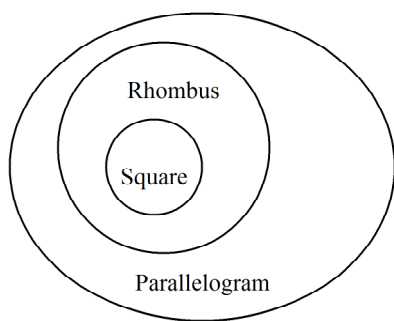


Algebra II Final Exam - Semester 1 (Practice Test)**Multiple Choice**

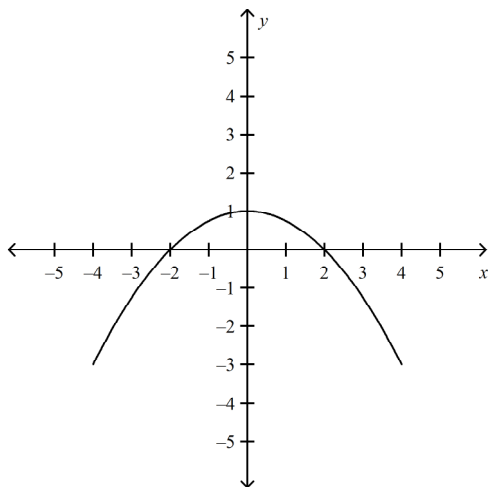
Identify the choice that best completes the statement or answers the question.

- _____ 1. (5 points) What statement can be determined from the diagram?



- A) Every square is a rhombus.
B) Every rhombus is a square.
C) No parallelogram is a rhombus.
D) No parallelogram is a square.

- _____ 2. (5 points) Which is an element of the range of the graphed function?

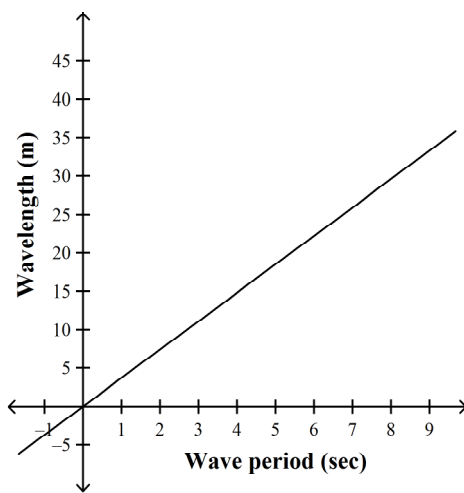


- A) 3
B) 2
C) 4
D) 0

3. (5 points) In the deep ocean, the length of a wave in meters is related to the period of the wave in seconds. Graph the relationship between wave period and wavelength and identify which parent function best describes it. (Hint: Although time cannot be negative, the negative portion of this function has been provided for you.)

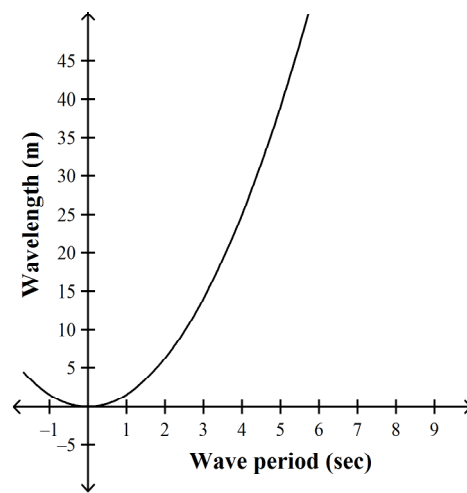
Wave period (sec)	Wavelength (m)
-1	1.56
1	1.56
2	6.24
3	14.04
5	39

A)



near parent function

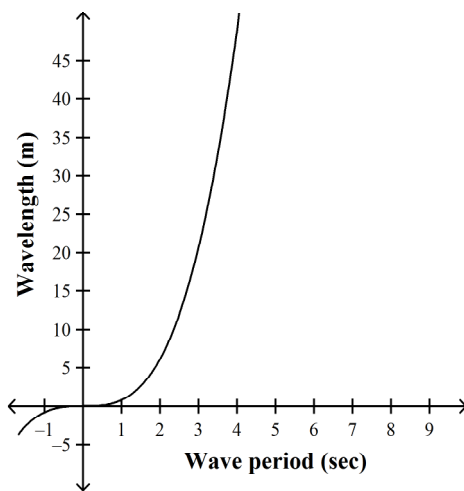
Li C)



uadratic parent function

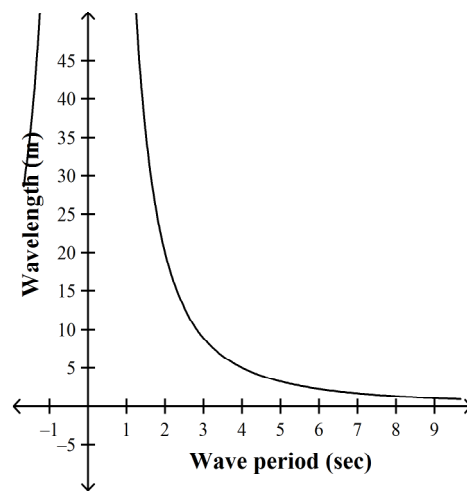
Q

B)



ubic parent function

C D)



uare-root parent function

Sq

Numeric Response

4. (5 points) A 5-foot-tall student casts a shadow 7 feet long. At the same time, a flagpole casts a shadow that is 35 feet long. How many feet tall is the flagpole?
5. (5 points) Using data from a new data set, the relationship between the height in centimeters and the length of a woman's humerus bone is modeled by the equation $h \approx 2.71l + 72.8$. Use this equation to approximate the height of a woman whose humerus bone is 28 centimeters long. Give your answer to the nearest tenth of a centimeter.
6. (5 points) Manny works 40 hours per week. He must work for his parents where he earns \$8 per hour. He also works for a computer company where he earns \$20 per hour. What is the minimum number of hours Manny can work for the computer company to earn a total of \$464 per week from both jobs?
7. (5 points) What is the x -coordinate of the vertex of the graph of $f(x) = -7(x - 9)^2 + 3$?
8. (5 points) Find the positive root of $x^2 + 2x - 35 = 0$.

Short Answer

9. (5 points) Order the numbers 2 , $-\frac{5}{7}$, $\sqrt{2}$, -0.6448 , π from least to greatest.

10. (5 points) Use interval notation to represent the set of numbers $-7 \leq x \leq 3$.

11. (5 points) Simplify the expression $\sqrt{\frac{50}{98}}$.

12. (5 points) Simplify $\frac{\sqrt{7}}{\sqrt{5}}$ by rationalizing the denominator.

13. (5 points) Add.
 $10\sqrt{3} + 2\sqrt{3}$

14. (5 points) Write an algebraic expression to represent the number of letters Isabel wrote. Isabel wrote 10 letters to friends each month for x months in a row.

15. (5 points) Simplify the expression $s^2 - 3s + t + 5s^2$.

16. (5 points) Murphy's motorcycle gets 55 miles per gallon of gas on the highway and 45 miles per gallon in the city. The motorcycle holds 8 gallons of gas. Write and simplify an expression for the total number of miles Murphy can travel if he has a full tank of gas but uses 2 gallons on the highway and the rest in the city.

17. (5 points) Simplify the expression $(4)^{-1}(2)^0$.

18. (5 points) Simplify the expression $(-5a)^2(a^2b)^5$. Assume all variables are nonzero.

19. (5 points) Simplify the expression $\left(\frac{5.64 \times 10^7}{15.792 \times 10^4}\right)^2$. Write the answer in scientific notation.

20. (5 points) Determine whether the relation is a function.

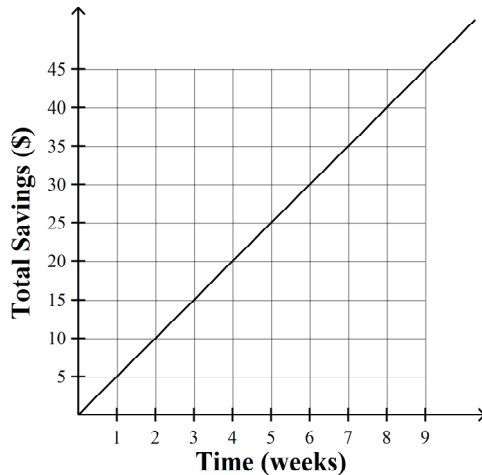
Antonio's age (years)	11	12	13	14	15	16
Antonio's height (inches)	60	61	62	67	69	69

21. (5 points) For $f(x) = -5x - 2$, evaluate $f(5)$.

22. (5 points) The commercial jet that travels from Houston to Miami averages about 375 mi/h. The air distance from Houston to Miami is 968 miles. Write a function to represent the distance d remaining on the trip t hours after takeoff.

23. (5 points) Translate the point $(1, 1)$ right 2 units and down 2 units. Give the coordinates of the translated point.

24. (5 points) The graph shows Carmen's savings each week. She decides to save 2.5 times as much money each week. Sketch a graph that represents the new savings and identify the transformation of the original graph that it represents.



25. (5 points) Dan paid a total of \$25.80 last month for his international calls. He makes international calls only to England. Dan pays \$0.06 per minute in addition to \$10.98 fixed monthly payment. How many minutes of international calls did Dan make last month?

26. (5 points) Solve $3n - 24 = 14 - 30n$.

27. (5 points) Solve $5j - 12 + 13j = -4 + 18j - 8$.

28. (5 points) Solve and graph $5(-4 + 2x) \geq 2(5x + 4)$.

29. (5 points) A high school stadium can seat about 80% of the students attending the high school. If there are 405 students enrolled in the high school, how many students can the stadium seat? If necessary, round to the nearest number of students.

30. (5 points) Lydia is training for the half marathon, a 13-mile-long race. This morning she ran 8 miles in 58 minutes. Assuming she can maintain this pace, how long will it take her to run the half marathon? Round your answer to the nearest minute.

31. (5 points) A sawyer (person who cuts down trees) wants to know the height of a tree. The sawyer measures the shadow of his friend, who is 5 feet tall and standing beside the tree, and measures the shadow of the tree. If his friend's shadow is 12 feet long and the tree's shadow is 60 feet long, how tall is the tree?

32. (5 points) Find the intercepts of $-x - y = 2$, and graph the line.

33. (5 points) Write the function $5x + 10y = -20$ in slope-intercept form. Then graph the function.

34. (5 points) Determine if $x = -2$ is vertical or horizontal. Then graph.

35. (5 points) There was \$1,400 in Naomi's school art and music fund when school began. Then the parents' group held a 12-day fundraiser to reach the school's goal of \$6,000. Find the average amount of money per day the parents raised. Graph the daily amount of money in the fund during the 12-day parent fundraiser.

36. (5 points) Determine whether the data in the table are linear. Explain.

Session Length (min)	4	9	14	21	27
Cost (\$)	2.90	4.65	6.40	8.85	10.95

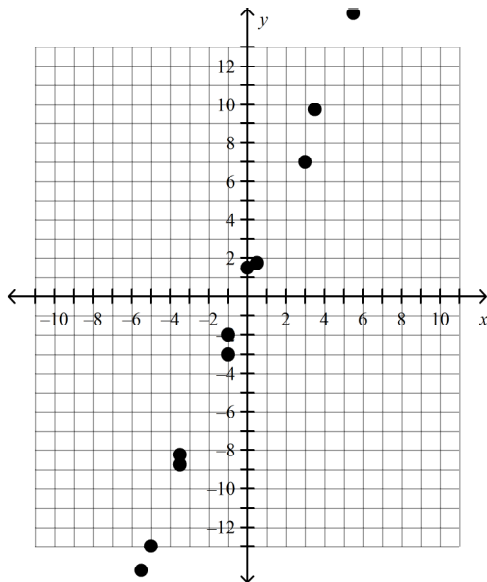
37. (5 points) In slope-intercept form, write the equation of the line that contains the points in the table.

x	-2	0	2	4	6
y	-3	1	5	9	13

38. (5 points) After the first three miles, the cost of a taxi ride is a linear function of the trip length. Express the taxi cost as a function of the trip length. Graph the relationship between the taxi cost and the trip length. If a 5-mile ride costs \$5.00 and a 10-mile ride costs \$8.75, how much does a 16-mile ride cost?

39. (5 points) A music store is selling posters and CDs. Each poster gives a profit of \$3.00 and each CD gives a profit of \$5.00. The store needs to make an average profit of \$200 per hour to stay in business. Let x represent the number of posters sold and y represent the number of CDs sold. Write and graph an inequality showing how many of each item (posters and CDs) the store needs to sell per hour to make a sufficient profit.

40. (5 points) Estimate the value of r for the scatter plot.



41. (5 points) Solve the compound inequality. Then graph the solution set.

$$s - 2 < -10 \text{ or } -3s \leq 6$$

42. (5 points) Use substitution to determine if $(0, 2)$ is an element of the solution set for the system of equations.

$$\begin{cases} x + 3y = 6 \\ -x + y = 8 \end{cases}$$

43. (5 points) Use a graph to solve the system $\begin{cases} -5x + 4y = 6 \\ 3x - y = 2 \end{cases}$. Check your answer.

44. (5 points) Classify the system $\begin{cases} -7x - 6y = 4 \\ -28x - 24y = 16 \end{cases}$, and determine the number of solutions.

45. (5 points) Two snow resorts offers private lessons to their customers. Big Time Ski Mountain charges \$5 per hour plus \$50 insurance. Powder Hills charges \$30 per hour plus \$10 insurance. For what number of hours is the cost of lessons the same for each resort?

46. (5 points) Jake fills a tank that can hold 200 gallons of water. The tank already has 50 gallons of water in it when Jake starts filling it at the rate of 10 gallons per minute. Karla fills a tank that can hold 300 gallons of water. That tank already has 100 gallons of water in it when Karla starts filling it at the rate of 5 gallons per minute. Jake and Karla start filling the tanks at the same time. How long after they start filling the tanks do the tanks have the same volume of water? What is that volume of water?

47. (5 points) Use substitution to solve the system $\begin{cases} 3x + y = -3 \\ y = x + 5 \end{cases}$.

48. (5 points) Use elimination to solve the system $\begin{cases} 3x - 3y = 9 \\ x + 3y = 7 \end{cases}$.

49. (5 points) A zookeeper needs to mix a solution for baby penguins so it has the right amount of medicine. Solution A has 20% medicine. Solution B has 4% medicine. How many ounces of each solution is needed to obtain 10 ounces of 8% medicine?

50. (5 points) Graph the system of inequalities $\begin{cases} y < -3x + 2 \\ y \geq 4x - 1 \end{cases}$.

51. (5 points) Mina's Catering Service is organizing a formal dinner for 280 people. The hall has two kinds of tables, one that seats 4 people and one that seats 10 people. The hall can contain up to a total of 52 tables. Write and graph a system of inequalities that can be used to determine the possible combinations of tables that can be used for the event so there are enough seats for all the people.

52. (5 points) Graph the system of inequalities, and classify the figure created by the solution region.

$$\begin{cases} y \leq 4x + 4 \\ y \leq -0.25x + 4 \\ y \geq 4x - 1 \\ y \geq -0.25x - 1 \end{cases}$$

53. (5 points) Identify the axis of symmetry for the graph of $f(x) = 4x^2 - 8x + 3$.

54. (5 points) Consider the function $f(x) = -4x^2 - 8x + 10$. Determine whether the graph opens up or down. Find the axis of symmetry, the vertex and the y-intercept. Graph the function.

55. (5 points) Find the minimum or maximum value of $f(x) = x^2 - 2x - 6$. Then state the domain and range of the function.

56. (5 points) The distance d in meters traveled by a skateboard on a ramp is related to the time traveled t in seconds. This is modeled by the function: $d(t) = 4.9t^2 - 2.3t + 5$. What is the maximum distance the skateboard can travel, and at what time would it achieve this distance? Round your answers to the nearest hundredth.

57. (5 points) Find the zeros of the function $h(x) = x^2 + 23x + 60$ by factoring.

58. (5 points) A toy rocket is launched from the ground level with an initial vertical velocity of 96 ft/s. After how many seconds will the rocket hit the ground?

59. (5 points) Find the roots of the equation $30x - 45 = 5x^2$ by factoring.

60. (5 points) Solve the equation $2x^2 + 18 = 0$.

61. (5 points) Find the zeros of the function $f(x) = x^2 + 6x + 18$.

62. (5 points) Find the complex conjugate of $3i + 4$.

63. (5 points) Find the zeros of $f(x) = x^2 + 7x + 9$ by using the Quadratic Formula.

64. (5 points) Graph $y \leq -x^2 - 5x + 4$.

65. (5 points) Solve the inequality $x^2 - 14x + 45 \leq -3$ by using algebra.

66. (5 points) The daily profit P that a bakery makes can be modeled by the function $P(x) = -15x^2 + 330x - 815$. (Note that profit does not increase linearly with price because a higher price usually means fewer total pizzas sold.) What must be the price of each loaf of bread to provide a daily profit of at least \$600? (Round your answer to the nearest dollar.)

67. (5 points) Subtract. Write the result in the form $a + bi$.
 $(5 - 2i) - (6 + 8i)$

68. (5 points) Multiply $6i(4 - 6i)$. Write the result in the form $a + bi$.

69. (5 points) Simplify $-8i^{20}$.

70. (5 points) Simplify $\frac{-2 + 2i}{5 + 3i}$.

71. (5 points) Identify the degree of the monomial $-5r^3s^5$.

72. (5 points) Rewrite the polynomial $12x^2 + 6 - 7x^5 + 3x^3 + 7x^4 - 5x$ in standard form. Then, identify the leading coefficient, degree, and number of terms. Name the polynomial.

73. (5 points) Add. Write your answer in standard form.

$$(4d^5 - d^3) + (d^5 + 6d^3 - 4)$$

74. (5 points) A florist delivers flowers to anywhere in town. d is the distance from the delivery address to the florist shop in miles. The cost to deliver flowers, based on the distance d , is given by $C(d) = 0.04d^3 - 0.65d^2 + 3.5d + 9$. Evaluate $C(d)$ for $d = 6$ and $d = 11$, and describe what the values of the function represent.

75. (5 points) For $h(x) = 2x^2 + 6x - 9$ and $k(x) = 3x^2 - 8x + 8$, find $h(x) - 2k(x)$.

76. (5 points) Find the product $2cd^4(-4c^6d^5 - c^3d)$.

77. (5 points) Find the product $(5x - 3)(x^3 - 5x + 2)$.

78. (5 points) Ms. Ponce owns a company that makes specialized race car engines. From 1985 through 2005, the number of engines produced can be modeled by $N(x) = 6x^2 - 4x + 300$ where x is number of years since 1985. The average revenue per engine (in dollars) can be modeled by $R(x) = 30x^2 + 70x + 1,000$. Write a polynomial $T(x)$ that can be used to model Ms. Ponce's total revenue.

79. (5 points) Use Pascal's Triangle to expand the expression $(4x + 3)^4$.

80. (5 points) Divide by using long division: $(5x + 6x^3 - 8) \div (x - 2)$.

81. (5 points) Divide by using synthetic division.
 $(x^2 - 9x + 10) \div (x - 2)$

82. (5 points) Use synthetic substitution to evaluate the polynomial $P(x) = x^3 - 4x^2 + 4x - 5$ for $x = 4$.

83. (5 points) Write an expression that represents the width of a rectangle with length $x + 5$ and area $x^3 + 12x^2 + 47x + 60$.

84. (5 points) Determine whether the binomial $(x - 4)$ is a factor of the polynomial $P(x) = 5x^3 - 20x^2 - 5x + 20$.

Algebra II Final Exam - Semester 1 (Practice Test)

Answer Section

MULTIPLE CHOICE

1. ANS: A PTS: 5
2. ANS: D PTS: 5
3. ANS: C PTS: 5 REF: Page 69

NUMERIC RESPONSE

4. ANS: 25
PTS: 5
5. ANS: 148.7
PTS: 5
6. ANS: 12
PTS: 5
7. ANS: 9
PTS: 5
8. ANS: 5
PTS: 5

SHORT ANSWER

9. ANS:
 $-\frac{5}{7}, -0.6448, \sqrt{2}, 2, \pi$
PTS: 5 REF: Page 6
10. ANS:
 $[-7, 3]$
PTS: 5 REF: Page 8
11. ANS:
 $\frac{5}{7}$
PTS: 5 REF: Page 22

12. ANS:

$$\frac{\sqrt{35}}{5}$$

PTS: 5

REF: Page 23

13. ANS:

$$12\sqrt{3}$$

PTS: 5

REF: Page 23

14. ANS:

$$10x$$

PTS: 5

REF: Page 27

15. ANS:

$$6s^2 - 3s + t$$

PTS: 5

REF: Page 28

16. ANS:

$$10x + 36; 380 \text{ miles}$$

PTS: 5

REF: Page 29

17. ANS:

$$\frac{1}{4}$$

PTS: 5

REF: Page 35

18. ANS:

$$25a^{12}b^5$$

PTS: 5

REF: Page 36

19. ANS:

$$1.28 \times 10^5$$

PTS: 5

20. ANS:

Yes, the relation is a function.

PTS: 5

REF: Page 45

21. ANS:

$$-27$$

PTS: 5

REF: Page 51

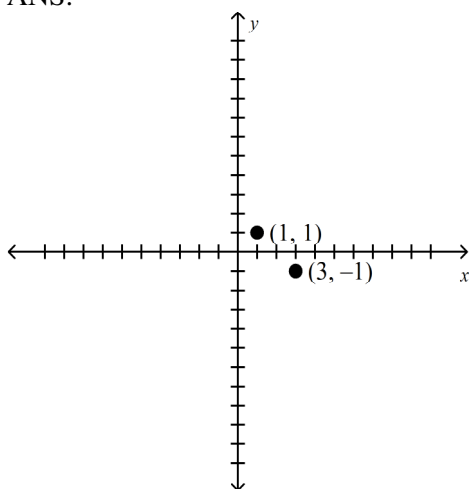
22. ANS:

$$d = 968 - 375t$$

PTS: 5

REF: Page 53

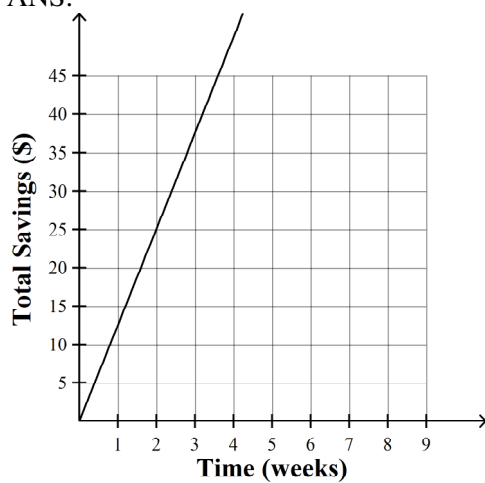
23. ANS:



PTS: 5

REF: Page 59

24. ANS:



The graph represents a vertical stretch by a factor of 2.5.

PTS: 5

REF: Page 62

25. ANS:

247 minutes

PTS: 5

REF: Page 91

26. ANS:

$$n = 1\frac{5}{33}$$

PTS: 5

REF: Page 92

27. ANS:

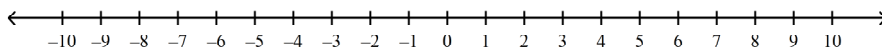
The solution set is all real numbers, or $\mathbb{R}$.

PTS: 5

REF: Page 92

28. ANS:

The inequality has no solution. The solution set is the empty set.



PTS: 5

29. ANS:

324 students

PTS: 5

REF: Page 98

30. ANS:

94 min

PTS: 5

REF: Page 98

31. ANS:

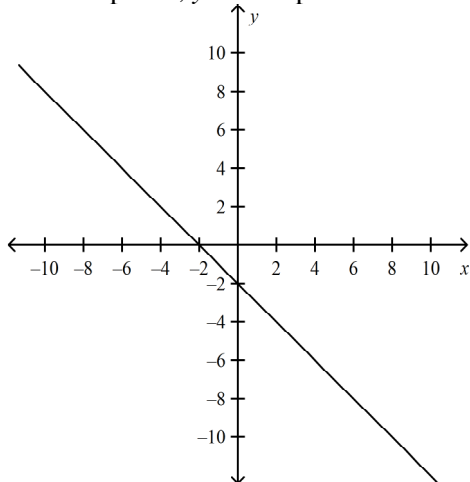
25 feet

PTS: 5

REF: Page 99

32. ANS:

x -intercept: -2 , y -intercept: -2

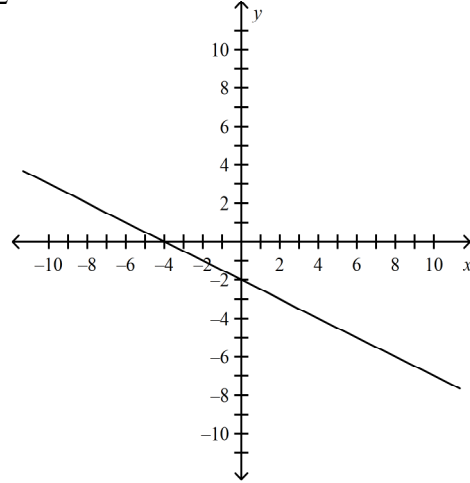


PTS: 5

REF: Page 106

33. ANS:

$$y = -\frac{1}{2}x - 2$$

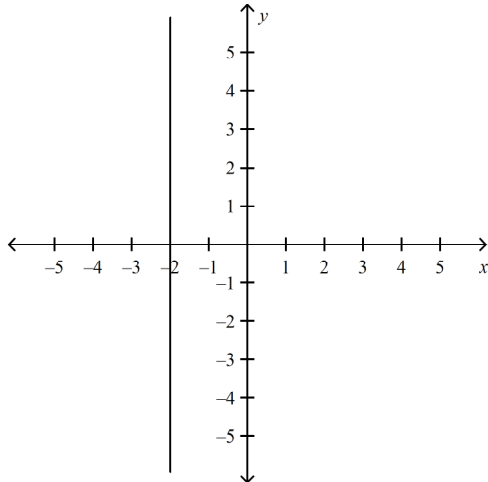


PTS: 5

REF: Page 107

34. ANS:

The line is vertical.

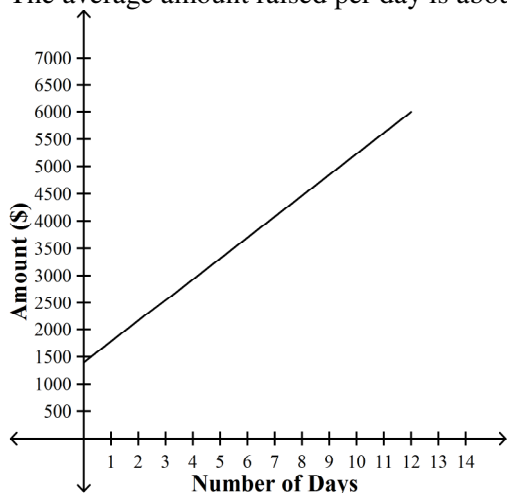


PTS: 5

REF: Page 108

35. ANS:

The average amount raised per day is about \$383.33.



PTS: 5

REF: Page 108

36. ANS:

Yes, the rate of change is constant. For example, to the nearest hundredth, $\frac{4.65 - 2.90}{9 - 4} = \frac{1.75}{5} = 0.35$,

$\frac{6.40 - 4.65}{14 - 9} = \frac{1.75}{5} = 0.35$, and so on.

PTS: 5

37. ANS:

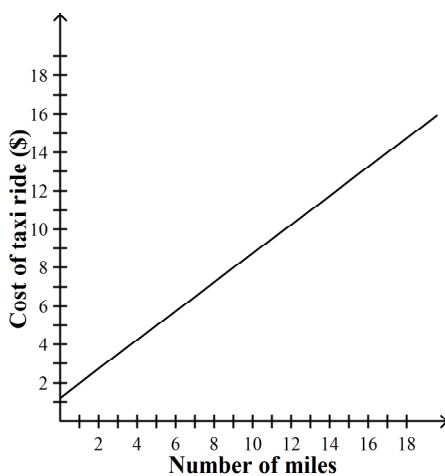
$$y = 2x + 1$$

PTS: 5

REF: Page 117

38. ANS:

$$y = 0.75x + 1.25$$

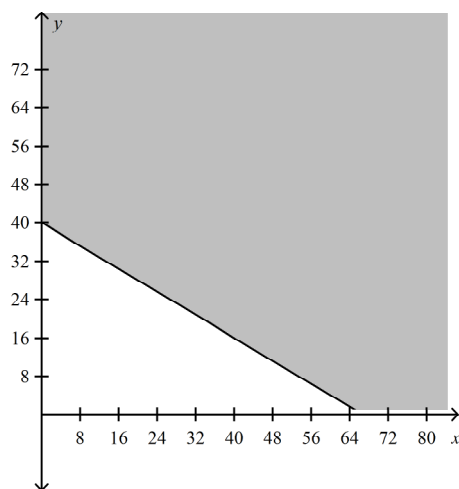


The 16-mile ride costs \$13.25.

PTS: 5

REF: Page 118

39. ANS:
 $3x + 5y \geq 200$



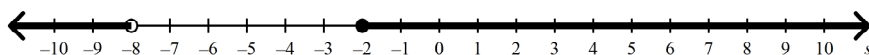
PTS: 5

REF: Page 126

40. ANS:
 1.00

PTS: 5

41. ANS:
 $\{s \mid s < -8 \text{ or } s \geq -2\}$



PTS: 5

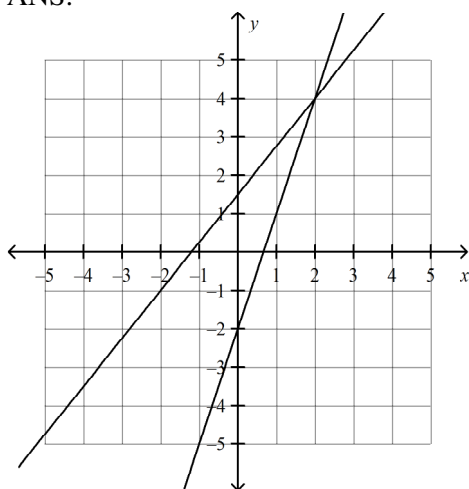
REF: Page 150

42. ANS:
 $(0, 2)$ is not a solution of the system.

PTS: 5

REF: Page 182

43. ANS:



The solution to the system is (2, 4).

PTS: 5 REF: Page 183

44. ANS:

This system is consistent. It has infinitely many solutions.

PTS: 5 REF: Page 184

45. ANS:

4 hours

PTS: 5 REF: Page 185

46. ANS:

10 minutes; 150 gallons

PTS: 5

47. ANS:

$(-2, 3)$

PTS: 5 REF: Page 190

48. ANS:

$(4, 1)$

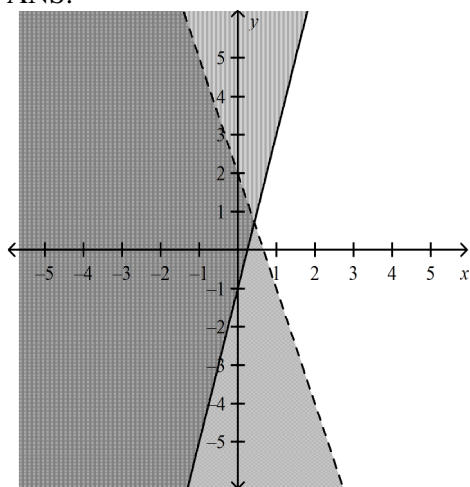
PTS: 5 REF: Page 191

49. ANS:

2.5 ounces of A and 7.5 ounces of B

PTS: 5 REF: Page 193

50. ANS:

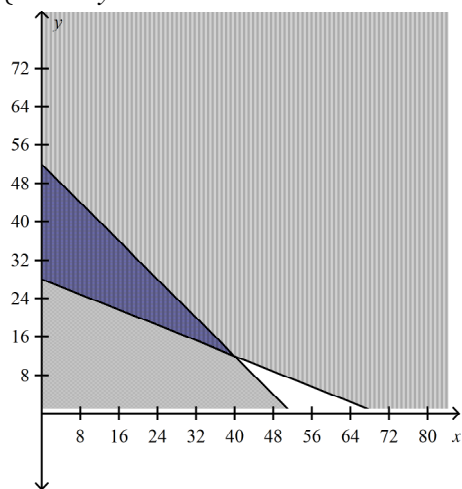


PTS: 5

REF: Page 199

51. ANS:

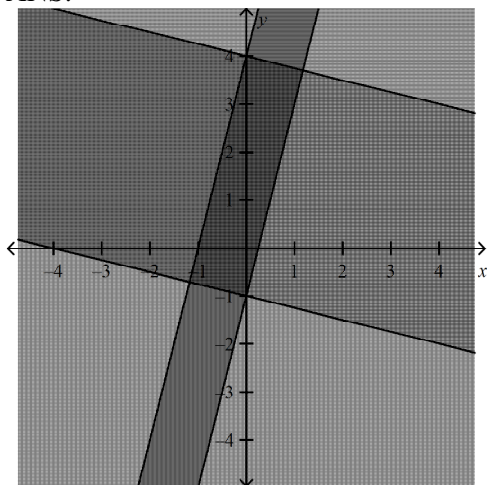
$$\begin{cases} x + y \leq 52 \\ 4x + 10y \geq 280 \end{cases}$$



PTS: 5

REF: Page 200

52. ANS:



The shaded region is a rectangle.

PTS: 5

REF: Page 201

53. ANS:

$$x = 1$$

PTS: 5

REF: Page 323

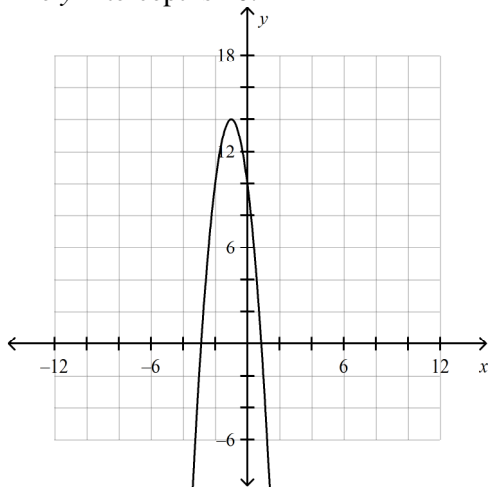
54. ANS:

The parabola opens downward.

The axis of symmetry is the line $x = -1$.

The vertex is the point $(-1, 14)$.

The y-intercept is 10.



PTS: 5

REF: Page 324

55. ANS:

The minimum value is -7 . D: {all real numbers}; R: $\{y \mid y \geq -7\}$

PTS: 5

REF: Page 326

56. ANS:
4.73 meters at 0.23 seconds

PTS: 5 REF: Page 327

57. ANS:
 $x = -20$ or $x = -3$

PTS: 5 REF: Page 334

58. ANS:
6 seconds

PTS: 5 REF: Page 335

59. ANS:
 $x = 3$

PTS: 5 REF: Page 336

60. ANS:
 $x = \pm 3i$

PTS: 5 REF: Page 351

61. ANS:
 $x = -3 + 3i$ or $-3 - 3i$

PTS: 5 REF: Page 352

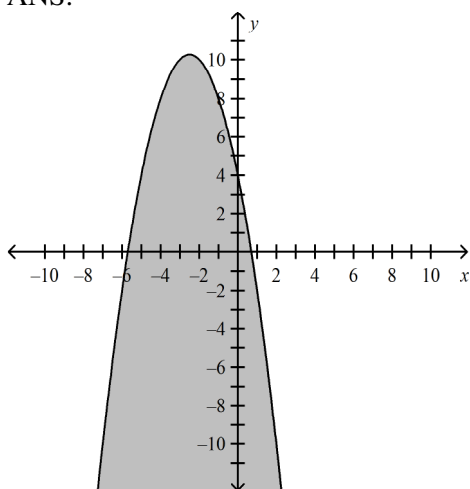
62. ANS:
 $4 - 3i$

PTS: 5 REF: Page 352

63. ANS:
$$x = \frac{-7 \pm \sqrt{13}}{2}$$

PTS: 5 REF: Page 357

64. ANS:



PTS: 5 REF: Page 366

65. ANS:
 $6 \leq x \leq 8$

PTS: 5 REF: Page 368

66. ANS:
 $6 \leq x \leq 16$

PTS: 5 REF: Page 368

67. ANS:
 $-1 - 10i$

PTS: 5 REF: Page 383

68. ANS:
 $36 + 24i$

PTS: 5 REF: Page 384

69. ANS:
 -8

PTS: 5 REF: Page 385

70. ANS:
 $-\frac{2}{17} + \frac{8}{17}i$

PTS: 5 REF: Page 385

71. ANS:
 8

PTS: 5 REF: Page 406

72. ANS:

$$-7x^5 + 7x^4 + 3x^3 + 12x^2 - 5x + 6$$

leading coefficient: -7 ; degree: 5 ; number of terms: 6 ; name: quintic polynomial

PTS: 5

REF: Page 407

73. ANS:

$$5d^5 + 5d^3 - 4$$

PTS: 5

REF: Page 407

74. ANS:

$$C(6) = 15.24; C(11) = 22.09.$$

 $C(6)$ represents the cost, \$15.24, of delivering flowers to a destination that is 6 miles from the shop. $C(11)$ represents the cost, \$22.09, of delivering flowers to a destination that is 11 miles from the shop.

PTS: 5

REF: Page 408

75. ANS:

$$-4x^2 + 22x - 25$$

PTS: 5

76. ANS:

$$-8c^7d^9 - 2c^4d^5$$

PTS: 5

REF: Page 414

77. ANS:

$$5x^4 - 3x^3 - 25x^2 + 25x - 6$$

PTS: 5

REF: Page 414

78. ANS:

$$180x^4 + 300x^3 + 14,720x^2 + 17,000x + 300,000$$

PTS: 5

REF: Page 415

79. ANS:

$$256x^4 + 768x^3 + 864x^2 + 432x + 81$$

PTS: 5

REF: Page 417

80. ANS:

$$6x^2 + 12x + 29 + \frac{50}{(x-2)}$$

PTS: 5

REF: Page 422

81. ANS:

$$x - 7 + \frac{-4}{x-2}$$

PTS: 5

REF: Page 423

82. ANS:

$$P(4) = 11$$

PTS: 5

REF: Page 424

83. ANS:

$$x^2 + 7x + 12$$

PTS: 5

REF: Page 425

84. ANS:

$(x - 4)$ is a factor of the polynomial $P(x) = 5x^3 - 20x^2 - 5x + 20$.

PTS: 5

REF: Page 430