1.   Gas prices at a local gas station for the year 1999–2000 are as follows:

Month	Price	Month	Price
January	1.27	July	1.30
February	1.36	August	1.43
March	1.40	September	1.52
April	1.52	October	1.58
May	1.38	November	1.65
June	1.34	December	1.69

Which type of function ***best*** models the data?

A   exponential

B   logarithmic

C   polynomial

D   rational

2. Thomas rented a van for $75 a day plus $0.25 for each mile that he would go over 3,000 miles. How can Thomas represent the cost, C, of renting the van for d days and driving for m miles $(m \geq 3{,}000)$?
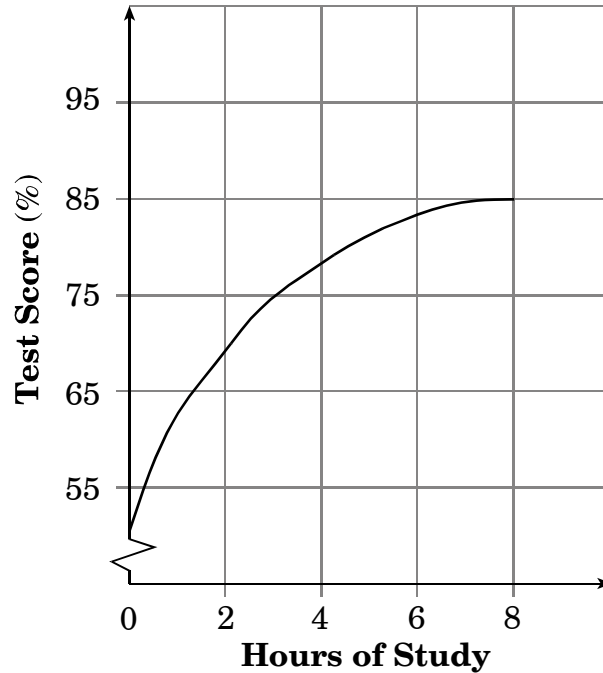
    A $C = 75d + 0.25(m - 3{,}000)$

    B $C = 75d + 0.25(m + 3{,}000)$

    C $C = 75d + 25(m - 3{,}000)$

    D $C = 75d + 25(m + 3{,}000)$

3. Which set contains the zeros of $f(x) = \dfrac{x}{x+4} - \dfrac{3}{x} - \dfrac{1}{2}$?

    A $\{^-6, {}^-4\}$

    B $\{^-12, 2\}$

    C $\{6, 4\}$

    D $\{12, {}^-2\}$

4.   The graph shows the relationship between hours spent studying and the test score obtained.


Which statement ***best*** describes this relationship?

A   The time spent studying is inversely proportional to the square root of the test scores.

B   The time spent studying is the dependent variable, and the test score is the independent variable.

C   The time spent studying is inversely proportional to test scores.

D   The time spent studying is the independent variable, and the test score is the dependent variable.

5.   The Ace Insurance Company has a special plan for safe drivers. For each year that a driver has no tickets or violations, the premium is reduced by 10% and a credit of $15.00 is awarded. Which equation shows the amount a driver with no tickets or violations owes in the $(n+1)$th year as a function of the amount owed in the nth year?

A $f(n+1) = f(n) - 0.10 f(n) - 15$

B $f(n+1) = f(n) + 0.10 f(n) + 15$

C $f(n+1) = f(n) + 0.10 f(n) - 15$

D $f(n+1) = f(n) - 0.10 f(n) + 15$

6.   A building contractor is hired to build a rectangular deck. The length needs to be 5 feet less than twice the width (w). His budget is not to exceed $4,000. The cost to build the deck is $25 per square foot. Which relation models the situation?

A $50w^2 - 125w - 4,000 \le 0$

B $50w^2 - 125w - 4,000 \ge 0$

C $2w^2 - 5w - 4,000 \le 0$

D $2w^2 - 5w - 4,000 \ge 0$

7. An oxygen mask is placed on a patient. Oxygen is administered to the patient for 5 minutes. Then the oxygen mask is removed and the amount of oxygen in the body decreases exponentially. Which graph ***best*** describes the amount of oxygen in the patient's bloodstream beginning with the moment when oxygen is first administered?
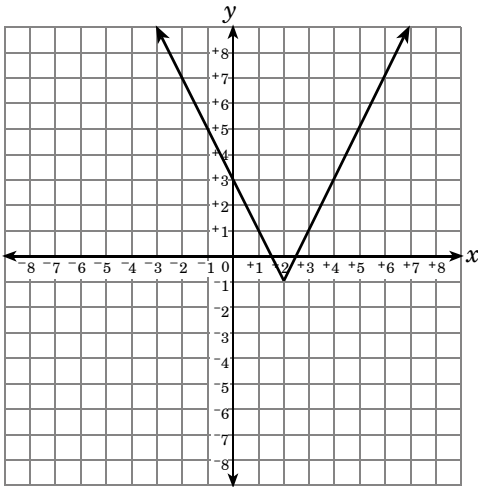
A

B

C

D
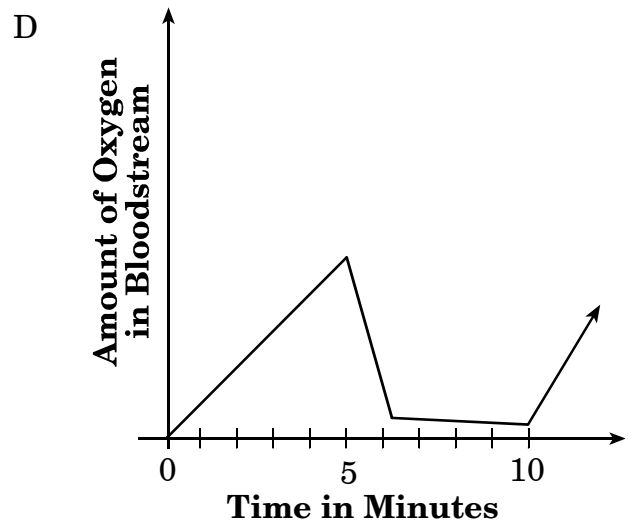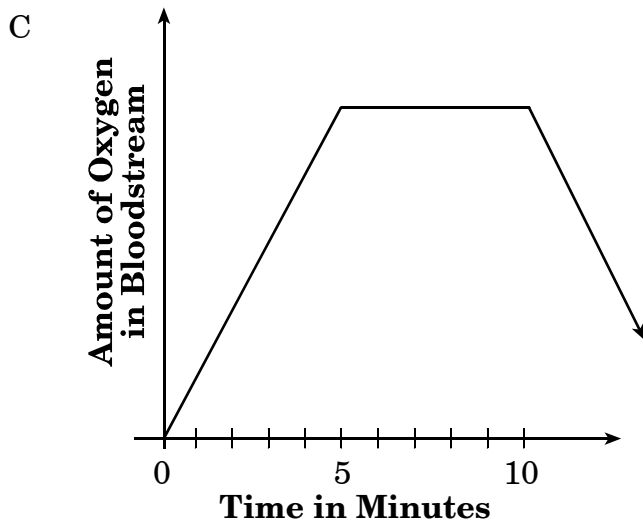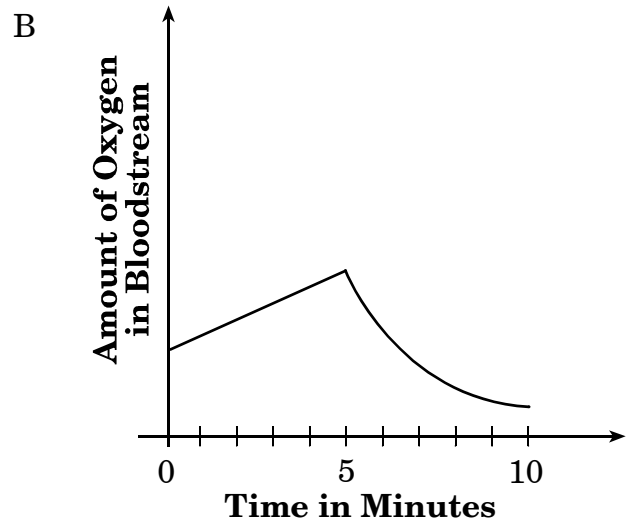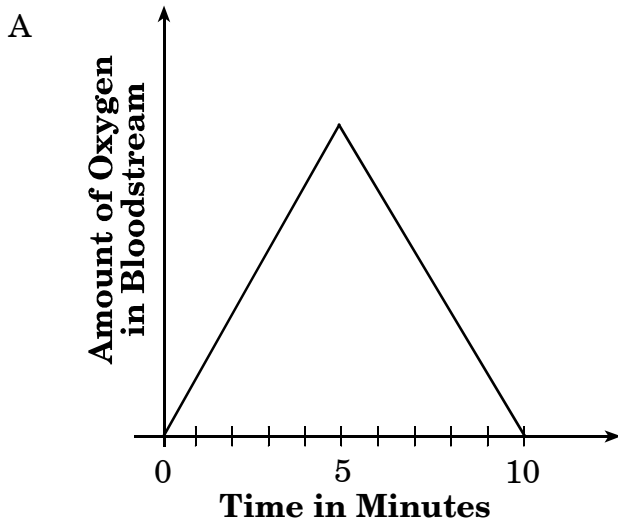
8.   Three consecutive integers are such that the sum of the first integer and the product of the other two is 62. Which equation could be used to find the integers?

A $x^2 - x - 1 = 62$

B $2x^2 - 1 = 62$

C $x^2 + 4x + 2 = 62$

D $2x^2 + x + 1 = 62$

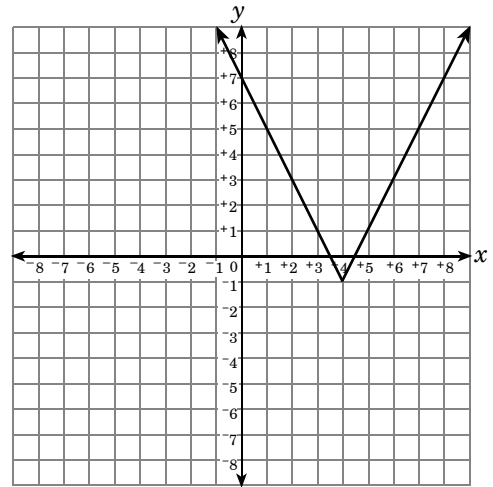9.   The graph of $y = f(x)$ is given.
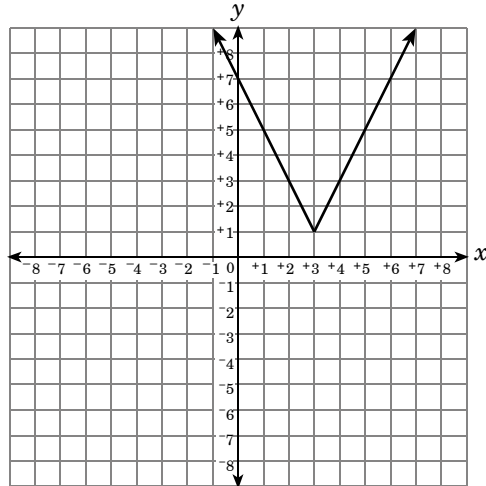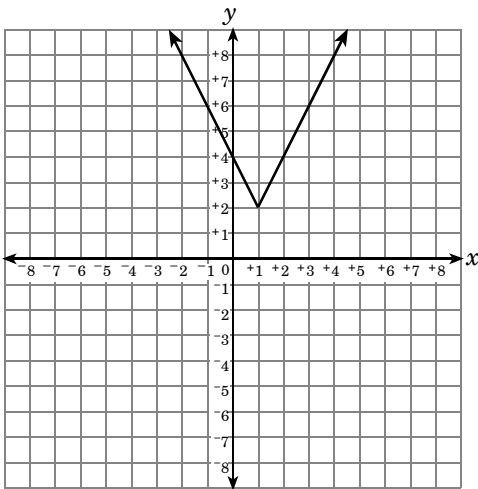

Which is the graph of $y = f(x + 1) - 2$?

A

B

C

D
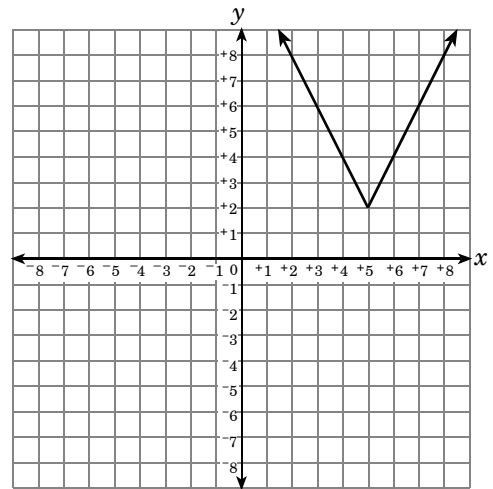
10. What are the zeros of
$f(x) = x^4 - 7x^3 + 15x^2 - 9x$?

   A $x = 1, x = 3$

   B $x = 0, x = 1$

   C $x = 0, x = 1, x = 3$

   D $x = 0, x = 1, x = 2, x = 3$

11. A model rocket is fired upward at an initial velocity v_0 of 240 ft/s. The height $h(t)$ of the rocket is a function of time t in seconds and is given by the formula $h(t) = v_0 t - 16t^2$. How long will it take the rocket to hit the ground after takeoff?

   A   16 seconds

   B   15 seconds

   C   7.5 seconds

   D   4 seconds

12. If $f(x) = x^2 - x$ and $g(x) = x - 1$, what is $f(g(x))$?

   A $x^2 - x - 1$

   B $x^2 - x - 2$

   C $x^2 - 3x + 2$

   D $x^2 - 3x + 1$

13. A box of laundry detergent sells for $3.25. The price the store pays is determined by the function $f(x) = x - 1$, where x is the selling price of the detergent. The wholesale price is determined by $g(x) = x - \frac{3}{4}$, where x is the price the store pays. What is the wholesale price?

   A $1.25

   B $1.50

   C $2.25

   D $2.50

14. Which of the following is the inverse of $f(x) = \frac{2x - 3}{5}$?

   A $f^{-1}(x) = \frac{5x + 3}{2}$

   B $f^{-1}(x) = \frac{^-2x + 3}{5}$

   C $f^{-1}(x) = \frac{2y - 3}{5}$

   D $f^{-1}(x) = \frac{^-5y - 3}{2}$

15. If $f(x) = 2x + 3$, at what point do the graphs of $y = f(x)$ and $y = f^{-1}(x)$ intersect?

   A $\left(^{-}1.5, 0\right)$

   B $\left(0, ^{-}1.5\right)$

   C $\left(^{-}3, ^{-}3\right)$

   D $(3, 0)$

16. What are the **approximate** solutions to the following equation?

$$6x^2 - 8x + 1 = 0$$

   A $\left\{^{-}0.19, ^{-}2.14\right\}$

   B $\left\{^{-}0.14, ^{-}1.19\right\}$

   C $\left\{0.14, 1.19\right\}$

   D $\left\{0.19, 2.14\right\}$

17. The Gardners wish to double the area of their 6-by-4-foot garden by adding an equal amount to each dimension. How much should be added to each dimension?

   A $\frac{1}{2}$ foot

   B   1 foot

   C   2 feet

   D   4 feet

18. Solve: $x^2 + 4x + 9 = 0$

   A $\left\{^{-}2 + i\sqrt{5}, ^{-}2 - i\sqrt{5}\right\}$

   B $\left\{^{-}2 + 6i, ^{-}2 - 6i\right\}$

   C $\left\{^{-}2 + \sqrt{13}, ^{-}2 - \sqrt{13}\right\}$

   D $\left\{^{-}2 + \sqrt{3}, ^{-}2 - \sqrt{3}\right\}$

19.   Solve: $3x^2 + 7x = 2$

    A $\left\{ \dfrac{^-7+\sqrt{73}}{6}, \dfrac{^-7-\sqrt{73}}{6} \right\}$

    B $\left\{ \dfrac{^-7+\sqrt{73}}{2}, \dfrac{^-7-\sqrt{73}}{2} \right\}$

    C $\left\{ ^-2, \dfrac{^-1}{3} \right\}$

    D $\left\{ \dfrac{1}{3}, 2 \right\}$

20.   A ball is thrown upward. Its height
    (h, in feet) is given by the function
    $h = {}^-16t^2 + 64t + 3$, where t is the
    length of time (in seconds) that the
    ball has been in the air. What is
    the ***maximum*** height that the ball
    reaches?

    A   3 ft

    B   51 ft

    C   63 ft

    D   67 ft

21.   The director of a local preschool plans
    to enclose a rectangular area for a
    playground. One side will be the side
    of the building itself. If 60 feet of
    fence are to be used, what is the
    maximum area that can be enclosed?

    A   575 ft^2

    B   450 ft^2

    C   400 ft^2

    D   225 ft^2

22.   What is the largest value that can
    be obtained by multiplying two real
    numbers whose sum is 3? (Round
    your answer to two decimal places.)

    A   1.51

    B   1.58

    C   2.17

    D   2.25

23.   What are the dimensions of a
    rectangle having the ***greatest***
    area with a perimeter of 20 feet?

    A   15 feet by 5 feet

    B   10 feet by 10 feet

    C   6 feet by 4 feet

    D   5 feet by 5 feet

24. What are the ***approximate***
    zeros of the function
    $f(x) = x^3 - 2x^2 - 3x + 1$?

    A $\{3, {}^-1\}$

    B $\{4, 0\}$

    C $\{{}^-1.2, 0.3, 2.9\}$

    D $\{{}^-1.1, 0.2, 3.0\}$

25. What is the ***approximate*** positive
    zero of $P(x) = 2x^4 - 5x - 16$?

    A 2.01

    B 1.97

    C 1.89

    D 1.75

26. A company's total revenue R
    (in millions of dollars) is related
    to its expenses by the equation
    $R = 4x^3 - 16x^2 + 12x$, where x
    is the amount of expenses
    (in tens of thousands of dollars).
    What values of x will produce
    zero revenue?

    A $x = 0, x = 1, x = 3$

    B $x = 1, x = 3, x = 4$

    C $x = 1, x = 3$

    D $x = 0, x = {}^-1, x = {}^-3$

27. Mr. Greene has 8.5 in. by 11 in. cardboard sheets. As a class project, Mr. Greene asked each of his students to make an open-top box under these conditions:

> I)   Each box must be made by cutting small squares from each corner of a cardboard sheet.

> II) The box must have a volume of 48 in^3.

> III) The amount of cardboard waste must be minimized.

Which is the ***approximate*** side length for the small squares that would be cut from the cardboard sheet?

A   3.65 in.

B   2.66 in.

C   0.71 in.

D   0.57 in.

28. The height, $h(t)$, in feet, of an object shot from a cannon with initial velocity of 20 feet per second can be modeled by the equation $h(t) = {}^-16t^2 + 20t + 6$, where t is the time, in seconds, after the cannon is fired. What is the maximum altitude that the object reaches?

    A   13.5 feet

    B   12.25 feet

    C   10.25 feet

    D   1.5 feet

29. With respect to which line is the graph of $f(x) = x^4 - 3x^2 + 6$ symmetric?

    A $x = 0$

    B $y = 0$

    C $y = x$

    D $x = 6$

30. A company found that its monthly profit, P, is given by $P = {}^-10x^2 + 120x - 150$ where x is the selling price for each unit of product. Which of the following is the **best** estimate of the maximum price that the company can charge without losing money?

    A $300.24

    B $210.00

    C $10.58

    D $6.00

31. A fast-food restaurant has hired a company to design a trash can that is in the shape of a cylinder $\left(V = \pi r^2 h\right)$ with a hemispherical top $\left(V = \frac{2}{3}\pi r^3\right)$. The can must be 4 feet tall and hold a volume of 4 cubic feet.

4 ft
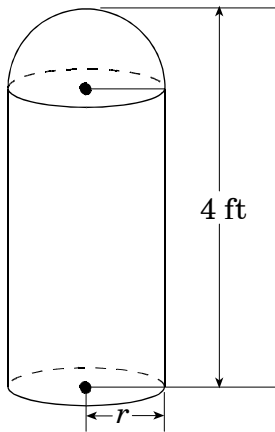
What is the **approximate** radius the designer should plan to use for the trash can?

A   5.5 in.

B   6.9 in.

C   8.4 in.

D   9.3 in.

32. If $3 + 2i$ is a solution for $x^2 + bx + c = 0$, where b and c are real numbers, what is the value of b?

A   ⁻13

B   ⁻6

C   6

D   13

33. Which is the polynomial for the given graph?
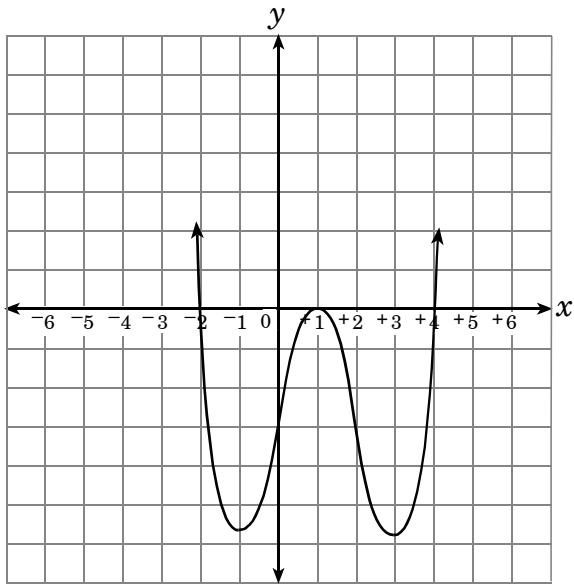
A $P(x) = (x-2)(x-8)(x+1)(x+4)$

B $P(x) = (x-2)(x+1)^2(x+4)$

C $P(x) = (x+2)(x+8)(x-1)(x-4)$

D $P(x) = (x+2)(x-1)^2(x-4)$

34. Which quadratic equation has roots $2+\sqrt{5}$ and $2-\sqrt{5}$?

A $x^2 + 4x + 1 = 0$

B $x^2 - 4x - 1 = 0$

C $x^2 - 4x + 1 = 0$

D $x^2 + 4x - 1 = 0$

35.   Which cubic polynomial *best* describes the data in the table?

x	¯3	¯2	¯1	0	1	2	3	4
y	¯12	0	0	¯6	¯12	¯12	0	30

A $y = x^3 + 6x^2 - 7x - 6$

B $y = x^3 - 7x + 6$

C $y = x^3 - 7x - 6$

D $y = -x^3 - 7x + 6$

36.   What are the vertical and
      horizontal asymptotes (if any)

      of $f(x) = \dfrac{x^3 + 9x^2 + 24x + 20}{4x^2 + 28x + 13}$?

      A $y = 3$

      B $x = {}^-5, x = {}^-2$

      C $x = {}^-0.5, x = {}^-6.5$

      D $y = x + 1$

37.   Which of the following is a horizontal
      asymptote of $f(x) = \dfrac{1}{x^2 - 16}$?

      A $x = {}^-4$

      B $y = 4$

      C $x = 1$

      D $y = 0$

38.   Solve: $\dfrac{3}{x^2 + x - 2} + \dfrac{3}{x - 1} = \dfrac{1}{x + 2}$

      A $\left\{{}^-3\right\}$

      B $\left\{{}^-5\right\}$

      C $\left\{2\right\}$

      D $\left\{5\right\}$

39.   Solve: $\dfrac{7}{5x-5} = \dfrac{3}{(x+1)(x-1)}$

Step 1 $\dfrac{7}{5x-5} = \dfrac{3}{(x+1)(x-1)}$

Step 2 $7(x+1)(x-1) = 3(5x-5)$

Step 3 $7x^2 - 7 = 15x - 15$

Step 4 $7x^2 - 15x + 8 = 0$

Step 5 $(7x-8)(x-1) = 0$

Step 6 $x = \dfrac{8}{7}$ or $x = 1$

Step 7 $x = \dfrac{8}{7}$

What justifies going from step 6 to step 7 in the solution?

A   The original equation is defined at $x = \dfrac{8}{7}$ and $x = 1$.

B   The original equation is not defined at $x = \dfrac{8}{7}$.

C   The original equation is defined at $x = 1$.

D   The original equation is not defined at $x = 1$.

40. Which of the following is equivalent to $y = \sqrt{x^2 - 8x + 16}$?

   A $y = x + 4$

   B $y = x - 4$

   C $y = |x + 4|$

   D $y = |x - 4|$

41. Solve: $\sqrt{x+5} + \sqrt{x-3} = 4$

   A $\{4\}$

   B $\left\{\frac{1}{4}, 1\right\}$

   C $\{^-1, 4\}$

   D   no solution

42. Solve: $\sqrt{x-4} + 4 = x$

   A $\{^-3, 4\}$

   B $\{3, 5\}$

   C $\{4, 5\}$

   D $\{4, 6\}$

43. What should be the first step in solving the equation $\sqrt[3]{2x - 2} = 4$?

   A   Square both sides.

   B   Divide both sides by 2.

   C   Raise both sides to the $\frac{1}{3}$ power.

   D   Cube both sides.

44. Solve: $y = 3x^2 + 3$
            $y = 5 - 5x$

   A $\left\{\left(\frac{1}{3}, \frac{10}{3}\right), (2, 15)\right\}$

   B $\left\{\left(\frac{1}{3}, \frac{10}{3}\right), (^-2, 15)\right\}$

   C $\left\{\left(\frac{^-1}{3}, \frac{20}{3}\right), (2, ^-5)\right\}$

   D $\left\{\left(\frac{^-1}{3}, \frac{10}{3}\right), (^-2, ^-5)\right\}$

45. John and his father each own a boat for bass fishing. The motor on one boat takes regular gasoline, and the other needs premium. John records the following information in his expense book:

Regular	Premium	Cost
3 gal	2 gal	$7.35
1 gal	4 gal	$7.75

What is the cost of one gallon of premium gasoline?

A $1.29

B $1.39

C $1.49

D $1.59

46. For a campaign, a company gave away 5,000 toys to children. Toys x and y cost the company $1.29 and $0.98, respectively. The company spent a total of $5,613. How many of toy x did the company give away?

A   229

B   2,000

C   2,200

D   2,300

47. Two pickup trucks have capacities of $\frac{1}{4}$ ton and $\frac{1}{2}$ ton. They made a total of 18 round trips to haul $7\frac{1}{2}$ tons of crushed rock to a job site. Which matrix equation could be used to determine how many round trips each truck made?

A $\begin{bmatrix} \frac{1}{4} & \frac{1}{2} \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 18 \\ 7\frac{1}{2} \end{bmatrix}$

B $\begin{bmatrix} \frac{1}{4} & \frac{1}{2} \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7\frac{1}{2} \\ 18 \end{bmatrix}$

C $\begin{bmatrix} \frac{1}{4} & 1 \\ \frac{1}{2} & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 18 \\ 7\frac{1}{2} \end{bmatrix}$

D $\begin{bmatrix} \frac{1}{4} & 1 \\ \frac{1}{2} & 1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7\frac{1}{2} \\ 18 \end{bmatrix}$

48. Specialty Furniture can produce a maximum of 400 tables and chairs each week. At least 25 tables and 100 chairs must be produced each week. The profit on each table is $350 and the profit on each chair is $75. What is the maximum profit that can be generated weekly?

A $16,250

B $36,875

C $98,750

D $112,500

49. Students plan to spend 300 hours preparing and 250 hours packaging popcorn for sale. The student council has $160 for supplies. The table below gives data on the time and money required to purchase materials and produce the finished product.

	Plain Popcorn	**Caramel Popcorn**
Preparation Time (per lb)	0.1 hr	0.8 hr
Packaging Time (per lb)	0.2 hr	0.45 hr
Material Costs (per lb)	$0.10	$0.40

The students want to set up a linear program to assist them in this project. Given that x = pounds of plain popcorn and y = pounds of caramel popcorn, what should be the constraints of this situation?

A $0.1x + 0.8y \leq 160$
    $0.2x + 0.45y \leq 250$
    $0.1x + 0.4y \leq 300$
    $x \geq 0$ and $y \geq 0$

B $0.1x + 0.2y \leq 300$
    $0.8x + 0.45y \leq 250$
    $0.1x + 0.4y \leq 160$
    $x \geq 0$ and $y \geq 0$

C $0.1x + 0.8y \leq 300$
    $0.2x + 0.45y \leq 250$
    $0.1x + 0.4y \leq 160$
    $x \geq 0$ and $y \geq 0$

D $0.1x + 0.8y \geq 300$
    $0.2x + 0.45y \geq 250$
 $0.1x + 0.4y \geq 160$

50. An art store sells framed photographs and prints. It buys the photos and prints from a supplier, but it makes its own frames. Each photograph costs the store $20 and requires 2 hours of framing time. Each print costs the store $25 and requires 5 hours for framing. The store has $400 to spend and 60 hours of framing time. It makes a profit of $20 on each framed photo and a profit of $40 on each framed print. How many photographs and prints should the store buy to maximize its profit?

    A   20 photographs and no prints

    B   10 photographs and 8 prints

    C   8 photographs and 10 prints

    D   no photographs and 20 prints

51. A survey at a local high school shows 18.6% of the students read the newspaper. Results of surveys of this size can be off by as much as 1.5 percentage points. Which inequality describes the results?

    A $x - 0.186 \le 0.015$

    B $x - 0.186 > 0.015$

    C $|x - 0.186| \le 0.015$

    D $|x - 0.186| > 0.015$

52. The graph of the inequality $y < 2|x - 1| - 2$ is shown.
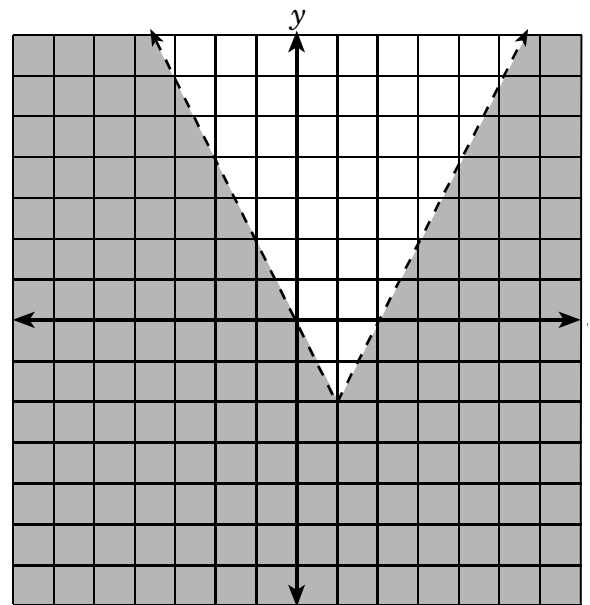
    Which statement explains how this graph can be used to solve the one-variable inequality $2 < 2|x - 1| - 2$?

    A   Intersect the given graph with that of $y = 2$ to obtain the solutions $x < {}^{-}1$ or $x > 3$.

    B   Intersect the given graph with that of $y = {}^{-}2$ to obtain the solutions $x > {}^{-}1$ or $x < 3$.

    C   Intersect the given graph with that of $y = 4$ to obtain the solutions $x < {}^{-}1$ or $x > 3$.

    D   Intersect the given graph with that of $y = 2$ to obtain the solutions $x = {}^{-}1$ or $x = 3$.

53. For $y = 3|7 - 2x| + 5$, which set describes x when $y < 8$?

   A $\{x \mid 3 < x < 4\}$

   B $\{x \mid 3 < x < 10\}$

   C $\{x \mid x < 3 \text{ or } x > 4\}$

   D $\{x \mid x < 3 \text{ or } x > 10\}$

54. For $y = |x|$, which set describes x when $y \geq 3$?

   A $\{x \mid x \geq 3\}$

   B $\{x \mid x \leq {}^-3\}$

   C $\{x \mid x \leq {}^-3 \text{ or } x \geq 3\}$

   D $\{x \mid {}^-3 \leq x \leq 3\}$

55. 100 kilograms of a substance has a half-life of 50 years. If the graph of its decay function is represented by $y = ab^x$ where x is the number of 50-year periods, what are the values of a and b?

   A $a = 100$ and $b = 50$

   B $a = 100$ and $b = 0.5$

   C $a = 50$ and $b = 0.5$

   D $a = 50$ and $b = 100$

56. Which equation **best** fits the data in the given table?

Number of Half-Lives	Remaining Amount of Substance (in grams)
0	4,000
1	2,000
2	1,000
3	500
4	250
5	125
6	62.5

A $y = 4{,}000\left(\frac{1}{2}\right)^x$

B $y = 2{,}000\left(\frac{1}{2}\right)^x$

C $y = \frac{1}{2}(4{,}000)^x$

D $y = \frac{1}{2}(2{,}000)^x$

57. In 1984, the population of Greensboro, N.C. was 197,910. According to the U.S. Census Bureau, Greensboro has been growing at the rate of 6.9% annually since 1984. What equation models the population of Greensboro t years after 1984?

A $y = 197{,}910(1 + 0.69)^t$

B $y = 197{,}910(1 + 69)^t$

C $y = 197{,}910(1 + 6.9)^t$

D $y = 197{,}910(1 + 0.069)^t$

58. The equation $c = 523{,}430(1.193)^t$ models United States copper production in pounds from 1987–1992. Which statement **best** interprets the coefficient and base of this equation?

   A   The copper production in 1987 was 523,430 pounds, and it had been increasing at a rate of 1.93% per year during that period.

   B   The copper production in 1987 was 523,430 pounds, and it had been increasing at a rate of 19.3% per year during that period.

   C   The copper production increased by a factor of $523{,}430 \times 1.193$ pounds per year during that period.

   D   The copper production at the beginning of 1987 was at 1.193 pounds, and it had been increasing by a factor of 523,430 pounds per year during that period.

59. Which of the following is the logarithmic form of the equation $y = 20^{-\frac{3}{2}}$?

   A $\log_{20} y = \dfrac{-3}{2}$

   B $\log_{\frac{3}{2}} 20 = y$

   C $^{-}\log_{\frac{3}{2}} y = 20$

   D $\log_{20}\left(\dfrac{-3}{2}\right) = y$

60. If $17^m = 6$, what is m?

   A $m = \dfrac{\log 6}{\log 17}$

   B $m = \log 6 - \log 17$

   C $m = \dfrac{\log 17}{\log 6}$

   D $m = \log \dfrac{6}{17}$

61. Solve $y = \log(5x + 3)$ for x.

   A $x = 10^{\frac{1}{5}(y-3)}$

   B $x = \dfrac{1}{5}(y - 3)$

   C $x = \dfrac{1}{5}\left(10^y - 3\right)$

   D $x = 5\left(10^y - 3\right)$

62. A savings account pays interest that is compounded continuously using the formula $A = Pe^{rt}$, where P is the initial amount of the investment and A is the amount in the account after t years at a constant annual interest rate, r. Which is the correct equation for calculating t?

A $t = \dfrac{A}{Pe^r}$

B $t = \dfrac{A - P}{e^r}$

C $t = \dfrac{\ln A + \ln P}{re}$

D $t = \dfrac{\ln A - \ln P}{r}$

63. If $y = 4(1.6)^x$, what is the ***approximate*** value of x when $y = 12$?

A   2.5

B   2.3

C   2.1

D   1.9

64. The air pollution, $P(t)$, in the Southwest has been growing according to the function $P(t) = 3000(2.5)^{0.3t}$, where $P(0)$ is the pollution level in 1995 and t is time in years. What was the ***approximate*** percent change in the air pollution levels between 1997 and 1998?

A   24%

B   32%

C   55%

D   76%

65. An $18,000 car depreciates at a rate of 16% per year. How old will the car be when it is worth $12,000?

A   0.2 year

B   2.3 years

C   2.6 years

D   3 years

66. Alan deposited $300 in an account
     that pays 6% interest compounded
     continuously. ***Approximately*** how
     long will it take for Alan's money to
     triple? (Use the formula $A = Pe^{rt}$ where
     A is the accumulated amount, P is the
     initial amount, r is the annual rate of
     interest, and t is the elapsed time in
     years.)

     A   7.95 years

     B   11.55 years

     C   18.31 years

     D   23.10 years

End of Goal 3 Sample Items

1. **Objective 3.01**
    Describe graphically, algebraically and verbally real-world phenomena as functions; identify the independent and dependent variables.
    Thinking Skill: Integrating **Correct Answer:** C

2. **Objective 3.01**
    Describe graphically, algebraically and verbally real-world phenomena as functions; identify the independent and dependent variables.
    Thinking Skill: Analyzing **Correct Answer:** A

3. **Objective 3.01**
    Describe graphically, algebraically and verbally real-world phenomena as functions; identify the independent and dependent variables.
    Thinking Skill: Applying **Correct Answer:** D

4. **Objective 3.01**
    Describe graphically, algebraically and verbally real-world phenomena as functions; identify the independent and dependent variables.
    Thinking Skill: Analyzing **Correct Answer:** D

5. **Objective 3.02**
    Translate among graphic, algebraic and verbal representations of relations.
    Thinking Skill: Analyzing **Correct Answer:** A

6. **Objective 3.02**
    Translate among graphic, algebraic and verbal representations of relations.
    Thinking Skill: Applying **Correct Answer:** A

7. **Objective 3.02**
    Translate among graphic, algebraic and verbal representations of relations.
    Thinking Skill: Analyzing **Correct Answer:** B

8. **Objective 3.02**
    Translate among graphic, algebraic and verbal representations of relations.
    Thinking Skill: Integrating **Correct Answer:** C

9. **Objective 3.03**
    Graph relations and functions and find the zeros of functions.
    Thinking Skill: Analyzing **Correct Answer:** A

10. **Objective 3.03**
    Graph relations and functions and find the zeros of functions.
    Thinking Skill: Applying **Correct Answer:** C

11. **Objective 3.03**
    Graph relations and functions and find the zeros of functions.
    Thinking Skill: Applying **Correct Answer:** B

12. **Objective 3.04**
    Find the composition and inverse of functions.
    Thinking Skill: Applying   **Correct Answer:**   C

13. **Objective 3.04**
    Find the composition and inverse of functions.
    Thinking Skill: Applying   **Correct Answer:**   B

14. **Objective 3.04**
    Find the composition and inverse of functions.
    Thinking Skill: Integrating   **Correct Answer:**   A

15. **Objective 3.04**
    Find the composition and inverse of functions.
    Thinking Skill: Applying   **Correct Answer:**   C

16. **Objective 3.05**
    Use quadratic equations and inequalities to solve problems. Solve by: a) Graphing.
    b) Factoring. c) Completing the square. d) Using the quadratic formula. e) Using
    properties of equality; justify steps needed.
    Thinking Skill: Applying   **Correct Answer:**   C

17. **Objective 3.05**
    Use quadratic equations and inequalities to solve problems. Solve by: a) Graphing.
    b) Factoring. c) Completing the square. d) Using the quadratic formula. e) Using
    properties of equality; justify steps needed.
    Thinking Skill: Applying   **Correct Answer:**   C

18. **Objective 3.05**
    Use quadratic equations and inequalities to solve problems. Solve by: a) Graphing.
    b) Factoring. c) Completing the square. d) Using the quadratic formula. e) Using
    properties of equality; justify steps needed.
    Thinking Skill: Applying   **Correct Answer:**   A

19. **Objective 3.05**
    Use quadratic equations and inequalities to solve problems. Solve by: a) Graphing.
    b) Factoring. c) Completing the square. d) Using the quadratic formula. e) Using
    properties of equality; justify steps needed.
    Thinking Skill: Applying   **Correct Answer:**   A

20. **Objective 3.06**
    Find and interpret the maximum and minimum values and the intercepts of a
    quadratic function.
    Thinking Skill: Applying   **Correct Answer:**   D

21. Objective 3.06
Find and interpret the maximum and minimum values and the intercepts of a quadratic function.
Thinking Skill: Applying **Correct Answer:** B

22. Objective 3.06
Find and interpret the maximum and minimum values and the intercepts of a quadratic function.
Thinking Skill: Analyzing **Correct Answer:** D

23. Objective 3.06
Find and interpret the maximum and minimum values and the intercepts of a quadratic function.
Thinking Skill: Integrating **Correct Answer:** D

24. Objective 3.07
Use polynomial equations (up to 4th degree) to solve problems. Solve by:
a) Graphing. b) Factoring. c) Using properties of equality; justify steps used.
Thinking Skill: Analyzing **Correct Answer:** C

25. Objective 3.07
Use polynomial equations (up to 4th degree) to solve problems. Solve by:
a) Graphing. b) Factoring. c) Using properties of equality; justify steps used.
Thinking Skill: Analyzing **Correct Answer:** C

26. Objective 3.07
Use polynomial equations (up to 4th degree) to solve problems. Solve by:
a) Graphing. b) Factoring. c) Using properties of equality; justify steps used.
Thinking Skill: Applying **Correct Answer:** A

27. Objective 3.07
Use polynomial equations (up to 4th degree) to solve problems. Solve by:
a) Graphing. b) Factoring. c) Using properties of equality; justify steps used.
Thinking Skill: Integrating **Correct Answer:** C

28. Objective 3.08
Find zeros, intercepts, and approximate the turning points of polynomial functions; describe them in the context of the problem.
Thinking Skill: Integrating **Correct Answer:** B

29. Objective 3.08
Find zeros, intercepts, and approximate the turning points of polynomial functions; describe them in the context of the problem.
Thinking Skill: Integrating **Correct Answer:** A

30. Objective 3.08
Find zeros, intercepts, and approximate the turning points of polynomial functions; describe them in the context of the problem.
Thinking Skill: Integrating **Correct Answer:** C

31. Objective 3.08
Find zeros, intercepts, and approximate the turning points of polynomial functions; describe them in the context of the problem.
Thinking Skill: Integrating **Correct Answer:** B

32. Objective 3.09
Write a polynomial equation given its solutions.
Thinking Skill: Integrating **Correct Answer:** B

33. Objective 3.09
Write a polynomial equation given its solutions.
Thinking Skill: Analyzing **Correct Answer:** D

34. Objective 3.09
Write a polynomial equation given its solutions.
Thinking Skill: Generating **Correct Answer:** B

35. Objective 3.09
Write a polynomial equation given its solutions.
Thinking Skill: Integrating **Correct Answer:** C

36. Objective 3.10
Use rational equations to solve problems. Solve by: a) Graphing; identify the asymptotes and intercepts. b) Factoring. c) Finding the zeros and asymptotes through analysis of the polynomials in the numerator and denominator. d) Using properties of equality; justify steps used.
Thinking Skill: Integrating **Correct Answer:** C

37. Objective 3.10
Use rational equations to solve problems. Solve by: a) Graphing; identify the asymptotes and intercepts. b) Factoring. c) Finding the zeros and asymptotes through analysis of the polynomials in the numerator and denominator. d) Using properties of equality; justify steps used.
Thinking Skill: Analyzing **Correct Answer:** D

38. Objective 3.10
Use rational equations to solve problems. Solve by: a) Graphing; identify the asymptotes and intercepts. b) Factoring. c) Finding the zeros and asymptotes through analysis of the polynomials in the numerator and denominator. d) Using properties of equality; justify steps used.
Thinking Skill: Applying **Correct Answer:** B

39. Objective 3.10
Use rational equations to solve problems. Solve by: a) Graphing; identify the asymptotes and intercepts. b) Factoring. c) Finding the zeros and asymptotes through analysis of the polynomials in the numerator and denominator. d) Using properties of equality; justify steps used.
Thinking Skill: Analyzing **Correct Answer:** D

40. Objective 3.11
Use equations which contain radical expressions to solve problems. Solve by:
a) Graphing. b) Factoring. c) Using properties of equality; justify steps used.
Thinking Skill: Integrating **Correct Answer:** D

41. Objective 3.11
Use equations which contain radical expressions to solve problems. Solve by:
a) Graphing. b) Factoring. c) Using properties of equality; justify steps used.
Thinking Skill: Applying **Correct Answer:** A

42. Objective 3.11
Use equations which contain radical expressions to solve problems. Solve by:
a) Graphing. b) Factoring. c) Using properties of equality; justify steps used.
Thinking Skill: Applying **Correct Answer:** C

43. Objective 3.11
Use equations which contain radical expressions to solve problems. Solve by:
a) Graphing. b) Factoring. c) Using properties of equality; justify steps used.
Thinking Skill: Analyzing **Correct Answer:** D

44. Objective 3.12
Use systems of two or more equations to solve problems. Solve by: a) Elimination and/or substitution. b) Graphing. c) Using matrix equations of the form AX = B.
Thinking Skill: Applying **Correct Answer:** B

45. Objective 3.12
Use systems of two or more equations to solve problems. Solve by: a) Elimination and/or substitution. b) Graphing. c) Using matrix equations of the form AX = B.
Thinking Skill: Applying **Correct Answer:** D

46. Objective 3.12
Use systems of two or more equations to solve problems. Solve by: a) Elimination and/or substitution. b) Graphing. c) Using matrix equations of the form AX = B.
Thinking Skill: Applying **Correct Answer:** D

47. Objective 3.12
Use systems of two or more equations to solve problems. Solve by: a) Elimination and/or substitution. b) Graphing. c) Using matrix equations of the form AX = B.
Thinking Skill: Analyzing **Correct Answer:** B

48. Objective 3.13
Use linear programming with systems of three or more inequalities to solve problems.
Thinking Skill: Applying **Correct Answer:** D

49. Objective 3.13
Use linear programming with systems of three or more inequalities to solve problems.
Thinking Skill: Applying **Correct Answer:** C

50. Objective 3.13
Use linear programming with systems of three or more inequalities to solve problems.
Thinking Skill: Applying **Correct Answer:** B

51. Objective 3.14
Use equations and inequalities with absolute value to solve problems by:
a) Locating points on the number line. b) Locating points on the coordinate plane.
c) Using properties of equality; justify steps used.
Thinking Skill: Analyzing **Correct Answer:** C

52. Objective 3.14
Use equations and inequalities with absolute value to solve problems by:
a) Locating points on the number line. b) Locating points on the coordinate plane.
c) Using properties of equality; justify steps used.
Thinking Skill: Generating **Correct Answer:** A

53. Objective 3.14
Use equations and inequalities with absolute value to solve problems by:
a) Locating points on the number line. b) Locating points on the coordinate plane.
c) Using properties of equality; justify steps used.
Thinking Skill: Applying **Correct Answer:** A

54. Objective 3.14
Use equations and inequalities with absolute value to solve problems by:
a) Locating points on the number line. b) Locating points on the coordinate plane.
c) Using properties of equality; justify steps used.
Thinking Skill: Analyzing **Correct Answer:** C

55. Objective 3.15
Write and graph exponential functions of the form $f(x) = ab^x$.
Thinking Skill: Integrating **Correct Answer:** B

56. Objective 3.15
Write and graph exponential functions of the form $f(x) = ab^x$.
Thinking Skill: Applying **Correct Answer:** A

57. Objective 3.15
Write and graph exponential functions of the form $f(x) = ab^x$.
Thinking Skill: Analyzing **Correct Answer:** D

58. Objective 3.15
Write and graph exponential functions of the form $f(x) = ab^x$.
Thinking Skill: Analyzing   **Correct Answer:** B

59. Objective 3.16
Recognize as inverses the exponential and logarithmic functions.
Thinking Skill: Analyzing   **Correct Answer:** A

60. Objective 3.16
Recognize as inverses the exponential and logarithmic functions.
Thinking Skill: Generating   **Correct Answer:** A

61. Objective 3.16
Recognize as inverses the exponential and logarithmic functions.
Thinking Skill: Applying   **Correct Answer:** C

62. Objective 3.16
Recognize as inverses the exponential and logarithmic functions.
Thinking Skill: Integrating   **Correct Answer:** D

63. Objective 3.17
Use logarithmic and exponential equations to solve problems. Solve by: a) Graphing.
b) Substitution. c) Applying the inverse relationship. d) Using properties of equality:
justify steps used.
Thinking Skill: Applying   **Correct Answer:** B

64. Objective 3.17
Use logarithmic and exponential equations to solve problems. Solve by: a) Graphing.
b) Substitution. c) Applying the inverse relationship. d) Using properties of equality:
justify steps used.
Thinking Skill: Applying   **Correct Answer:** B

65. Objective 3.17
Use logarithmic and exponential equations to solve problems. Solve by: a) Graphing.
b) Substitution. c) Applying the inverse relationship. d) Using properties of equality:
justify steps used.
Thinking Skill: Applying   **Correct Answer:** B

66. Objective 3.17
Use logarithmic and exponential equations to solve problems. Solve by: a) Graphing.
b) Substitution. c) Applying the inverse relationship. d) Using properties of equality:
justify steps used.
Thinking Skill: Integrating   **Correct Answer:** C