1. Simplify: $\sqrt{-4}\cdot\sqrt{-25}$ [A] -10 [B] -10i [C] 10 [D] 10i

2. Simplify: $\sqrt{-5}\cdot\sqrt{-75}$ [A] $-5i\sqrt{15}$ [B] $5i\sqrt{15}$ [C] $-5\sqrt{15}$ [D] $5\sqrt{15}$

3. Solve: $8 = x\sqrt{3} + 2$ [A] $2\sqrt{3}$ [B] $\frac{\sqrt{3}}{3}$ [C] $6\sqrt{3}$ [D] $\frac{4\sqrt{3}}{3}$

4. Solve: $x = x\sqrt{2} + 3$ [A] $3+3\sqrt{2}$ [B] $-3+3\sqrt{2}$ [C] $-3-3\sqrt{2}$ [D] $3-3\sqrt{2}$

5. Solve: $\sqrt{2x+5} - 1 = x$ [A] No Solutions [B] $x = -2$ [C] $x = 2$ [D] $x = \pm 2$

6. Solve: $\sqrt{7-a} - 3 = 3a$

   [A] $a = -\frac{1}{9}$ *or* $a = -2$ [B] $a = -\frac{1}{9}$ [C] No Solutions [D] $a = -2$

7. Simplify: $(3+4i)(-2+3i)$ [A] $-6+i+12i^2$ [B] $6+i$ [C] $-18+i$ [D] 6

8. Simplify: $\left(-1+i\sqrt{3}\right)^2$

[A] $-2-2i\sqrt{3}$ [B] $2+2i\sqrt{3}$ [C] $-2+2i\sqrt{3}$ [D] $2-2i\sqrt{3}$

9. $\dfrac{5}{3+4i}$ in $a+bi$ form is

[A] $-\dfrac{15}{7}+\dfrac{2}{7}i$ [B] $\dfrac{3}{5}-\dfrac{4}{5}i$ [C] $\dfrac{3}{5}+\dfrac{4}{5}i$ [D] $-\dfrac{15}{7}-\dfrac{2}{7}i$

10. $\dfrac{15}{2-i}$ in $a+bi$ form is [A] $10-5i$ [B] $6-3i$ [C] $10+5i$ [D] $6+3i$

11. If $g\left(x\right)=\dfrac{x^2}{x-1}$, find $g\left(1+\sqrt{2}\right)$

[A] $\dfrac{3\sqrt{2}-4}{2}$ [B] $3\sqrt{2}+4$ [C] $3\sqrt{2}-4$ [D] $\dfrac{3\sqrt{2}+4}{2}$

12. If $f\left(x\right)=\dfrac{x-1}{x+1}$, find $f\left(1+i\sqrt{3}\right)$

[A] $\dfrac{3}{7}+\dfrac{2\sqrt{3}}{7}i$ [B] $2i\sqrt{3}+3$ [C] $2i\sqrt{3}-3$ [D] $\dfrac{3}{7}-\dfrac{2\sqrt{3}}{7}i$

13. Solve using the quadratic formula. $3x^2 + 5x = -1$

[A] $\frac{-5+i\sqrt{13}}{6}$ and $\frac{-5-i\sqrt{13}}{6}$

[B] $\frac{-5+\sqrt{11}}{6}$ and $\frac{-5-\sqrt{11}}{6}$

[C] $\frac{-5+\sqrt{13}}{6}$ and $\frac{-5-\sqrt{13}}{6}$

[D] $\frac{-3+i\sqrt{11}}{6}$ and $\frac{-3-i\sqrt{11}}{6}$

14. A car travels 300 km at a certain speed. If the speed had been increased by 10 km/h, the trip could have been made in 1 hour less time. Find the actual speed.

[A] 47 km/h [B] 49 km/h [C] 50 km/h [D] 48 km/h

15. Approximate the solutions to $2x^2 - 7x - 3 = 0$. Round to the nearest hundredth.

[A] 3.89 and -0.39 [B] 3.90 and 0.39 [C] 3.90 and -0.39 [D] -3.89 and 0.39

16. Find the vertex of $y = 1.3x^2 - 14.56x - 2$.

[A] (5.60, -42.768) [B] (5.76, -42.786) [C] (5.11, -42.451) [D] (5.96, -42.602)

17. Find the real value of k so that $3x^2 + x - k = 0$ will have two different real roots.

[A] $k > -\frac{1}{12}$ [B] $k > -12$ [C] $k = \frac{1}{12}$ [D] $k < \frac{1}{12}$

Determine the nature of the solution of the equation.

18. $x^2 + 5x - 24 = 0$

[A] There is one real number solution and it is positive.

[B] There are two solutions and they are real numbers.

[C] There are two complex solutions that are conjugates of each other.

[D] none of these

19. If the vertex of a parabola is at (-4, 0), then the discriminant is

[A] negative [B] zero

[C] positive [D] cannot be determined from the information given

20. if $y = a(x+3)^2 - 2$, and $a < 0$, then the discriminant is

[A] zero [B] negative

[C] positive [D] cannot be determined from the information given

21. if the discriminant of a quadratic function, with integral coefficients, is a perfect square, then its zeros are

[A] real and irrational [B] real and rational

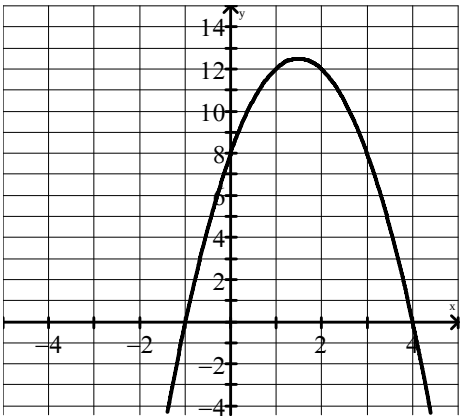
[C] non real [D] cannot be determined from the information given

22. if the discriminant of a quadratic function, with integral coefficients, is a perfect square, then the function

[A] cannot be factored [B] can be factored

[C] cannot be determined from the information given

23. Which of the following statements is true about the equation $y = ax^2 + bx + c$, whose graph is shown below?



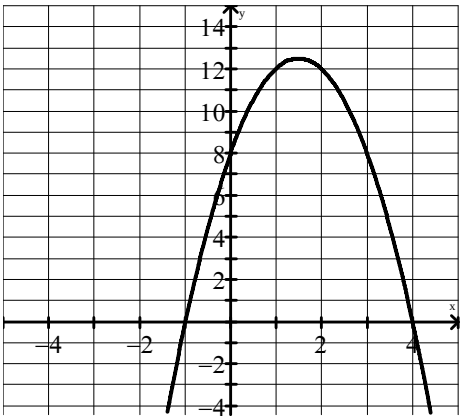
[A] *a is positive and c is negative*

[B] *a is negative and c is negative*

[C] *a is positive and c is positive*

[D] *a is negative and c is positive*

24. Find the equation of parabola.



[A] $y = 2(x+4)(x-1)$

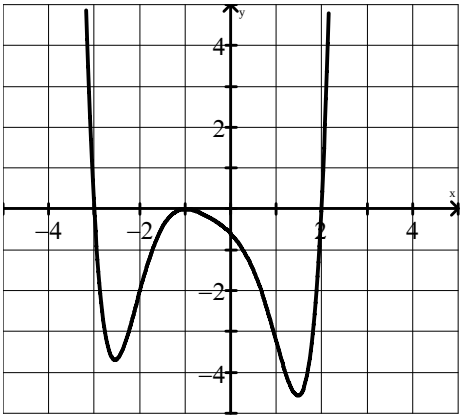
[B] $y = 2(x-4)(x+1)$

[C] $y = -2(x+4)(x-1)$

[D] $y = -2(x-4)(x+1)$

25. The graph is a sixth degree polynomial. Its equation is

$y = \frac{1}{10}(x+3)(x^2+1)(x-2)(x+1)^2$.



[A] The function has 3 non-real zeros. [B] The function has 2 non-real zeros.

[C] The function has no non-real zeros.

[D] We cannot determine with the information given

26. Suppose that $P(x)$ is a polynomial with degree 5. It has real roots only at $x = 2$, $x = 3$, and $x = -1$, which is a triple root. Furthermore, $P(0) = -4$. Which of the following statements are true about $P(x)$?

I If I divide $P(x)$ by $x-2$, I get a remainder of 0.
II $P(x)$ has no non-real roots.
II $as\ x \to \infty,\ P(x) \to \infty$

[A] I and II only [B] I, II, and III [C] I and III only [D] I only

27. Solve for x: $\left(\frac{x+1}{2}\right)^2 + 5\left(\frac{x+1}{2}\right) = -6$

[A] $x = -7$ *or* $x = -5$ [B] $x = 7$ *or* $x = -5$

[C] $x = -7$ *or* $x = 5$ [D] $x = 7$ *or* $x = 5$

Solve.

28. $x^{\frac{1}{2}} - 8x^{\frac{1}{4}} + 15 = 0$

[A] x = 81 and 529 [B] x = 81 and 625 [C] x = 64 and 625 [D] x = 2 and 3

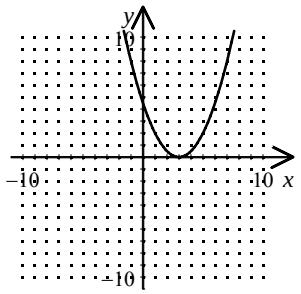
29. $x - 2\sqrt{x} - 3 = 0$ [A] x = 9 [B] $x = -1$ [C] x = 1 [D] $x = -3$

30. $\sqrt{2x+5} = 2\sqrt{2x} + 1$

[A] $x = \frac{2}{9}$ or $x = 2$ [B] No Solution [C] $x = \frac{2}{3}$ [D] $x = \frac{2}{9}$

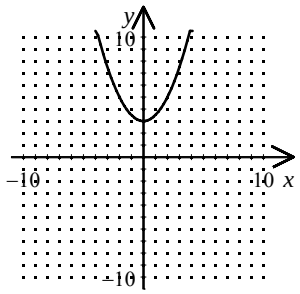
31. Graph the function, find the vertex, and find the line of symmetry. $f(x) = \frac{1}{2}(x-3)^2$

[A]



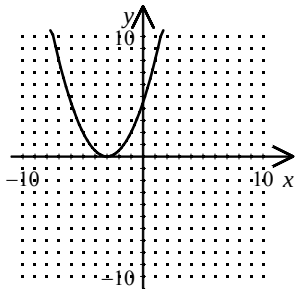
vertex: $(3,0)$;
line of symmetry: $x = 3$

[B]



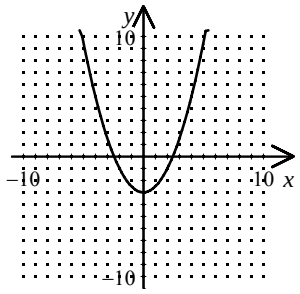
vertex: $(0,3)$;
line of symmetry: y-axis

[C]



vertex: $(-3,0)$;
line of symmetry: $x = -3$

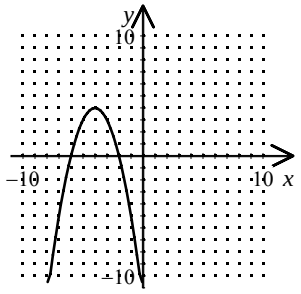
[D]



vertex: $(0,-3)$;
line of symmetry: y-axis

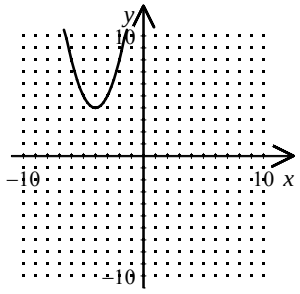
32. Graph the following function, then find its vertex, line of symmetry, and minimum or maximum value. $f(x) = -(x-4)^2 + 4$

[A]



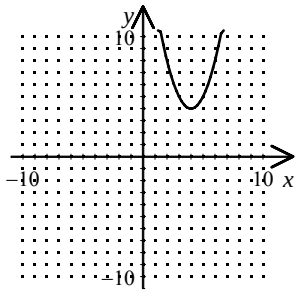
vertex: $(-4,4)$;
line of symmetry: $x = -4$;
maximum value: 4

[B]



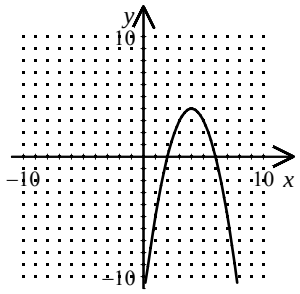
vertex: $(-4,4)$;
line of symmetry: $x = -4$;
minimum value: 4

[C]



vertex: $(4,4)$;
line of symmetry: $x = 4$;
minimum value: 4

[D]



vertex: $(4,4)$;
line of symmetry: $x = 4$;
maximum value: 4

33. For the function, find standard form, the vertex, the line of symmetry, and the maximum or minimum value. $f(x) = x^2 + 2x + 3$

[A] $f(x) = (x+1)^2 + 2$; Vertex: $(1, 2)$; Line: $x = 1$; Minimum Value: 2

[B] $f(x) = (x+1)^2 + 2$; Vertex: $(1, 2)$; Line: $x = 1$; Maximum Value: 2

[C] $f(x) = (x+1)^2 + 2$; Vertex: $(-1, 2)$; Line: $x = -1$; Minimum Value: 2

[D] $f(x) = (x+1)^2 + 2$; Vertex: $(-1, 2)$; Line: $x = -1$; Maximum Value: 2

34. Dalco Manufacturing estimates that its weekly profit, *P*, in hundreds of dollars, can be approximated by the formula $P = -3x^2 + 6x + 3$, where *x* is the number of units produced per week, in thousands.
a) How many units should the company produce per week to earn the maximum profit?
b) Find the maximum weekly profit.

[A] a) 100 units
b) \$200

[B] a) 1000 units
b) \$600

[C] a) 1 units
b) \$500

[D] a) 10 units
b) \$0

35. A farmer has 2200 feet of fencing available and wishes to enclose a rectangular area. If *x* represents the width of the rectangle, for what value of *x* is the area largest?

[A] 549 feet [B] 548.5 feet [C] 548 feet [D] none of these

36. A farmer wants to build a rectangular fence near a river, and he will use 120 ft of fencing. The side next to the river will not be fenced. What is the area of the largest region that can be enclosed?

[A] 1000 ft^2 [B] 1800 ft^2 [C] 1500 ft^2 [D] 900 ft^2

Solve.

37. $\frac{x}{x+3} - \frac{1}{4} = -\frac{3}{x+3}$ [A] 0 [B] no solution [C] –3 [D] 3

38. $\frac{8}{x} + \frac{12}{x-6} = 1$ [A] $x = 24$ or 2 [B] $x = 3$ [C] $x = 2$ [D] $x = 25$ or 3

Divide to determine which of the following polynomials is a factor of the polynomial $P(x)$.

39. $2x^3 + 9x^2 + 7x - 6$ [A] $x-2$ [B] $x+3$ [C] $x-1$ [D] $x-3$

40. $x^7 + 128$ [A] $x+2$ [B] $x-3$ [C] $x-5$ [D] $x+1$

41. If $3x^3 - 9x^2 + kx - 12$ is divsible by $x-3$, k is

[A] -12 [B] 4 [C] -4 [D] 12 [E] can not be deterimned

42. Divide $\dfrac{4x^5+4x^2-2x-2}{2x^2+1}$ and find the remainder.

[A] $x+4$ [B] $-x-4$ [C] $x-4$ [D] -4

Use synthetic division to find the function value.

43. $P(4)$ if $P(x)=x^4-14x^3+68x^2-130x+75$

[A] 4 [B] 5 [C] 2 [D] none of these

44. $P(-2)$ if $P(x)=x^4-2x^3-28x^2-46x-21$

[A] –11 [B] –8 [C] –9 [D] –10

45. Determine whether the expression of type $x-r$ is a factor of the polynomial.
$x+4;\ P(x)=2x^3-12x^2+18x-8$

46. Suppose a polynomial of degree 4 with real coefficients has the given roots. Find all roots of the polynomial.
$-4,\ -2,\ 12+3i$

[A] $4,\ 2,\ 12-3i$ [B] $-4,\ -2,\ 12+3i,\ 12-3i$

[C] $12+3i,\ 12-3i$ [D] $-4,\ -2,\ 12+3i,\ -12+3i$

47. Find a third-degree polynomial function with real coefficients and with roots 2 and 3 + *i*.

[A] $P(x) = x^3 - 8x^2 + 22x - 20$ [B] $P(x) = x^3 - 8x^2 - 2x - 20$

[C] $P(x) = x^3 - 4x^2 - 2x + 20$ [D] $P(x) = x^3 + 8x^2 + 22x + 20$

48. Find a polynomial of lowest degree with real coefficients that has $-4i$ and -1 as roots.

[A] $P(x) = x^3 + x^2 - 16x - 16$ [B] $P(x) = x^3 - x^2 - 16x - 16$

[C] $P(x) = x^3 + x^2 + 16x + 16$ [D] $P(x) = x^3 - x^2 + 16x - 16$

49. Find the rational roots, if they exist, of the polynomial. Find the other roots, if possible.
$P(x) = x^4 + 3x^3 - 7x^2 - 9x + 12$

[A] $4, -1, \pm\sqrt{3}$ [B] $-4, -3, -2, 6$ [C] $-4, 1, \pm\sqrt{3}$ [D] $-1, -4, \pm\sqrt{12}$

50. Find only the rational roots. $P(x) = x^4 - 6x^3 + 6x^2 + 12x - 16$

[A] 2, 4 [B] 2, –4 [C] –2, 4 [D] –2, –4

51. Use Descartes' rule of signs to find the number of positive real roots of the polynomial.
$P(x) = x^6 - x^5 - 3x^4 + 5x^3 + 5x^2 - 2x - 1$

[A] 3 or 1 positive real roots
[B] 4, 2, or no positive real roots
[C] 5, 3, or 1 positive real roots
[D] 6, 4, 2, or no positive real roots

52. Let $P(x) = x^4 - 5x^3 + 13x^2 - 45x + 36$. Find all roots of $P(x)$, given that $3i$ is a root.

[A] $3i,\ -3,\ 4,\ 1$ [B] $3i,\ -3i,\ -4,\ 1$ [C] $3i,\ -3i,\ 4,\ 1$ [D] $3,\ -3,\ -4,\ 1$

Find the equation for $f^{-1}(x)$ for the following.

53. $f(x) = 5x + 7$

[A] $f^{-1}(x) = \frac{x-7}{5}$ [B] $f^{-1}(x) = \frac{x+7}{5}$ [C] $f^{-1}(x) = \frac{1}{5x+7}$ [D] $f^{-1}(x) = \frac{x}{5} - 7$

54. $f(x) = \sqrt{x+1}$

[A] $f^{-1}(x) = x^2 - 1;\ x \geq 0$
[B] $f^{-1}(x) = x^2 + 1$
[C] $f^{-1}(x) = x^2 - 1$
[D] $f^{-1}(x) = \sqrt{-x-1}$

55. $f(x) = \sqrt{x+5}$. Find $f^{-1}(f(11))$ and $f(f^{-1}(5))$.

[A] $f^{-1}(f(11)) = 4;\ f(f^{-1}(5)) = 20$
[B] $f^{-1}(f(11)) = 11;\ f(f^{-1}(5)) = 5$
[C] $f^{-1}(f(11)) = 116;\ f(f^{-1}(5)) = 20$
[D] $f^{-1}(f(11)) = 116;\ f(f^{-1}(5)) = \sqrt{10}$

56. If $f(x) = 3x - 2$ and $g(x) = e^x$, find $(g \circ f)(x)$

[A] $e^{(3x-2)}$ [B] $\frac{1}{e^{(3x-2)}}$ [C] $e^x(3x-2)$ [D] $3e^x - 2$

57. Convert to a logarithmic equation. $3^{-3} = \frac{1}{27}$

[A] $\log_{27} \frac{1}{3} = -3$ [B] $\log_3 \frac{1}{27} = -3$ [C] $\log_3 \frac{1}{3} = 27$ [D] $\log_{-3} \frac{1}{27} = 3$

Convert to an exponential equation.

58. $\log_2 \frac{1}{16} = -4$ [A] $2^{-4} = \frac{1}{16}$ [B] $-4^2 = 16$ [C] $2^4 = 16$ [D] $2^{-2} = \frac{1}{4}$

59. $\log_2 8 = g$ [A] $g = 8^2$ [B] $8^g = 2$ [C] $g^2 = 8$ [D] $2^g = 8$

Solve.

60. $2^x = \frac{1}{8}$ [A] -3 [B] $-\frac{1}{3}$ [C] $\frac{1}{3}$ [D] 3

Solve.

61. $\log_x 27 = 3$ [A] $x = \frac{3}{27}$ [B] $x = 9$ [C] $x = 4$ [D] $x = 3$

62. $\log_x 3 = \frac{1}{3}$ [A] $x = \frac{1}{27}$ [B] $x = 27$ [C] $x = \frac{1}{9}$ [D] $x = 9$

63. $\log_5 x = -1$ [A] $x = -\frac{1}{5}$ [B] $x = \frac{1}{5}$ [C] $x = -5$ [D] $x = 5$

64. $\log_x 3 = \frac{1}{4}$ [A] $x = 27$ [B] $x = 81$ [C] $x = 6$ [D] $x = 9$

Simplify.

65. $\log_7 7^3$ [A] 0 [B] 3 [C] 1 [D] 7

66. $\log_9 9^t$ [A] 9^t [B] 9 [C] t^9 [D] t

67. Simplify: $\log_4 4 + \log_4 64 - \log_4 256$ [A] –3 [B] –2 [C] 1 [D] 0

68. Express $\log_b \sqrt[3]{7}$ as a product.

[A] $\frac{1}{7}\log_b 3$ [B] $7\log_b 3$ [C] $\frac{1}{3}\log_b 7$ [D] $3\log_b 7$

69. Express as a difference of logarithms. $\log_c \frac{5}{8}$

[A] $\log_c 5 - \log_c 8$ [B] $\log_8 c - \log_5 c$ [C] $\log_5 c - \log_8 c$ [D] $\log_c 8 - \log_c 5$

Express as a single logarithm.

70. $\log_n 11 - \log_n 4$ [A] $\log_n \frac{11}{4}$ [B] $\log_n 15$ [C] $\log_n 7$ [D] $\log_n \frac{4}{11}$

71. $5\log_b x + 9\log_b y$

[A] $\log_b (45xy)$ [B] $\log_b (x^5 y^9)$ [C] $\log_b \left(\frac{x^5}{y^9}\right)$ [D] $\log_b \left(\frac{5x}{9y}\right)$

Express as a single logarithm.

72. $\log_b 4x + 4(\log_b x - \log_b y)$

[A] $\log_b \frac{16x^2}{y}$ [B] $\log_b \frac{8x}{4y}$ [C] $\log_b \frac{4x^5}{y^4}$ [D] none of these

73. Find the domain of the equation: $\log_3 x + \log_3 (x-6) = 3$

[A] $0 < x < 6$ [B] $x < 6$ [C] $x > 0$ [D] $x > 6$

74. Solve: $\log_3 x + \log_3 (x-6) = 3$

[A] $x = -3$ or $x = 9$ [B] $x = -3$ [C] $x = 9$ [D] $x = 0$

75. Use a calculator to find the logarithm. Round the answer to the thousandths place value.
log 3.5

[A] 0.544 [B] 0.061 [C] 1.871 [D] 1.253

Solve.

76. $\log_3 (x-8) = -3$ [A] $\frac{217}{27}$ [B] $-\frac{215}{27}$ [C] -19 [D] 243

Solve.

77. $\log_8(2x+3) = 2$ [A] $\frac{13}{2}$ [B] $\frac{67}{2}$ [C] $\frac{61}{2}$ [D] none of these

78. Solve for x: $5^{x-1} = \sqrt{125}$ [A] $x = \frac{2}{3}$ [B] $x = \frac{3}{2}$ [C] $x = -\frac{5}{2}$ [D] $x = \frac{5}{2}$

79. Solve for x: $27^{2x-1} = 3\sqrt{3}$

[A] $x = \frac{4}{3}$ [B] $x = \frac{3}{4}$ [C] $x = -\frac{4}{3}$ [D] $x = -\frac{3}{4}$

80. Solve for x: $9x^{-\frac{2}{3}} = 4$ [A] $x = \frac{27}{8}$ [B] $x = \frac{9}{8}$ [C] $x = \frac{8}{27}$ [D] $x = \frac{1}{72}$

81. $\left(x^2+4\right)^{\frac{2}{3}} = 25$ [A] $x = \frac{5}{2}$ [B] $x = \pm 11$ [C] $x = 11$ [D] $x = \pm\frac{5}{2}$

82. Solve for x: $\log_b x = 2\log_b 3 + \log_b 5$

[A] $x = 45$ [B] $x = 11$ [C] $x = 14$ [D] $x = 30$

83. $\log(3x+5) - \log(x-5) = \log 8$ [A] $x = 9$ [B] $x = \frac{45}{11}$ [C] $x = 8$ [D] $x = \frac{40}{11}$

84. Solve for x: $2e^{-2x} = 0.4$

[A] $x = \frac{1}{2}\ln 5$ [B] $x = \frac{\ln 0.2}{2}$ [C] $x = \ln 2.5$ [D] $x = \ln 10$

85. Use the change-of-base formula to find the value of $\log_6 8$.

[A] 1.160 [B] 0.862 [C] 0.861 [D] 1.161

86. What is the domain of the equation: $\log_2\left(x^2 + 5x - 6\right) - \log_2\left(x + 6\right) = -2$

[A] $-6 < x < 1$ [B] $x > -6$ [C] $x > 1$ [D] $x < -6$

87. Solve: $\log_2\left(x^2+5x-6\right)-\log_2\left(x+6\right)=-2$

[A] $x=\frac{5}{4}$ [B] No solution [C] $x=\frac{5}{4}$ *or* $x=-6$ [D] $x=-6$

88. Solve: $3e^{2x}-7e^{x}+4=0$

[A] $x=\ln\left(\frac{4}{3}\right)$ or $x=0$ [B] $x=e^{\frac{4}{3}}$ or $x=e$

[C] $x=\frac{4}{3}$ or $x=1$ [D] $x=\ln\left(\frac{3}{4}\right)$ or $x=\ln 1$

89. The half-life of carbon-14 is 5700 years. Find the age of a sample of which 32% of the original radioactive nuclei have decayed.

[A] 3171 years [B] 4171 years [C] 3721 years [D] 3271 years

90. You invest $2000 in a bank offering 8.5% interest compounded quarterly. Find the value of your investment after a total of five years' growth.

[A] $43339.97 [B] $3045.59 [C] $3054.59 [D] $3007.31

91. A certain bacteria population doubles in size every 12 hours. By how much will it grow in 2 days?

[A] the population grows by a factor of 4 in 2 days.

[B] the population grows by a factor of 32 in 2 days.

[C] the population grows by a factor of 8 in 2 days.

[D] the population grows by a factor of 16 in 2 days.

92. Given $t_n = n(5n-2)$, find the first four terms.

[A] 3, 16, 39, 72 [B] 5, 18, 43, 78 [C] 5, 1, –1, –3 [D] 3, 16, 37, 68

93. Given $a_n = \frac{n(n+3)}{3}$, find the first five terms.

[A] $\frac{14}{3}, 4, 10, 18, 28$ [B] $\frac{4}{3}, \frac{10}{3}, 6, \frac{28}{3}, \frac{40}{3}$

[C] $1, \frac{4}{3}, \frac{10}{3}, 6, \frac{28}{3}$ [D] $\frac{4}{3}, \frac{5}{2}, \frac{18}{5}, \frac{14}{3}, 4$

Find a general term for the sequence.

94. 9, 3, –3, –9, –15

[A] $a_n = 9n - 6$ [B] $a_n = 15 - 6n$ [C] $a_n = 14 - 7n$ [D] $a_n = 9 - 6n$

Find a general term for the sequence.

95. 9, 16, 25, 36, 49, 64, . . .

[A] $a_n = (n+2)^2$ [B] $a_n = 3n^2$ [C] $a_n = n+7$ [D] $a_n = (n+3)^{n+1}$

96. Evaluate. $\sum_{i=1}^{16} \frac{i+1}{256}$ [A] $\frac{19}{31}$ [B] $\frac{15}{16}$ [C] $\frac{9}{16}$ [D] none of these

97. Write sigma notation for the sum. $-14-6+2+10+18$

[A] $\sum_{j=0}^{4} -14(8)^j$ [B] $\sum_{j=1}^{4} 8j-14$ [C] $\sum_{j=0}^{4} -14+8(j+1)$ [D] $\sum_{j=0}^{4} 8j-14$

98. Find the 11th term of the sequence 12, 17, 22, 27, . . .

[A] 67 [B] 55 [C] 62 [D] 72

99. Find the 9th term of the sequence 10, 17, 24, 31, . . .

[A] 73 [B] 80 [C] 66 [D] 63

100. The 17th term of an arithmetic sequence is 97 and the 26th term is 151. Find a_1 and d. Construct the sequence.

[A] $a_1 = 1,\ d = 6.$ The sequence is 1, 7, 13, 19, 25, . . .

[B] $a_1 = 2,\ d = \frac{1}{6}.$ The sequence is 2, 8, 14, 20, 26, . . .

[C] $a_1 = -56,\ d = 9.$ The sequence is $-56,\ -47,\ -38,\ -29,\ -20,\ \ldots$

[D] $a_1 = \frac{1}{2},\ d = 3.$ The sequence is 89, 89.5, 90, 90.5, 91, . . .

101. Insert three arithmetic means between 2 and 30.

[A] 12, 18, 24 [B] 9, 11, 13 [C] 7, 14, 21 [D] 9, 16, 23

102. Find the sum of the first 12 terms of the arithmetic series $6 + 17 + 28 + 39 + 50 + \cdots$

[A] 792 [B] 789 [C] 798 [D] 787

103. Find the sum of the series $\sum_{n=1}^{12}(4n-5)$. [A] 276 [B] 252 [C] -44 [D] 216

104. Find the 6th term of the geometric sequence $-\frac{1}{4}, -\frac{3}{8}, -\frac{9}{16}, \ldots$

[A] $-\frac{729}{512}$ [B] $-\frac{243}{128}$ [C] $-\frac{37}{128}$ [D] $-\frac{81}{32}$

105. Find the sum of the first 7 terms of the geometric series.
$\frac{1}{3} + \frac{5}{3} + \frac{25}{3} + \ldots$

[A] 1365.25 [B] 6510.5 [C] 1365.42 [D] 6510.33

Find the sum of the geometric series.

106. $\sum_{n=1}^{5} 3^n$ [A] 346 [B] 363 [C] 243 [D] 1092

107. $\sum_{n=1}^{4} \left(\frac{1}{4}\right)^n$ [A] $\frac{85}{64}$ [B] $\frac{85}{4}$ [C] $\frac{21}{64}$ [D] $\frac{85}{256}$

108. Find the sum of the series: 75 + 67 + 59 + ... –101

[A] –283 [B] –307 [C] –291 [D] –299

109. A rubber ball dropped on a hard surface takes a sequence of bounces, each one $\frac{1}{7}$ as high as the preceding one. If this ball is dropped from a height of 21 feet, what is the total distance it has traveled after it hits the surface the 5th time?

[A] $28\frac{1}{343}$ ft [B] $27\frac{342}{343}$ ft [C] $24\frac{171}{343}$ ft [D] $48\frac{342}{343}$ ft

Find the sum of the infinite geometric series.

110. $7 + 3 + \frac{9}{7} + \frac{21}{49} + \ldots$

[A] $S = 16\frac{1}{3}$ [B] $S = 4$ [C] $S = 12\frac{1}{4}$ [D] $S = 4\frac{9}{10}$

111. $\frac{4}{9} - \frac{12}{45} + \frac{12}{75} - \frac{12}{125} + \ldots$ [A] $S = \frac{1}{3}$ [B] $S = \frac{5}{18}$ [C] $S = \frac{10}{9}$ [D] $S = \frac{2}{9}$

112. Find the tenth term in the expansion of $(x+6)^{11}$.

[A] $9{,}976{,}919{,}040x^2$ [B] $9{,}976{,}919{,}040x^3$

[C] $554{,}273{,}280x^3$ [D] $554{,}273{,}280x^2$

Expand.

113. $(3a-b)^4$

[A] $81a^4-12a^3b+18a^2b^2-12ab^3+b^4$ [B] $81a^4+12a^3b+18a^2b^2+12ab^3+b^4$

[C] $81a^4+108a^3b+54a^2b^2+12ab^3+b^4$ [D] $81a^4-108a^3b+54a^2b^2-12ab^3+b^4$

114. $(u-t)^5$

[A] $u^5-5u^4t-20u^3t^2+60u^2t^3+120ut^4-120t^5$

[B] u^5-t^5 [C] $u^5-7u^4t+12u^3t^2-12u^2t^3+7ut^4-t^5$

[D] $u^5-5u^4t+10u^3t^2-10u^2t^3+5ut^4-t^5$

115. Convert to degrees and minutes. $75.25°$

[A] $75°45'$ [B] $14°45'$ [C] $75°12'$ [D] $75°15'$

116. Find two angles, one positive and one negative, that are coterminal with $-210°$

[A] $150°, -570°$ [B] $130°, -570°$ [C] $140°, -260°$ [D] $120°, -240°$

117. The terminal side of an angle in standard position passes through $(4,-4)$. Find the measure of the angle.

[A] $315°$ [B] $-135°$ [C] $-225°$ [D] $45°$

118. The terminal side of an angle in standard position passes through $(\sqrt{3}, -1)$. Find the measure of the angle.

[A] $30°$ [B] $300°$ [C] $60°$ [D] $330°$

119. Suppose that $\cos\theta = \frac{4}{5}$ and θ is in quadrant I. Which statement below is correct?

[A] $\tan\theta = \frac{5}{3}$ [B] $\tan\theta = \frac{3}{4}$ [C] $\tan\theta = \frac{3}{5}$ [D] $\tan\theta = \frac{4}{3}$

120. Suppose that $\cot\theta = \frac{5}{2}$ and θ is in quadrant I. Which statement below is correct?

[A] $\sin\theta = \frac{2}{\sqrt{29}}$ [B] $\sin\theta = \frac{5}{\sqrt{29}}$ [C] $\sin\theta = \frac{\sqrt{29}}{2}$ [D] $\sin\theta = \frac{\sqrt{29}}{5}$

121. Find the exact value of $\sin 60°$ [A] $\frac{\sqrt{3}}{2}$ [B] $\frac{2\sqrt{3}}{3}$ [C] $\frac{\sqrt{2}}{2}$ [D] $\frac{1}{2}$

122. Find the exact value of $\tan 45°$ [A] $\frac{\sqrt{2}}{2}$ [B] $\sqrt{2}$ [C] $\frac{1}{2}$ [D] 1

123. $\csc 26.7°$ is approximately

[A] 1.12 [B] 0.00065 [C] Domain Error [D] 2.23

124. Find the measure of the acute angle if the $\cot\theta = 11.43$

[A] $4.95°$ [B] $5.00°$ [C] $0.20°$ [D] $0.012°$

125. if the $\cos\theta = \frac{3}{4}$, and θ is in quadrant I, then $\cot\theta =$

[A] $\frac{5}{3}$ [B] $\frac{3}{5}$ [C] $\frac{3}{\sqrt{7}}$ [D] $\frac{\sqrt{7}}{3}$

126. Find the length of the altitude of an isosceles triangle with a $70°$ vertex angle and a base 246 ft long?

[A] 338 ft [B] 169 ft [C] 176 ft [D] 86 ft

127. From the top of a building an observer is trying to measure the height of a taller building that
is 51 feet away. The angle of elevation to the top of the taller building is 18° and the angle of depression to the bottom of the taller building is 32°. Find the height of the taller building.

[A] 31.9 feet [B] 48.4 feet [C] 54.7 feet [D] 16.8 feet

128. A pendulum 50 cm long is initially at rest. When it is moved 26° from the vertical, how much is the lower end of the pendulum raised?

[A] 4.67 cm [B] 5.06 cm [C] 25.61 cm [D] 28.08 cm