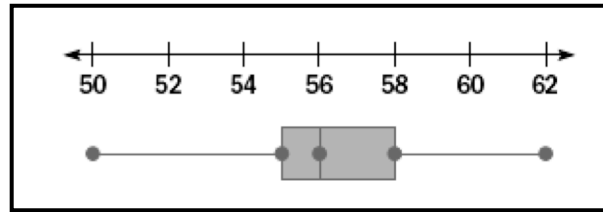Multiple Choice: Choose the best answer and mark it on the bubble sheet.

1.   What does the number 58 represent in the box-and-whisker plot?

   A. Upper extreme   B. Upper quartile   C. Lower quartile   D. Median

2.   The function rule $y = 2x - 1$ relates *x* and *y* in which set of ordered pairs?
   A. $(1,3),(2,5),(8,9)$ B. $(0,-1),(2,3),(3,5)$ C. $(1,1),(3,2),(-1,0)$ D$(-1,-3),(0,1),(2,5)$

3.   A recipe calls for 2 eggs to make 12 pancakes. You were asked to make 50 pancakes. How many eggs
   will you need to use to meet this request?
   A. 8   B. 9   C. 25   D. 40

4.   When attending the school play, students are allowed to order one snack and one drink at the
   concession stand. Students can choose a snack of popcorn, nachos, a candy bar, or a hot-dog. For a
   drink they can choose a bottle of soda, water, or juice. If all choices are equally likely, what is the
   probability that a randomly chosen person orders nachos and a bottle of water?
   A. $\dfrac{2}{12}$ B. $\dfrac{1}{12}$ C. $\dfrac{2}{7}$ D. $\dfrac{1}{7}$

5.   Simplify the expression: $\dfrac{10x}{3} + \dfrac{5x}{7}$
   A. $\dfrac{3x}{2}$ B. $\dfrac{15x}{21}$ C. $\dfrac{85x}{21}$ D. $\dfrac{15x^2}{10}$

6.   Which decimal is greater than $\dfrac{3}{5}$?
   A. 0.0053   B. 0.35   C. 0.4   D. 0.67

7.   A coffee shop offers a souvenir ceramic mug filled with coffee for $8.95. After that, each refill costs $1.50.
   Salem spent $26.95 on a mug and refills last month. Choose the equation that could be solved to find the
   number of refills (*r*) that Salem bought last month.
   A. $(8.95 + 1.50)r = 26.95$ B. $1.50r + 8.95 = 26.95$
   C. $26.95 + 8.95 = 1.50r$ D. $8.95 - 1.50r = 26.95$

8. The total cost to join a swim club is $1200 a year. The cost includes an initiation fee of $150 that is due before you can use the pool. The remainder of the cost is covered with 12 monthly payments. Choose the equation that could be solved to find the amount of each monthly payment (m).

A. $1200 + 12 = 150m$
C. $1200 = 12m + 150$
B. $1200 + 150 - 12m$
D. $1200 = 12m - 150$

9. Which graph represents the solutions to the inequality $-\frac{2}{3}x < 1\frac{1}{3}$

A.

B.

C.

D.

10. What is the area of the rectangle to the right?

A. $24.59\ ft^2$
B. $245.9\ ft^2$
C. $98.9664\ ft^2$
D. $989.664\ ft^2$

$5.07\ ft$

$19.52\ ft$

11. Complete the statement using <, > or =. Justify your answers.　　8.04×10^{-5} ☐ 9.17×10^{-6}

A. <　　　　B. >　　　　C. =　　　　D. Values cannot be compared

12. Solve the system of equations　　$3x + 2y = 0$　　$-2x - 3y = -15$

A. (3, −7)　　B. (−3, 7)　　C. (6, −9)　　D. (−6, 9)

13. Sharon has some five-dollar bills and some ten-dollar bills. She has 14 bills. The value of the bills is $90. Which system of equations can be used to find the number of f five-dollar bills and t ten-dollar bills?

A.
$f + t = 14$
$f + t = 90$

B.
$f + t = 14$
$5f + 10t = 90$

C.
$f + t = 90$
$5f + 10t = 14$

D.
$5f + 10t = 90$
$5f + 10t = 14$

14. A rectangle has a perimeter of 72 inches. The length is 3 inches more than twice the width. What is the length of the rectangle?

A. 11 inches　　B. 17 inches　　C. 25 inches　　D. 39 inches

15. Darren pays $4.10 for 4 packages of gum and 2 bags of candy. Darla pays $3.85 for 2 packages of gum and 5 bags of candy. Find the cost of a package of gum and a bag of candy.
   A. Gum: $1.15; Candy: $0.45   B. Gum: $1.18; Candy: $0.30
   C. Gum: $0.80; Candy: $0.45   D. Gum: $0.80; Candy: $0.30

16. Simplify completely: $x^5 \cdot x^{-5}$
   A. 0   B. 1   C. x^{-25} D. $2x^{-25}$

17. Simplify completely: $\left(3x^{-2}y\right)^3$
   A. $\dfrac{9y^3}{x^6}$ B. $9x^6y^3$ C. $\dfrac{27y^3}{x^6}$ D. $27x^6y^3$

18. Simplify completely: $\dfrac{12x^6y^7}{3x^2y^{-1}}$
   A. $4x^4y^8$ B. $4x^4y^6$ C. $9x^4y^8$ D. $9x^3y^6$

19. In the year 2000, you bought a car for $15,250. Each year the value of the car depreciates by 15%. What was the estimated value of your car in the year 2005?
   A. $2287.50   B. $3812.50   C. $5751.53   D. $6766.51

20. Which model best represents the exponential growth curve shown in the graph?

   A. $y = 25(1.5)^{-t}$

   B. $y = 25(1.5)^{t}$

   C. $y = 25(0.9)^{-t}$

   D. $y = 25(0.9)^{t}$
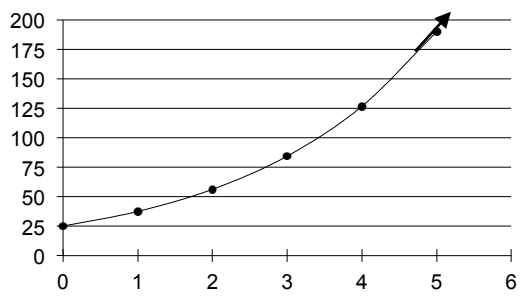
21. The starting salary for a new employee is $25,000. The salary for this employee increases by 8% per year. Find the salary of the employee after 5 years.
   A. $25,000.08   B. $36,733.20
   C. $41,122.75   D. $135,000.00

22. Simplify: $\left(5x^2 - 3x - 10\right) - \left(2x^2 - x + 7\right)$
   A. $3x^2 - 2 - 3$ B. $3x^2 - 2x - 17$
   C. $3x^2 - 4x - 17$ D. $3x^2 - 4x - 3$

23. Multiply and simplify: $(2x-5)^2$

A. $4x^2 - 20x + 25$ B. $4x^2 - 10x + 25$ C. $4x^2 - 25$ D. $4x^2 + 25$

24. Factor the polynomial $6x^3 - 27x^2 - 54x$ completely. Which choice below is one of the factors?

A. $(x+6)$ B. $(2x+3)$ C. $(x-9)$ D. $6x$
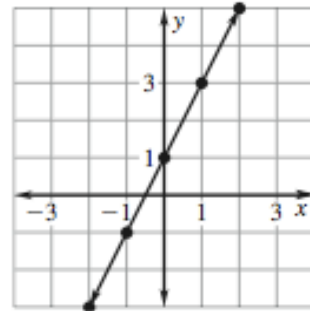
25. Which graph represents the function $f(x) = x^2 - 2$?

A.

B.

C

D.
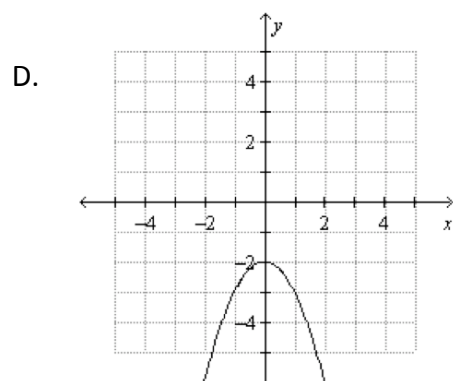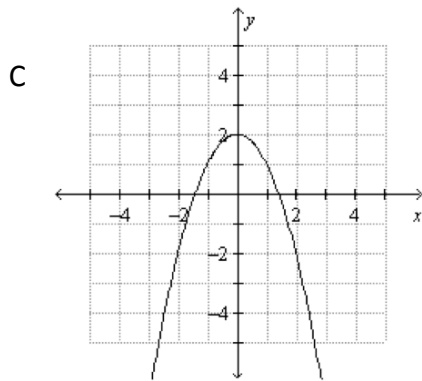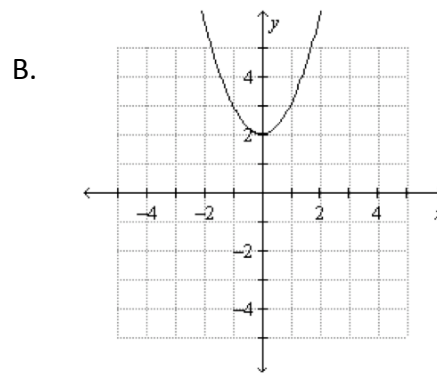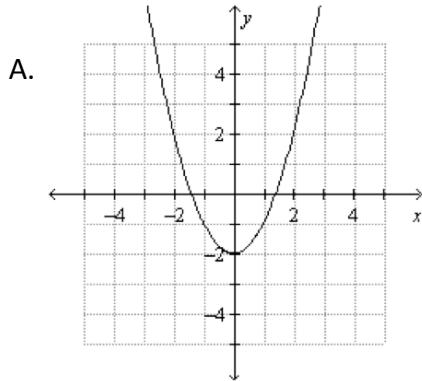
26. Which of the quadratic functions has the <u>widest</u> graph?

A. $f(x) = -3x^2 + 1$ B. $f(x) = -\frac{1}{2}x^2 + 1$ C. $f(x) = x^2 + 1$ D. $f(x) = 4x^2 + 1$

27. Solve the equation: $10x^2 - 7x = 12$

A. $x = -8, 15$ B. $x = 0.8, -1.5$ C. $x = -0.8, 1.5$ D. No Solution

28. Simplify: $3\sqrt{5} - 5\sqrt{2} + 6\sqrt{5}$

A. $4\sqrt{7}$ B. $4\sqrt{5} - 5\sqrt{2}$ C. $9\sqrt{5} - 5\sqrt{2}$ D. $4\sqrt{12}$

29. Which graph represents a linear function?

A.

B.

C.

(0, 3)
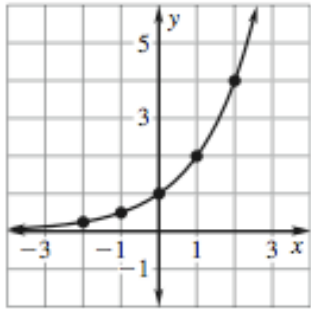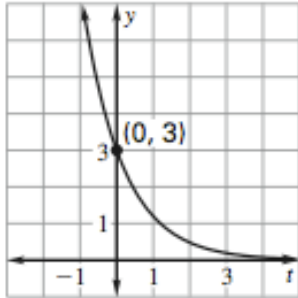
D.
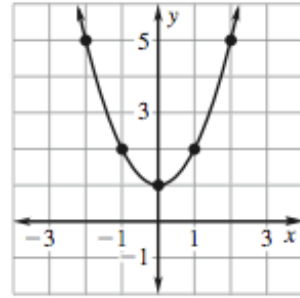
30. Which table represents a quadratic function?

A.

x	y
0	-5
1	-3
2	-1
3	1
4	3

B.

x	y
-1	6
0	3
1	2
2	3
3	6

C.

x	y
2	5
3	8
4	11
5	14
6	17

D.

x	y
-2	0.25
-1	0.5
0	1
1	2
2	4

31. Solve for C: $F = \frac{9}{5}C + 32$

A. $C = \frac{5}{9}F - 32$

B. $C = \left(\frac{5}{9}\right)32 - F$

C. $C = \frac{5}{9}(F - 32)$

D. $C = \frac{9}{5}(F - 32)$

32. A package delivery company has determined that they can meet their schedules if they have 4 drivers for every 30 square miles of area they cover. If they want to offer service to a county of 75 square miles, how many drivers must they have?

A. 9 drivers   B. 10 drivers   C. 15 drivers   D. 18 drivers

33. Solve: $\frac{13 - x}{6} = \frac{4 - x}{8}$

A. -64   B. -40   C. 40   D. 64

34. Solve: $-3x + 2 \geq 7$

    A. $x \leq -\dfrac{5}{3}$ B. $x \geq -\dfrac{5}{3}$ C. $x \leq \dfrac{5}{3}$ D. $x \geq \dfrac{5}{3}$

35. After taxes, you earn $5.50 per hour at your job. You are saving to buy a new cell phone that will cost at least $150. Using *h* as the number of hours worked, which inequality represents this situation?

    A. $h + 5.50 \leq 150$ B. $h + 5.50 \geq 150$ C. $5.50h \leq 150$ D. $5.50h \geq 150$

36. Solve: $|2d + 3| = 17$

    A. $d = 7$ and $d = -7$ B. $d = 7$ and $d = -10$ C. $d = 7$ and $d = 10$ D. $d = 10$ and $d = -10$

37. Choose the graph that does **not** represent a function.

    A.

    B.

    C.

    D.
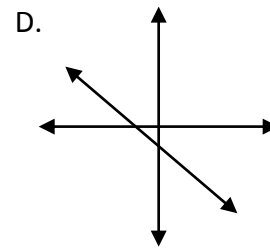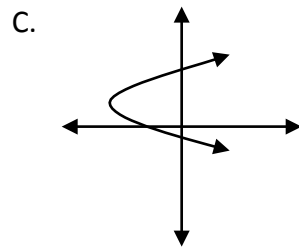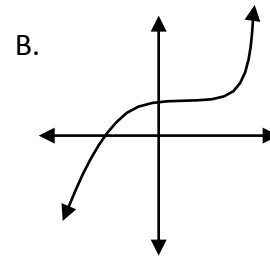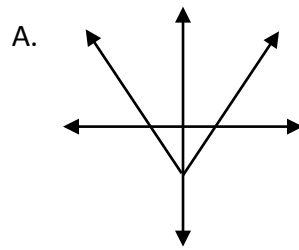
38. Choose the correct graph of the function $f(x) = |x| - 1$.

    A.

    B.

    C.

    D.
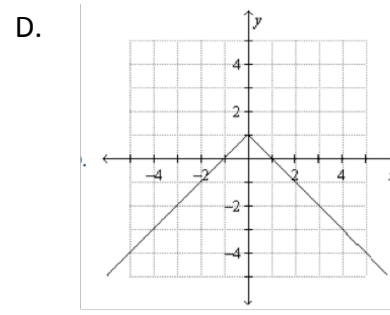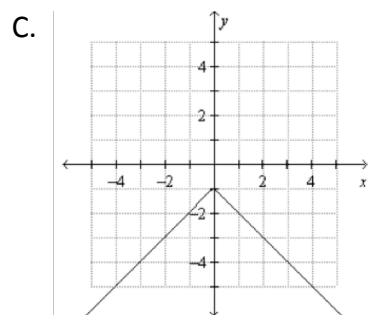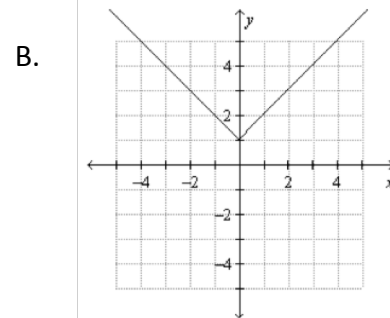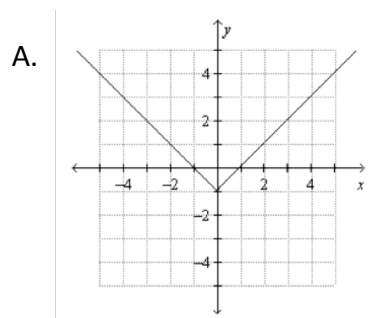
39. Which of the following best describes the slope of the line below?

   A. zero slope   B. positive slope

   C. negative slope   D. undefined slope
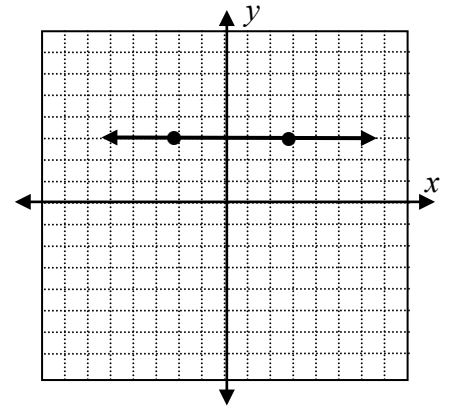
40. In 1990, a movie ticket cost $3.50. In 2000, a movie ticket cost $6.00. Find the average rate of change for the price of a movie ticket in **dollars per year**.
   A. $0.25/year   B. $0.35/year   C. $0.60/year   D. $0.95/year

41. The grocery store sells peppers for $2.25 per pound and sells tomatoes for $1.50 per pound. Choose the correct equation in standard form modeling the weights of peppers p and tomatoes t that a customer could buy with $18.
   A. $2.25t + 1.50p = 18$
   B. $2.25p + 1.50t = 18$
   C. $2.25p = 1.50t + 18$
   D. $2.25 + 1.50 = p$

42. Suppose you spin the pointer of the spinner below 100 times. Out of 100 spins, the arrow lands on the letter "P" 23 times. What is the **experimental** probability of the pointer NOT landing on the letter "P"?
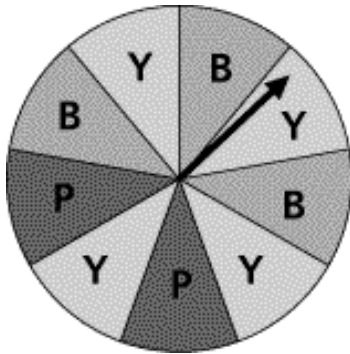
   A. $\dfrac{77}{100}$ B. $\dfrac{23}{100}$

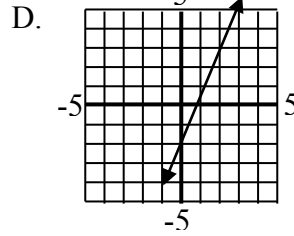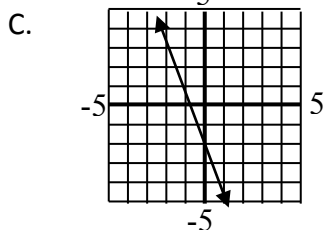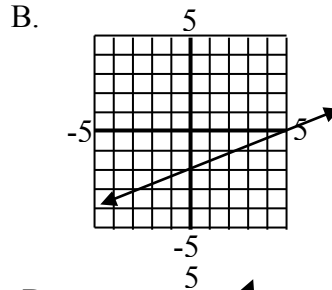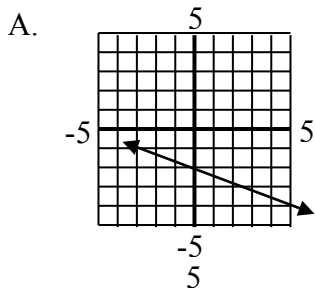   C. $\dfrac{7}{9}$ D. $\dfrac{2}{9}$

43. In a word game, you choose a tile from a bag, **replaced it**, and then chose another. If there are 21 vowels and 15 consonants, what is the probability you will choose a consonant and then a vowel?

   A. $\dfrac{35}{8}$ B. $\dfrac{35}{4}$ C. $\dfrac{35}{144}$ D. $\dfrac{1}{36}$

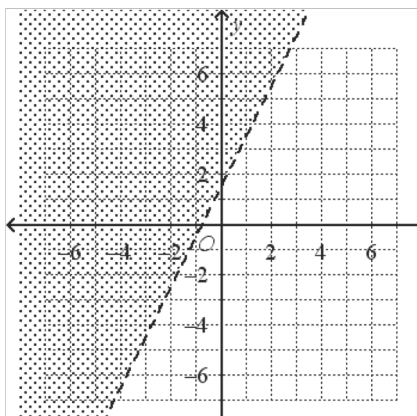44. Given that $f(x) = 4x - 2$ and $g(x) = -2x + 1$. Find $\dfrac{f(5)}{g(-3)}$.

   A. $1\dfrac{5}{9}$ B. $2\dfrac{4}{7}$ C. -2   D. 2

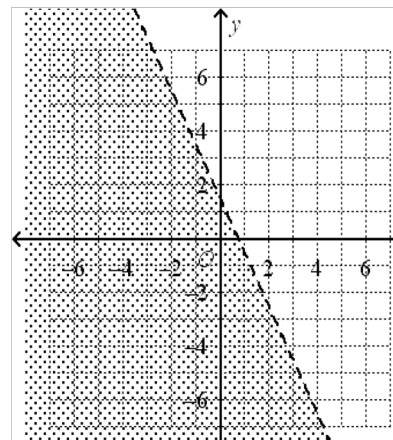45. Which of the following is a graph of $y = \dfrac{5}{2}x - 2$?

A.

B.

C.

D.

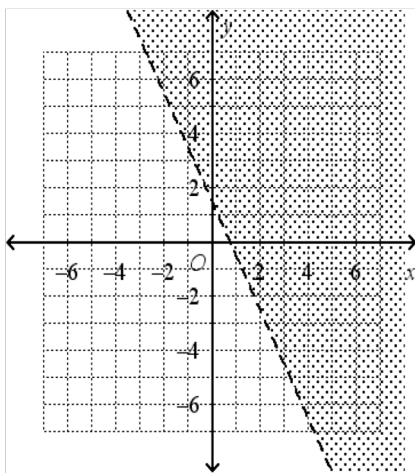46. Choose the correct graph of the inequality: $4x - 2y < -3$
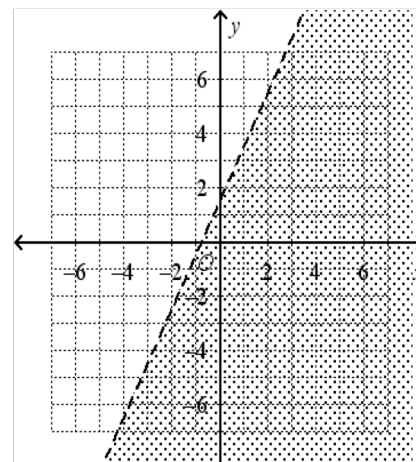
A.

B.

C.

D.

47. You are solving a system of linear equations and get an answer of 0 = -10. Describe the solutions to the system.

A. infinite   B. one   C. imaginary   D. none

48. A group of 52 people attended a ball game. There were three times as many children as adults in the group. Set up a system of equations that represents the numbers of adults (a) and children (c) who attended the game.

A. $\begin{cases} a + c = 52 \\ a = c + 3 \end{cases}$
B. $\begin{cases} a + c = 52 \\ a = 3c \end{cases}$
C. $\begin{cases} a + c = 52 \\ c = a + 3 \end{cases}$
D. $\begin{cases} a + c = 52 \\ c = 3a \end{cases}$

49. Solve the system of equations and then find the value of x + y. $\begin{cases} 3x + 2y = 14 \\ 4x + 10y = 15 \end{cases}$

A. 9.5   B. 4.5   C. 5.5   D. 4.83

50. Write in standard $a + bi$ form: $(6 + 2i) - (-3 + 5i)$

A. $9 - 3i$ B. $9 + 7i$ C. $3 - 3i$ D. $3 + 7i$

51. Write in standard $a + bi$ form: $(2 + 5i)(-1 + 5i)$

A. $23 + 5i$ B. $-27 + 5i$ C. $-2 + 25i$ D. $-2 + 5i$

52. What is the remainder when $x^2 - 5x + 7$ is divided by $x + 1$?

A. 13   B. 1   C. -1   D. -13

53. What is the quotient of $(x^4 - x^2 + 2x - 16) \div (x - 2)$?

A. $x^3 - 2x^2 + 3x - 4\ R\ 24$
B. $x^3 + 2x^2 + 3x + 8$
C. $x^2 + x + 4\ R\ 24$
D. $x^2 - 3x + 8$

54. A polynomial with real coefficients has 3, 2i, and $-i$ as three of its zeros. What is the least possible degree of the polynomial?

A. 3   B. 4   C. 5   D. 6

55. Which number is a root of $f(x) = x^3 + 6x^2 + 9x$ that has a multiplicity 1?

A. -3   B. 0   C. 1   D. 3

56. Does the following quadratic function have a maximum or minimum and what is the value of the maximum or minimum: $f(x) = x^2 - 4x + 11$

A. maximum; 7   B. minimum; 2   C. minimum; 7   D. maximum; 2

57. Solve: $(x-5)^2 = 49$

A. $x = \sqrt{74}$ or $x = -\sqrt{74}$ B. $x = -2$ or $x = 2$

C. $x = -12$ or $x = 2$ D. $x = -2$ or $x = 12$

58. If the graph of $y = x^2$ is shifted 4 units to the right and two units down, what is the equation of the new graph?

A. $y = (4x)^2 - 2$ B. $y = (4x)^2 + 2$ C. $y = (x+4)^2 - 2$ D. $y = (x-4)^2 - 2$

59. Determine the end behavior of the graph:

A.
$\lim\limits_{x\to -\infty} f(x) \Rightarrow -\infty$
$\lim\limits_{x\to +\infty} f(x) \Rightarrow -\infty$
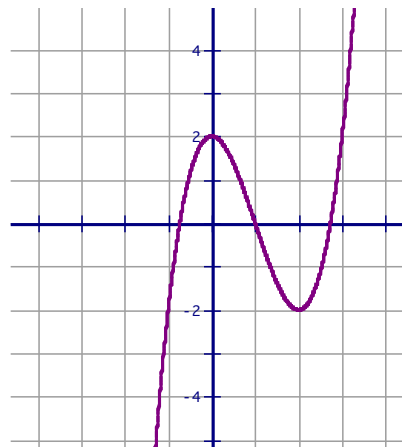
B.
$\lim\limits_{x\to -\infty} f(x) \Rightarrow -\infty$
$\lim\limits_{x\to +\infty} f(x) \Rightarrow +\infty$

C.
$\lim\limits_{x\to -\infty} f(x) \Rightarrow +\infty$
$\lim\limits_{x\to +\infty} f(x) \Rightarrow -\infty$

D.
$\lim\limits_{x\to -\infty} f(x) \Rightarrow +\infty$
$\lim\limits_{x\to +\infty} f(x) \Rightarrow +\infty$

60. Stan the Hot Dog Man sells 100 hot dogs per day for $2 each. His daily revenue is $200. He estimates that for every 25 cents he increases the price of a hot dog, he will sell 5 fewer. What is the maximum revenue that Stan can earn?

A. $235   B. $240   C. $245   D. $250

61. On a bookshelf, there are 5 fiction and 4 nonfiction books. Paul randomly selects one, puts it back, and then randomly selects another. What is the probability that both selections were fictions books?

A. $\dfrac{10}{81}$ B. $\dfrac{20}{81}$ C. $\dfrac{16}{81}$ D. $\dfrac{25}{81}$

62. Determine whether the given event is independent or dependent. Then find the probability. There are 3 peanut butter and 4 vegetable sandwiches in a tray. Dennis chooses 3 of them at random for his siblings. What is the probability that he chooses 2 vegetable sandwiches one after another, and then 1 peanut butter sandwich?

A. dependent; $\dfrac{6}{35}$ B. independent; $\dfrac{3}{7}$ C. dependent; $\dfrac{35}{6}$ D. independent; $\dfrac{2}{7}$

63. Each letter of the alphabet is written on a different piece of paper. These pieces of paper are folded and kept in a bag. One folded paper is drawn at random from this bag. What is the probability of selecting a vowel (a, e, i, o, u) or a letter from the word COMPUTER?

   A. $\dfrac{5}{13}$ B. $\dfrac{1}{2}$ C. $\dfrac{9}{26}$ D. $\dfrac{11}{26}$

64. A spinner is numbered from 1 through 10 with each number equally likely to occur. What is the probability of obtaining a number less than 2 or greater than 7 in a single spin?

   A. $\dfrac{2}{5}$ B. $\dfrac{1}{2}$ C. $\dfrac{5}{2}$ D. $\dfrac{3}{10}$

65. A total of 25 students will be coming to the end-of-year picnic. In how many ways can the teacher select 7 students for the clean-up crew?

   A. 2,422,728,000   B. 303,600   C. 480,700   D. 7

66. A python breeder measures the length of 60 pythons. They have a mean of 26 inches with a standard deviation of 3 inches. If the data is normally distributed, what percent of the pythons are over 32 inches?
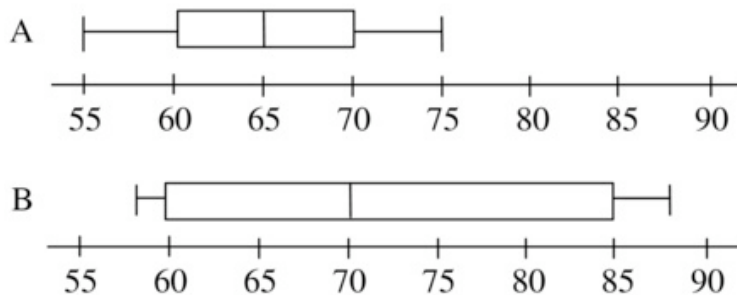
   A. 50%   B. 97.5%   C. 16%   D. 2.5%

67. Determine the type of distribution to the right:

   A. Normally Distributed   B. Negatively Skewed
   C. Positively Skewed   D. Not Skewed
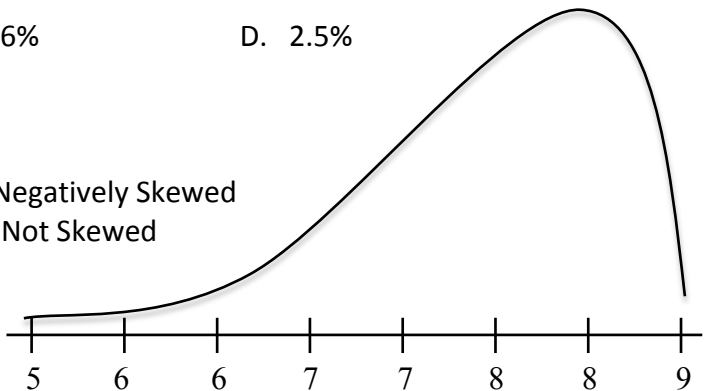
68. What conclusions can you make about the box-and-whisker plots below?


   A. The median for B is greater than the median for A.
   B. There is more variability in B than A.
   C. There is more variability in A than B.
   D. Both a and b.

69. Write $(8a^{-6})^{-\frac{2}{3}}$

A. $\dfrac{a^4}{4}$ B. $\dfrac{1}{4a^4}$ C. $4a^4$ D. None of these

70. Simplify completely. $\dfrac{\sqrt{90x^{18}}}{\sqrt{2x}}$

A. $5x\sqrt{3x^8}$ B. $\sqrt{18x^{17}}$ C. $3x^8\sqrt{5x}$ D. $\dfrac{3x^9}{\sqrt{x}}$

71. Solve for x. $-2+\sqrt{3x+4}=8$

A. x = 32   B. x = -32   C. $x = \dfrac{32}{3}$ D. $-\dfrac{104}{3}$

72. Solve for y. $5(y+1)^{\frac{1}{3}}+7=22$

A. y = 0   B. y = 2   C. y = 26   D. y = -28

73. If $f(x)=x^2+3x-5$ and $g(x)=3x+1$, find $f(g(x))$

A. 9x² + 15x - 1   B. $9x^2+12x-1$ C. $3x^2+9x-14$ D. $3x^3+10x^2-12x-5$

74. Find the inverse of $f(x)=\sqrt[3]{x-4}+1$

A. $f^{-1}(x)=(x+4)^3-1$ B. $f^{-1}(x)=\sqrt[3]{x-1}+4$
C. $f^{-1}(x)=\sqrt[3]{x+1}-4$ D. $f^{-1}(x)=(x-1)^3+4$

75. Choose the function that represents exponential decay.

A. $y=\dfrac{1}{100}(6)^x$ B. $y=4x^{\frac{1}{2}}$ C. $y=12\left(\dfrac{1}{8}\right)^x$ D. $y=2\left(\dfrac{4}{3}\right)^x$

76. Solve $4+3e^{5x}=27$

A. 0.4074   B. 2.0369   C. 0.4394   D. 0.1769

77. Jan deposits $2000 in an account that pays 5% annual interest compounded **continuously**. What is the balance after 3 years?

A. $8963.38   B. $2323.67   C. $6750.00   D. $2315.25

78.   Choose the graph of the function. $y = \sqrt{x} + 3$

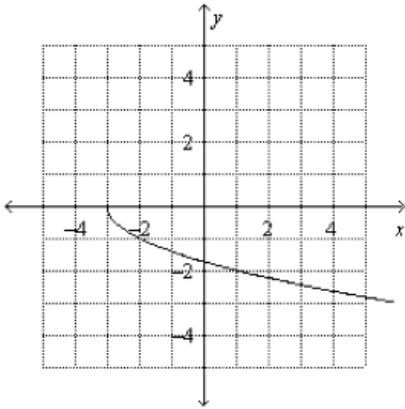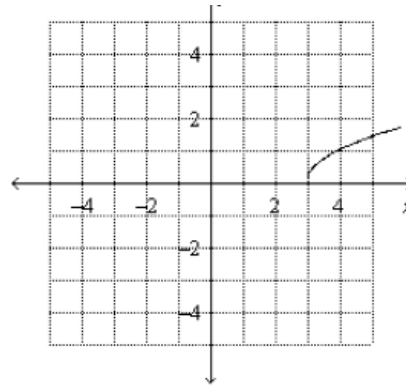A.
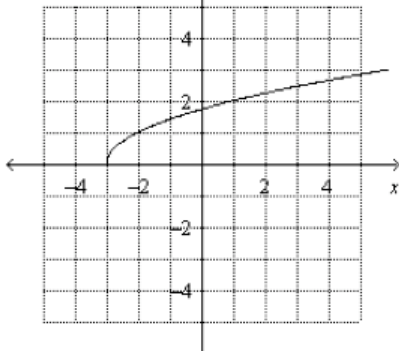
B.
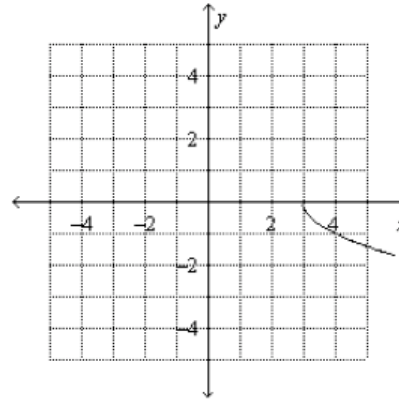
C.

D.

79.   Ray Industries bought a touch screen monitor for $1200.   It is expected to depreciate at a rate of 25%
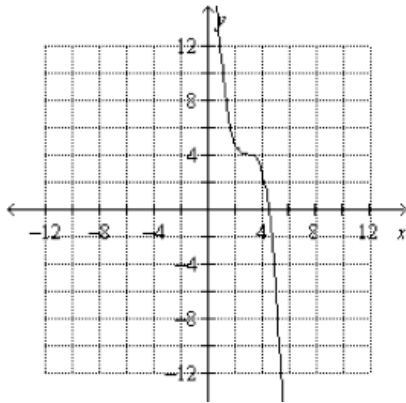   per year. What will the value be in 3 years?
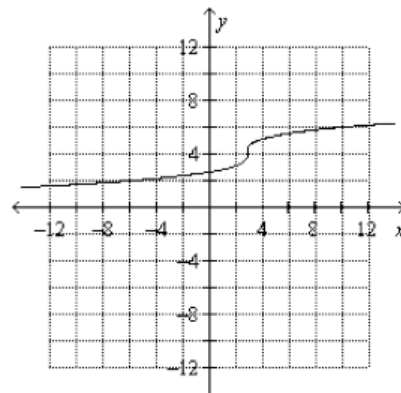   A. $142   B. $900   C. $506   D. $2340

80.   Choose the graph of the function. $y = -\sqrt[3]{x - 3} + 4$

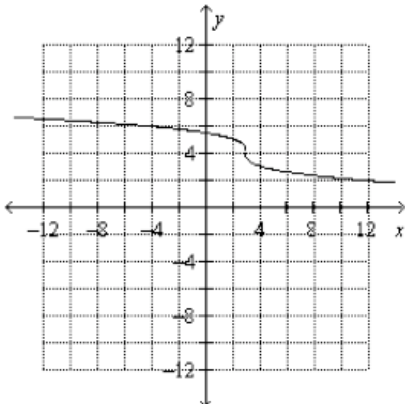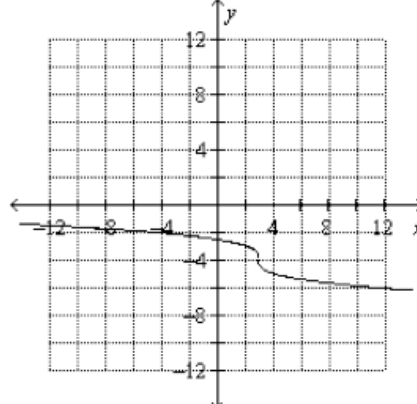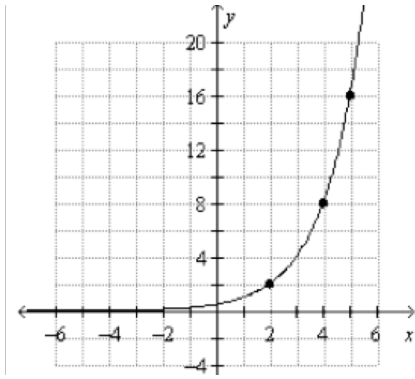A.

B.

C.

D.

81. Which exponential function is modeled by the graph?

A. $y = 0.5(2)^x$ B. $y = 2(0.5)^x$
C. $y = (2 \cdot 0.5)^x$ D. $y = 2(5)^x$

82. Solve $\log_3(5x+1) = \log_3(3x+7)$
A. x = 3   B. x = 6   C. x = 4   D. x = 27

83. Evaluate the four decimal places: $\log_5 9$
A. 0.4120   B. 1.3652   C. 0.7325   D. 2.4270

84. A landscaper is designing a wall made of white bricks. The pattern consists of 130 bricks in the bottom row, 110 bricks in the second row, and 90 bricks on the third row. How many bricks will the 6th row have?
A. 10   B. 23   C. 30   D. 80