-\sqrt{x}$ when $x = 121$

5. A golf course charges $45 to play 18 holes of golf. It charges $24.75 to play 9 holes. Find the cost per hole for each game. Which game costs less per hole played?

6. You have 26 CDs and plan to buy 2 more each month. Write a rule for the number of CDs as a function of the number of months from now. Identify the independent and dependent variables, the domain, and the range.

Find the sum, difference, product, or quotient.

7. $-12 + (-13)$

8. $27 - (-15)$

9. $-17 - 18$

10. $(-0.2)(-0.8)$

11. $-15 \div \dfrac{3}{5}$

12. $-\dfrac{14}{21} \div \left(-\dfrac{6}{15}\right)$

13. Find the mean of the numbers: $-3, 5, 8, -6, 12, 9, -4$.

Solve the equation.

14. $\dfrac{k}{7} - 9 = 33$

15. $17 = -5x - 6x + 14$

16. $\dfrac{1}{2} = 4(5x - 3)$

17. $2(x + 3) = \dfrac{3}{4}(8x - 12)$

18. An architect is making a scale drawing of a building using a scale of 1 inch : 4 feet. The height of the building on the drawing is 23 inches. What is the height of the actual building?

19. 55% of a zoo's animals are herbivores. How many of the zoo's 360 animals are herbivores?

Identify the slope and y-intercept of the line with the given equation.

20. $y = -\dfrac{9}{7}x + 2$

21. $9x + 3y = 6$

Write an equation in slope intercept form of the line that passes through the given point and has the given slope m.

22. $(1, 3); m = 4$

23. $(-2, 5); m = -3$

Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
   _____
   _____
   _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
    _____
21. _____
    _____
22. _____
23. _____

CHAPTERS
1–13 **End-of-Course Test** *continued*
For use after Chapters 1–13

Graph the equation.

Answers

24. $y = 3x - 4$
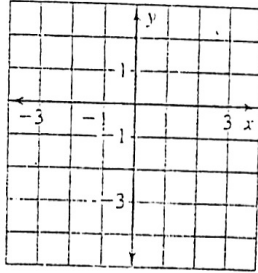
25. $2x - 3y = 1$
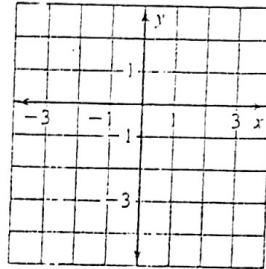
27. _____

28. _____

Solve the inequality, if possible. Graph your solution.

27. $7 - 3x > 16$

28. $4(8x - 1) < 3(9x + 2)$

33. _____

34. _____
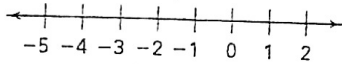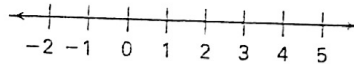
Graph the inequality.

31. $y > x + 7$
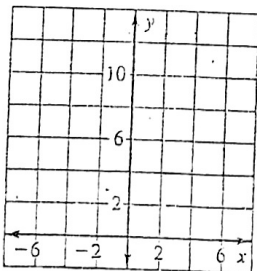
32. $y \le \frac{1}{2}x - 3$
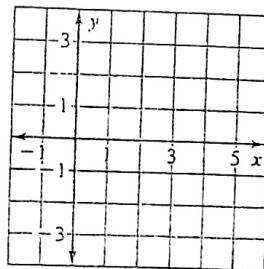
Solve the linear system.

33. $9x - 7y = 31$
$\qquad -9x + 3y = -39$

34. $3x + 8y = 2$
$\qquad 5x - 4y = 38$

⑨

CHAPTERS
1–13
End-of-Course Test continued
For use after Chapters 1–13

Answers

35. Graph the system of linear inequalities.

$y < 2x - 3$

$y \geq \frac{1}{2}x + 2$

36. _____

37. _____

38. _____
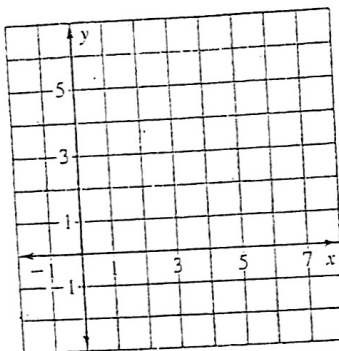
Simplify the expression. Write your answers using only positive exponents.

36. $\dfrac{6^7 \cdot 6^{12}}{6^8}$

37. $\left(\dfrac{y^7}{z^2}\right)^3$

38. $\dfrac{(3mn)^2}{4m^3} \cdot \dfrac{(2m)^3}{n^4}$

42. _____

43. _____

44. _____

45. _____

46. _____

47. _____

48. _____

Find the sum, difference, or product.

42. $(7a^2 - 3a + 14) + (9a^2 + 11a)$

43. $(b^3 - 2b^2 + 6b - 1) - (3b^3 + 11b)$

44. $(6c - 1)(2c + 7)$

45. $(9d + 7)(9d - 7)$

49. _____

50. _____

51. _____

52. _____

Factor the polynomial.

46. $2x^2 + 7x - 30$

47. $9y^2 + 66y + 121$

48. A frog jumps straight up off the ground with an initial vertical velocity of 2 feet per second. After how many seconds does the frog land on the ground?

Solve the equation. Round the solutions to the nearest hundredth, if necessary.

49. $12x^2 - 15 = 0$

50. $-t^2 + 2t + 15 = 0$

51. $4x^2 - 11x + 3 = 5x + 4$

52. $9x^2 + 4x + 7 = 3x^2 - 8$

Cumulative Test

1. 19   2. 82   3. 28   4. 22   5. −42   6. 77

7. $5x + 17$ 8. $21 − 5y < 7$ 9. $\dfrac{75}{z+2} = 25$

10. $21a + 15c$; $129   11. $−\sqrt{5}, −1.6, 0, \sqrt{4}, 3.1$

12. −18   13. −5   14. 23   15. $−\dfrac{9}{12}$ 16. −80

17. 42   18. 3   19. −49   20. $−\dfrac{1}{50}$ 21. −19

22. 17   23. 49   24. 23   25. $3x − 18$

26. $3y − 28$ 27. $2w − 3$ 28. $.02   29. 48

30. 6   31. −57   32. −3   33. −5   34. 24

35. $\ell = \dfrac{P − 2w}{2}$ 36. 11 in.   37. 3   38. 7   39. 3

40. 27.5%   41. $y = 4x + 5$ 42. $y = −\dfrac{1}{2}x + 3$

43. $\dfrac{1}{2}$ 44. −5

45.

46.

47. $p = 2.4a$; $72

48.
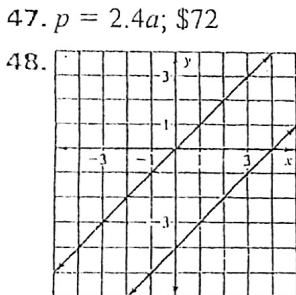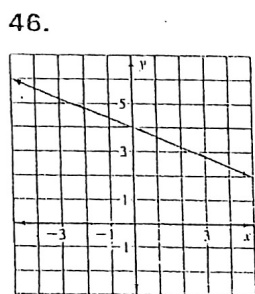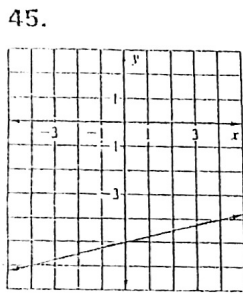
Because the graph of $h(x)$ and $f(x)$ have the same slope, $m = 1$, the lines are parallel. Also, the y-intercept of the graph of h is 4 less than the y-intercept of the graph of f.

49. $y = 3x + 5$ 50. $y = −2x + 3$

51. $y = \dfrac{5}{4}x − 7$ 52. $= \dfrac{1}{3}x − \dfrac{4}{3}$ 53. $−3x + 2y = −5$

54.

$y = 3x − 2$
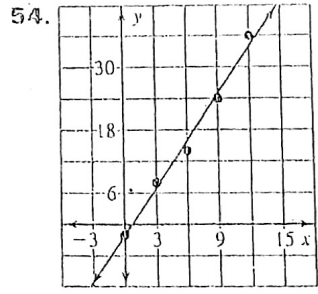
55. $x \geq 4.3$

56. $x > 21$
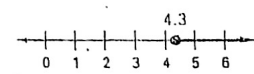
57. $x \leq 3$
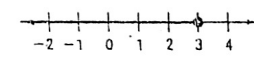
58. $−2 < x < 1$

59. $x < −4.5 \text{ or } x > 4$
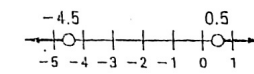
60. $x > 10 \text{ or } x \leq −12$

61. $3, −7$ 62. no solution

63. $p + g \leq 500$;
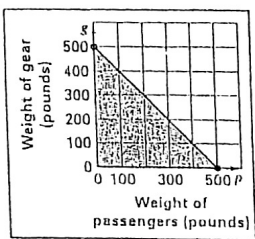
Answers will vary.

64. $(−3, −2)$ 65. $(2, 3)$ 66. $(−1, 8)$

67. $(4, 1)$ 68. no solution   69. infinitely many solutions

70.
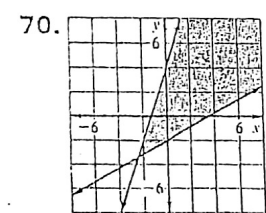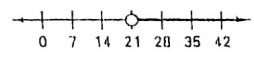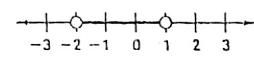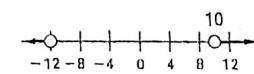
Cumulative Test

1. $(−2)^8$ 2. 6^{15} 3. 4^4 4. 5^8 5. $16m^4n^2$

6. $\dfrac{−27}{r^3}$ 7. $\dfrac{4z^6}{x^4y^2}$ 8. $\dfrac{3b}{4ac^2}$ 9. $\dfrac{4m^{10}}{9}$

10. $3.84 \times 10^{−3}$ 11. 0.0000526

12. $p = 24{,}000(1.02)^t$ 13. $27,027.90

14. $4x^3 + 7x^2 − 8x + 3$ 15. $6y^2 − 4y − 3$

16. $18r^2 − 3r − 3$ 17. $7t^3 − 33t^2 − 31t − 6$

18. $9a^2 − 30ab + 25b^2$ 19. $81z^2 − 4$

20. $(x + 3)(x + 7)$ 21. $(4y − 1)(y + 6)$

22. $5(x + 2)^2$ 23. $(x + 11)(x − 11)$

24. $(−7n + 2)(2n + 3)$ 25. $(t + 3)(t − 3)(t + 2)$

26. $−8, 7$ 27. 13   28. $\dfrac{1}{11}, −2$ 29. $−6, 0, 6$

30. $h = −16t^2 + 18t$ 31. $t = 1.125$

32. $x^3 + 21x^2 + 86x − 264$
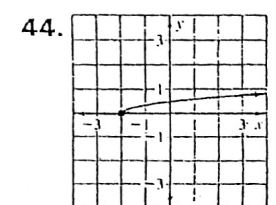
33. $\ell = 15$ in., $w = 16$ in., $h = 2$ in.

34.

35.
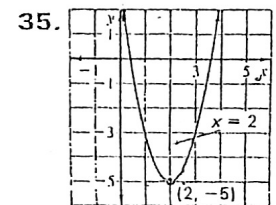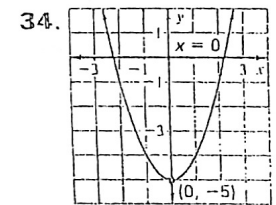
36. ± 15 37. $\pm\dfrac{5}{9}$ 38. $0.81, 0.41$

39. no solution   40. one solution

41. two solutions   42. 6.2 ft/sec

43.

44.
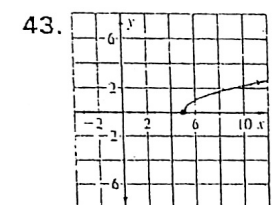
domain: $x \geq 5$;
range: $y \geq 0$

domain: $x \geq −2$;
range: $y \geq 0$

45. $\dfrac{3\sqrt{3}}{x}$ 46. $6x^2\sqrt{2}$ 47. $−2$
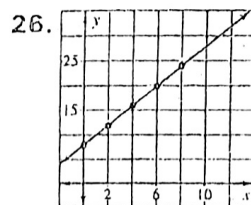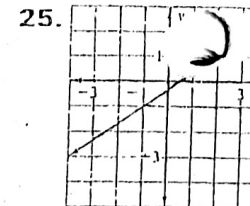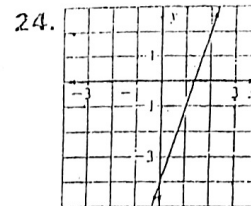
End-of-Course Test

1. 21 2. 2 3. 51 4. −11 5. $2.50, $2.75, 18-holes 6. $y = 2x + 26$; independent variable: x, dependent variable: y, domain: $x \geq 0$, range: $y \geq 26$ 7. −25 8. 42 9. −35 10. 0.16

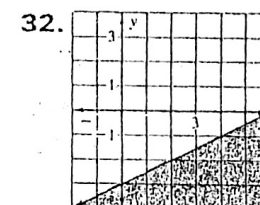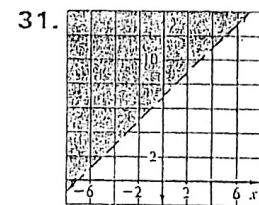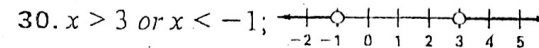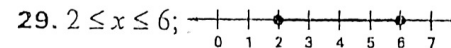11. −25 12. $\frac{5}{3}$ 13. 3 14. 294 15. $-\frac{3}{11}$
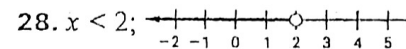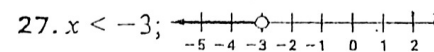
16. $\frac{5}{8}$ 17. $\frac{15}{4}$ 18. 92 ft 19. 198 animals
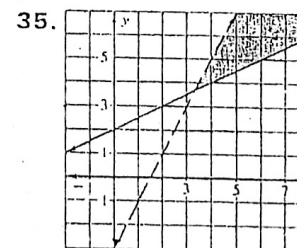
20. $m = -\frac{9}{7}, b = 2$ 21. $m = -3, b = 2$

22. $y = 4x - 1$ 23. $y = -3x - 1$

24.

25.

26.

$y = 2x + 8$

27. $x < -3$;

28. $x < 2$;

29. $2 \leq x \leq 6$;

30. $x > 3$ or $x < -1$;

31.   32.

33. $(5, 2)$ 34. $(6, -2)$

35.

36. 6^{11} 37. $\frac{y^{21}}{z^6}$ 38. $\frac{18m^2}{n^2}$ 39. 9.3×10^{-4}

40. $y = a(1 + r)^t$ 41. $8881.47

42. $16a^2 + 8a + 14$ 43. $-2b^3 - 2b^2 - 5b - 1$

44. $12c^2 + 40c - 7$ 45. $81d^2 - 49$

46. $(x + 6)(2x - 5)$ 47. $(3y + 11)^2$

48. 0.125 sec 49. −1.12, 1.12 50. −3, 5

51. 4.06, −0.06 52. no solution 53. $6.3\sqrt{}$