1. Which expression is equivalent to: $\sqrt{x^8 y^{-6}}$?

a) xy b) $\frac{x^4}{y^3}$ c) $x^{16}y^{-12}$ d) undefined e) NOT

2. Solve: $x^2 - 5x - 24 = 0$

a) x =6 or x = -4 b) x =8 or x = -3 c) x =12 or x = -7 d) x =12 or x =7 e) NOT

3. An arch is modeled by the equation $h = -w^2 + 40$ where *h* is the height in feet and *w* is the width in feet. What is the maximum height of the arch?

a) 10 feet b) 25 feet c) 30 feet d) 40 feet e) NOT

4. Which function describes the values in the table?

x	y
-1	undefined
0	0
1	3
2	4.24
3	5.20
4	6

a) $y = \sqrt{x}$ b) $y = 3\sqrt{x}$ c) $y = x^2$

d) $y = 3x^2$ e) NOT

5. Which expression is equivalent to $(-x^2 + 50\sqrt{y})(\frac{1}{4}x + y^2)$

a) $-\frac{1}{4}x^3 - x^2y^2 + \frac{25}{2}x\sqrt{y} + 7.07y$ b) $-\frac{1}{4}x^2 - x^2y^2 + \frac{25}{2}x\sqrt{y} + \sqrt{50y^2}$

c) $-\frac{1}{4}x^3 - x^2y^2 + \frac{25}{2}x\sqrt{y} + 50y^2\sqrt{y}$ d) $-\frac{1}{4}x^3 - x^2y^2 + \frac{25}{2}x\sqrt{y} + \sqrt{50y^2}$ e) NOT

6. Which of the following is the axis of symmetry of the graph $y = 3(x - 4)^2 + 2$?

a) x = 2 b) y = 3 c) x = 3 d) x = 4 e) y = x

7. What are the solutions of $2x^3 + 10x^2 + 12x = 0$?

a) 2, 10, 12 b) 0, 3 c) 0, -2, -3 d) 0, 2, 3 e) -1, 0, 6

8. If M is the midpoint of $\overline{AB}$, and the coordinates of M and A respectively are (-4.2, -1.9) and (-3.4, 2.5), then the coordinates of B are:

a) (-3.8, -0.6) b) (-5, 6.9) c) (-3.8, 0.3) d) (-5, -6.3) e) (1.3, -3.45)

9. Solve the equation: $4(x + 2)^2 - 32 = 0$. Approximate to the nearest hundredth.

a) 9.31 or -13.31 b) 4.83 or -0.83 c) 0.83 or 4.83 d) 3.66 or -7.66 e) none of these

10. Solve the equation: $6x^2 = 78$. Approximate to the nearest hundredth.

a) ± 8.83 b) ± 3.61 c) ± 12 d) ± 21.63 e) none of these

11. Write the quadratic equation in vertex (h, k) form. Give the coordinates of the vertex and the equation of the axis of symmetry. $y = x^2 + 4x - 9$

a) $y = (x - 2)^2 - 7$; x = -2; (2, 7) b) $y = (x - 2)^2 - 5$; x = -2; (2, 5)

c) $y = (x + 2)^2 - 5$; x = -2, (-2, -5) d) $y = (x + 2)^2 - 13$; x = -2; (-2, -13)

e) none of these

12. Solve the following quadratic equation: $5x^2 - 16x + 3 = 0$.

a) $-\frac{17}{5}, \frac{1}{5}$ b) $-3, -\frac{1}{5}$ c) $3, \frac{1}{5}$ d) $\frac{17}{5}, -\frac{1}{5}$ e) none of these

13. Find the axis of symmetry and the vertex for the function $y = -5x^2 + 20x - 14$
a) x = -2; (-2, -6) b) x = 2; (2, 6) c) x = -2; (-2, 6) d) x = 2; (2, -6)
e) none of these

14. Find the axis of symmetry and the vertex for the function $y = x^2 + 6x - 5$
a) x = 3; (3, -4) b) x = 3; (3, 31) c) x = -3; (-3, 4) d) x = -3; (-3, -14)
e) none of these

15. Find the quadratic equation that fits the set of data points exactly, in the form $y = ax^2 + bx + c$ with values of *a*, *b*, and *c* correct to three decimal places.
(1, 14.1), (7, 12.8), and (11, 14.9)
a) $y = -0.063 x^2 + 1.650 x - 4.312$ b) $y = -0.171 x^2 + 1.150 x + 13.121$
c) $y = 0.074 x^2 - 0.810 x + 14.836$ d) $y = 0.308 x^2 - 3.610 x + 17.403$
e) none of these

16. The turnstiles at the entrance to the State Fair kept track of the number of people entering the fairgrounds, for the first seven hours following the opening of the fair. Find a quadratic equation that models the data shown.

Time (hr)	0	1	2	3	4	5	6
People (1000s)	5.8	5.59	5.44	5.35	5.33	5.37	5.46

a) $y = 0.043 x^2 - 0.118 x + 4.21$ b) $y = 0.075 x^2 - 0.146 x + 7.17$
c) $y = 0.031 x^2 - 0.241x + 5.80$ d) $y = 0.042 x^2 - 0.199 x + 4.60$ e) none of these

17. Solve the quadratic inequality $x^2 + 3x - 28 < 0$
a) $(-\infty,-7)\cup(4,\infty)$ b) $(-\infty,-4)\cup(7,\infty)$ c) (-4, 7) d) (-7, 4) e) none of these

18. If *y* varies jointly as *x* and the inverse of *z*, and *y* = -5 when *x* = -5 and *z* = 6, find *y* when *x* = 5 and *z* = -8.
a) $-\frac{8}{15}$ b) $-\frac{15}{4}$ c) $-\frac{20}{3}$ d) $-\frac{3}{20}$ e) none of these

19. The wattage rating of an appliance is given as *W*, in watts, and varies jointly as the resistance, *R*, in ohms, and the square of the current, *I*, in amperes. If the wattage is 18 watts when the resistance is 50 ohms and the current is 0.6 amperes, find the wattage when the resistance is 100 ohms and the current 0.3 amperes.
a) 30 watts b) 60 watts c) 9 watts d) 3000 watts e) none of these

20. Find the center and the radius of the circle that has a diameter with the given endpoints.
Diameter $\overline{CD}$, *C* (6, -3) and *D*(-4, 7)
a) center (1, 2); radius $5\sqrt{2}$ b) center (1, 2); radius $2\sqrt{13}$
c) center (5, -5); radius $\sqrt{185}$ d) center (5, -5); radius $\sqrt{187}$ e) none of these

21. Solve: $x^2 - 4x + 2 = 0$
a) $2 \pm \sqrt{2}$ b) $2 \pm \sqrt{6}$ c) $-2 \pm \sqrt{2}$ d) $-2 \pm \sqrt{6}$ e) none of these

22. $2x (x - 2) = -4$ a) $\pm i$ b) $1 \pm i\sqrt{6}$ c) $1 \pm 2i$ d) $1 \pm i$ e) NOT

23. If the equation $x^2 - 4x + k = 1$ has exactly one solution for the value of x, then k =
a) 5 b) 4 c) 2 d) -1 e) none of these

24. A ball is thrown vertically upward withan initial velocity of 80 ft/sec. Its height after *t* seconds is given by the function $h(t) = 80t - 16t^2$. The maximum height of the ball is:
a) 200 ft b) 100 ft c) 2.5 ft d) 5 ft e) none of these

25. If (x – 2) is a factor of $x^3 - x^2 - x - 2$, then f(2)=
a) -2 b) 0 c) 1 d) 2 e) none of these

26. What is the remainder when ($2x^2 - 5x - 1$) is divided by (x – 3)?
a) -4 b) -2 c) 0 d) 2 e) none of these

27. What is the vertex of the parabola whose equation is $y = 3x^2 - 2x + 3$?
a) $\left(\frac{1}{3}, \frac{8}{3}\right)$ b) (0.3, 2.6) c) $\left(\frac{1}{2}, \frac{5}{2}\right)$ d) (0.2, 3.2) e) none of these

28. TRUE or FALSE: The imaginary roots of the polynomial equations with real coefficients occur in conjugate pairs.

29. If $b \neq 0$, which of the exponents or powers property is *not* written correctly?
a) $b^0 = 1$ b) $\frac{1}{(9b^n)} = \frac{b^{-n}}{9}$ c) $b^m \cdot b^n = b^{mn}$ d) $\frac{a^n}{b^n} = (\frac{a}{b})^n$ e) NOT

30. Solve: $x^2 - 6x - 27 = 0$
a) x = 9 or x = -3 b) x = -9 or x = -3 c) x = 9 or x = 3 d) x = - 9 or x = 3 e) NOT

31. Solve: $x^2 - 1 = 8$ a) x = -3 b) x = 3 c) $x = \pm 3$ d) $x = \pm 9$ e) NOT

32. Find the solutions of the equation $-3x^2 + 10x - 8 = 0$
a) $x = -\frac{3}{4}, 2$ b) $x = \frac{4}{3}, -2$ c) $x = \frac{4}{3}, 2$ d) $x = 4, \frac{2}{3}$ e) NOT

33. Solve: $c^2 - 3c = 4$
a) c = -1 and c = 4 b) c = -1 and c = -4 c) c = 1 and c = 4
d) c = 1 and c = -4 e) NOT

34. Solve $\frac{4+3x}{x-8} = \frac{7}{8-x}$

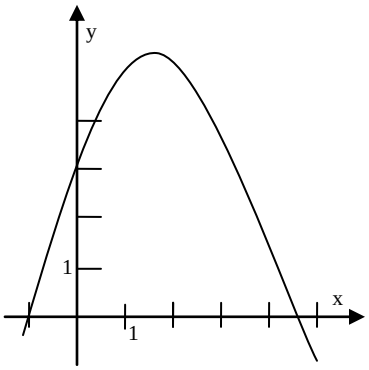
a) $x = -\frac{11}{3}$ b) $x = -\frac{11}{3}, 8$ c) $x = -\frac{13}{6}$ d) x = -2, 25 e) NOT

35. Let the function f be defined by $f(x) = x^2 + 18$. If *m* is a positive number such that $f(2m) = 2f(m)$, what is the value of *m*?

36. If $g(n) = n^2 + n$ and $h(n) = n^2 - n$, which of the following is equal to $h(m+1)$?
a) *g(m)* b) *g(m)* + 1 c) *g(m)* – 1 d) *h(m)* + 1 e) *h(m)* – 1

37. In the *xy*-coordinate system, $(p,0)$ is one of the points of intersection of the graphs of $y = -x^2 + 9$ and $y = x^2 - 9$. If *p* is positive, what is the value of *p*?
a) 3 b) 6 c) 9 d) 18 e) 81

38. The figure shows the graph of a quadratic function h whose maximum value is $h(2)$.



If $h(a) = 0$, which of the following could be the value of a?

a) -1 b) 0 c) 2 d) 3 e) 4

39. If x## is defined as x## = $x^2 - x$ for all values of x, and A## = (A – 2)##, then what is the value of A? a) 1 b) $\frac{1}{2}$ c) $\frac{3}{2}$ d) $\frac{6}{5}$ e) 3

40. At time $t = 0$, a ball was thrown upward from an initial height of 6 feet. Until the ball hit the ground, its height, in feet, after t seconds was given by the function $h(t) = c - (d - 4t)^2$ in which c and d are positive constants. If the ball reached its maximum height of 106 feet at time $t = 2.5$ seconds, what was the height, in feet, of the ball at time $t = 1$ second?

41. For the function $f(x) = (x+1)^{\frac{3}{4}}$ what are all values of x for which $f(x)$ is a real number?

a) all real numbers b) $x \geq -1$ c) $x \geq 0$ d) $x \geq \frac{3}{4}$ e) $x \geq 1$

42. If x and t are positive numbers that satisfy the equation $\sqrt{x^2 - t^2} = 2t - x$ what is the value of $\frac{x}{t}$?

43. If $16^x = 4$ and $5^{x+y} = 625$ then $y =$

a) 2 b) 5 c) 12.5 d) 3.5 e) 1

44. In the equation $x^2 + kx + 54 = 0$ one root is equal to twice the other root. The value(s) of k is (are):

a) ± 5.2 b) 15.6 c) -5.2 d) ± 15.6 e) 22.0

45. If $3x^3 - x^2 + 12x - 4 = (x - 2i)(3x - 1)Q(x)$ for all x, then $Q(x) =$

a) $x - 2$ b) $x + 2$ c) $x - 2i$ d) $x + 2$i e) $x + i$

46. If $f(x) = ax^2 + bx + c$ for all x and if $f(-3) = 0$ and $f(1) = 0$ then $b + c =$
a) -5 b) -1 c) 1 d) 5 e) 0

47. If h varies as V and inversely as the square of r, which of the following statements must be true?
a) If r increases by 2, V increases by 4.
b) If both r and h are doubled, then V is doubled.
c) If r is doubled and h is divided by 4, then V stays the same.
d) If r is doubled and h is divided by 2, then V stays the same.
e) None of the above statements must be true.

48. If the equation $x^2 + 2(k+2)x + 9k = 0$ has equal roots, then k=
a) 1 or 4 b) 0 or 4 c) 4 only d) -1 or 4 e) 2 or -4

49. What is the remainder when $3x^4 - 2x^3 - 20x^2 - 12$ is divided by $x + 2$?
a) -4 b) -28 c) -6 d) -36 e) -60

50. If A varies as the square of B and inversely as the cube of C, then if B is tripled and C is doubled, the value of A is a) multiplied by 3 b) multiplied by $\frac{9}{8}$ c) multiplied by 8 d) divided by 3 e) divided by $\frac{2}{3}$

51. If $x - 7$ divides $x^3 - 3k^3x^2 - 13x - 7$ then the approximate value of k is
a) 5.04 b) 4.63 c) 1.72 d) 1.34 e) 1.20

52. If $x - 1$ is a factor of $x^2 + ax - 4$, then a has the value
a) 4 b) 3 c) 2 d) 1 e) none of these

53. What is the sum of the real roots of the equation $(x - \sqrt{2})(x^2 - \sqrt{3}x + \frac{\pi}{3}) = 0$?
a) -0.13 b) 0.13 c) 1.414 d) 3.15 e) 4.56

54. If x varies inversely as the cube root of y, and if $x = 3$ and $y = 4$, the constant of variation is
a) 1.9 b) 4.8 c) 0.04 d) 192 e) 0.53

55. If $x^5 y^8 z^{-3} = \frac{8x^4}{y^{-8} z^3}$, then $x =$
a) $\frac{1}{8}$ b) $\frac{1}{4}$ c) 8 d) $8y^2z^2$ e) $8y^{16}z^6$

56. The sum of the roots of $3x - 7x^{-1} + 3 = 0$ is
a) $\frac{7}{3}$ b) 1 c) $-\frac{7}{3}$ d) -1 e) $\frac{3}{7}$

57. The amount of heat received by an object varies inversely as the square of its distance from the source of the heat. By comparison, how much heat is received by an object that is three times as far from the source of the heat?

a) three times as much b) nine times as much c) one-third as much d) one-ninth as much e) one-sixth as much

58. The positive difference between the roots of the equation $3x^2 + 4x - 1 = 0$ is

a) -1.3 b) 0.7 c) 1.3 d) 1.8 e) 2.0

59. If $3x^{\frac{3}{2}} = 4$ then $x =$ a) 1.1 b) 1.2 c) 1.3 d) 1.4 e) 1.5

60. For what values of k are the roots of the equation $kx^2+4x+k=0$ real and unequal?

a) $0 < k < 2$ b) $|k| < 2$ c) $|k| > 2$ d) $k > 2$ e) $-2 < k < 0$ or $0 < k < 2$

61. The equations of the asymptotes of the graph of $4x^2 - 9y^2 = 36$ are

a) $y - x$ and $y = -x$ b) $y = 0$ and $x = 0$ c) $y = \frac{2}{3}x$ and $y = -\frac{2}{3}x$

d) $y = \frac{3}{2}x$ and $y = -\frac{3}{2}x$ e) $y = \frac{4}{9}x$ and $y = -\frac{4}{9}x$

62. Given $f(x)=3\left[\frac{1}{2}x-2\right]+4$, determine the length of the steps and the jump between the steps respectively.

a) $\frac{1}{2}$ unit, 3 units b) 2 units, 3 units c) $\frac{1}{2}$ unit, $\frac{3}{2}$ units

d) $\frac{1}{2}$ unit, 6 units e) NOT

63. Given $f(x)=3\left[\frac{1}{2}x-2\right]+4$, determine the domain of the function.

a) $(-\infty,\infty)$ b) $\{x : x = 2n, n \in Z\}$ c) $\{x : x = 4n, n \in Z\}$

d) $\{x : x = 3n+1, n \in Z\}$ e) $\{x : x = 3n-1, n \in Z\}$

64. Given $f(x)=3\left[\frac{1}{2}x-2\right]+4$, determine the range of the function.

a) $(-\infty,\infty)$ b) $\{y : y = 2n, n \in Z\}$ c) $\{y : y = 4n, n \in Z\}$

d) $\{y : y = 3n+1, n \in Z\}$ e) $\{y : y = 3n-1, n \in Z\}$

65. Given $f(x)=3\left[\frac{1}{2}x-2\right]+4$, the graph of the function is:

a) increasing throughout b) decreasing throughout

c) in horizontal steps that increase d) in horizontal steps that decrease

e) NOT

66. Given $g(x)=-2[x+1]-3$, determine the length of the steps and the jump between the steps respectively.

a) 2 unit, 2 units b) 1 unit, 2 units c) 2 units, 1 unit
d) 1 unit, $\frac{1}{2}$ unit e) NOT

67. Given $g(x)=-2[x+1]-3$, determine the domain of the function.

a) $(-\infty,\infty)$ b) $\{x : x=2n+1, n\in Z\}$ c) $\{x\in Z\}$ d) $\{x : x=\frac{n+1}{2}, n\in Z\}$
e) NOT

68. Given $g(x)=-2[x+1]-3$, determine the range of the function.

a) $(-\infty,\infty)$ b) $\{y : y=2n+1, n\in Z\}$ c) $\{y\in Z\}$ d) $\{y : y=\frac{n+1}{2}, n\in Z\}$
e) NOT

69. Given $g(x)=-2[x+1]-3$, the graph of the function is:

a) increasing throughout b) decreasing throughout
c) in horizontal steps that increase d) in horizontal steps that decrease
e) NOT

70. Given $h(x)=\frac{2}{3}[3-x]+1$, determine the length of the steps and the jump between the steps respectively.

a) 3 units, $\frac{2}{3}$ unit b) 3 units, 2 units c) 1 unit, $\frac{2}{3}$ units
d) 1 unit, $\frac{3}{2}$ units e) NOT

71. Given $h(x)=\frac{2}{3}[3-x]+1$, determine the domain of the function.

a) $(-\infty,\infty)$ b) $\{x : x=\frac{n}{3}, n\in Z\}$ c) $\{x : x=\frac{2n}{3}, n\in Z\}$ d) $\{x : x=\frac{2n+1}{3}, n\in Z\}$
e) NOT

72. Given $h(x)=\frac{2}{3}[3-x]+1$, determine the range of the function.

a) $(-\infty,\infty)$ b) $\{y : y=\frac{n}{3}, n\in Z\}$ c) $\{y : y=\frac{2n}{3}, n\in Z\}$ d) $\{y : y=\frac{2n+1}{3}, n\in Z\}$
e) NOT

73. Given $h(x)=\frac{2}{3}[3-x]+1$, the graph of the function is:

a) increasing throughout b) decreasing throughout
c) in horizontal steps that increase d) in horizontal steps that decrease
e) NOT

74. Given $j(x)=-4\left[\frac{1}{2}x+\frac{3}{4}\right]-2$, determine the length of the steps and the jump between the steps respectively.

a) 2 units, 4 units b) $\frac{1}{2}$ unit, 2 units c) 2units, $\frac{1}{4}$ unit
d) $\frac{1}{2}$ unit, 4 units e) NOT

75. Given $j(x)=-4\left[\frac{1}{2}x+\frac{3}{4}\right]-2$, determine the domain of the function.

a) $(-\infty,\infty)$ b) $\{x : x=2n+4, n\in Z\}$ c) $\{x : x=\frac{3n}{4}, n\in Z\}$
d) $\{x : x=4n-2, n\in Z\}$ e) NOT

76. Given $j(x)=-4\left[\frac{1}{2}x+\frac{3}{4}\right]-2$, determine the range of the function.

a) $(-\infty,\infty)$ b) $\{y : y=2n+4, n\in Z\}$ c) $\{y : y=\frac{3n}{4}, n\in Z\}$
d) $\{y : y=4n-2, n\in Z\}$ e) NOT

77. Given $j(x)=-4\left[\frac{1}{2}x+\frac{3}{4}\right]-2$, the graph of the function is:

a) increasing throughout b) decreasing throughout
c) in horizontal steps that increase d) in horizontal steps that decrease
e) NOT

78. Positive integers *x*, *y*, and *z* satisfy the equations $x^{-\frac{1}{2}}=\frac{1}{3}$ and $y^z=16$.

If *z* > *y*, what is the value of $x+y$?

a) 5 b) 7 c) 11 d) 13 e) 15

79. If the parabola $y=ax^2+bx+c$ passes through points (17, -4), (11, 5), and (1, 8), then the value of $a+b+c$ is equal to

a) $\frac{17}{43}$ b) $\frac{5}{2}$ c) $\frac{14}{27}$ d) 8 e) -11

80. For what value(s) of *k* is x^2+3x+k divisible by $x+k$?

a) 0 only b) -4, 0 only c) 0, 2 only d) no value of *k* e) any value of *k*

81. The roots of f(x) = 0 are 1 and -2. The roots of f (2x) = 0 are

a) 1, -2 b) $\frac{1}{2},-1$ c) $-\frac{1}{2},1$ d) 2, -4 e) -2, 4

82. Which number is a zero for P (x)= $2x^3 + 5x^2 + 4x + 1$?

a) -2 b) -1 c) $\frac{1}{2}$ d) 4 e) none of these

83. Given f(x) = 7x + 2, find $f^{-1}(x)$

a) - (7x + 2) b) $\frac{1}{7x+2}$ c) $\frac{x-2}{7}$ d) $x-\frac{2}{7}$ e) NOT

84. Determine the solution for the inequality: $(x-3)(x-4)(x-5) > 0$

a) $(3,4)\cup(5,\infty)$ b) $(-\infty,3)\cup(4,5)$ c) $(3,\infty)$ d) $(3,5)\cup(5,\infty)$ e) NOT

85. Identify the list of possible rational zeros: $f(x) = 3x^4 + 5x^3 - 2x + 7$

a) ± 3, ± 1, ± 7 b) $\pm 1, \pm 3, \pm 7, \pm\frac{1}{3}, \pm\frac{1}{7}, \pm\frac{3}{7}, \pm\frac{7}{3}$ c) $\pm 1, \pm 7, \pm\frac{1}{3}, \pm\frac{7}{3}$

d) $\pm 1, \pm 3, \pm\frac{1}{7}, \pm\frac{3}{7}$ e) none of these

86. True or False: 79. Every one-to-one function has an inverse function.

87. Solve for x : x log 4 = log 8 + log 2

a) .602 b) .778 c) 1.204 d) 2 e) NOT

88. If A varies inversely as the square of B, what is the effect on B when A is multiplied by 4?

a) It is multiplied by 1.5 b) It is multiplied by 4. c) It is multiplied by 2.
d) It is divided by 2. e) none of these

89. Find the quadratic equation that fits the set of data points exactly, in the form $y = ax^2 + bx + c$ with values of *a, b,* and *c* correct to two decimal places.
(2, 4.6), (5, 2.2), and (12, 4.3)

a) $y = -0.2\,x^2 + 3.64\,x - 11.10$ b) $y = -0.01\,x^2 - 0.71\,x + 6.07$
c) $y = 0.11\,x^2 - 1.57\,x + 7.30$ d) $y = 0.32\,x^2 - 4.50\,x + 12.33$ e) NOT

90. Match the graph with the correct function:
(a) $f(x) = -(x-2)^2 + 4$
(b) $f(x) = (x + 2)^2 + 4$
(c) $f(x) = -2x + 4$
(d) $f(x) = -(x+2)^2 + 4$

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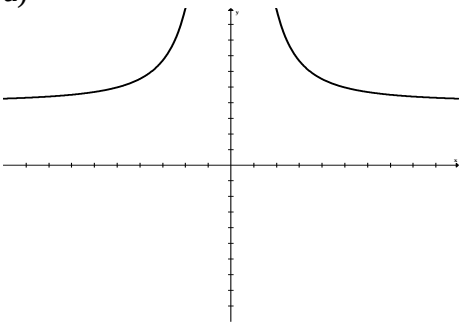
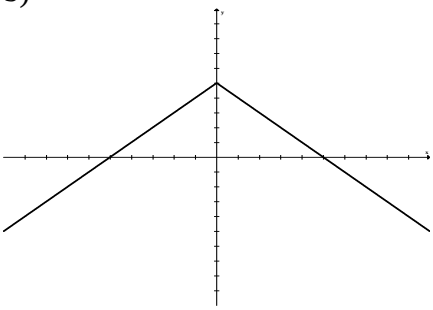
91. Graph $y = \frac{24}{x^2 + 4}$ in a standard viewing rectangle.

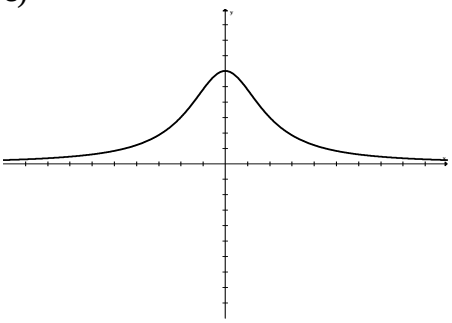
a)



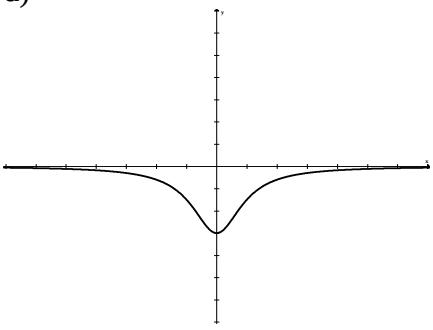
b)



c)



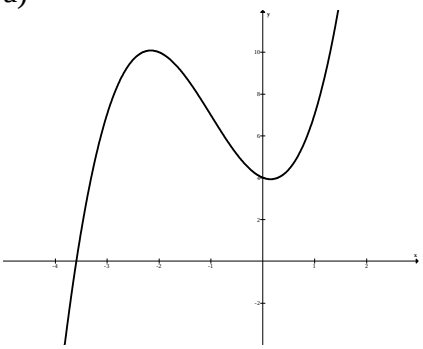
d)



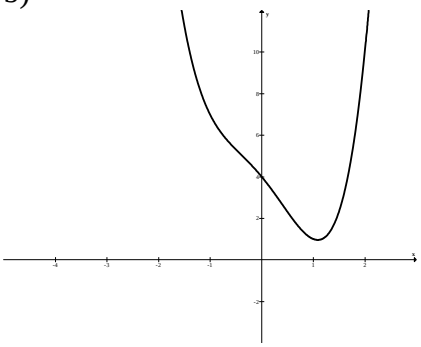
e) none of these

92. Graph the function $y = x^3 + 3x^2 - x + 4$ in a standard viewing rectangle.

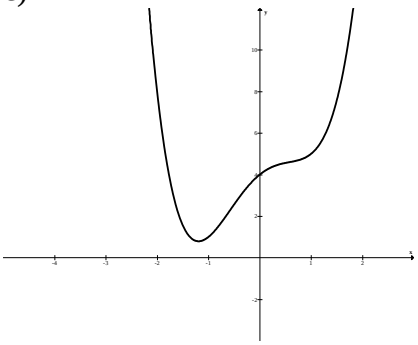
a)



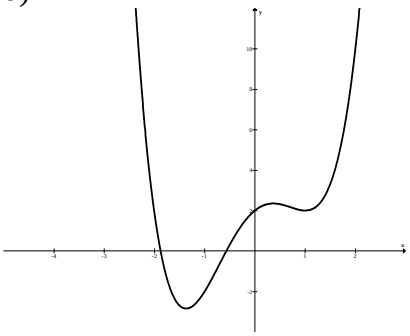
b)



c)



d)



e) none of these

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93. Given $f(x) = 9x^2 + 1$, find $f(2)$

a) 19 b) 37 c) 12 d) 18 e) none of these

---

94. If $f(x) = 2x^2 - 6x$ and $g(x) = x - 3$, find the values for which $f(x) = g(x)$

a) -2, -1 b) 1/2, 3 c) 1, 2 d) 1, 3 e) none of these

---

95. Find the domain of the function $f(x) = \frac{9}{x}$

a) $(9, \infty)$ b) $(-\infty, \infty)$ c) $(-\infty, 0) \cup (0, \infty)$ d) $(-\infty, 9) \cup (9, \infty)$ e) none of these

---

96. Find the domain of the function $f(x) = \sqrt{5 - x}$

a) $(-\infty, 5]$ b) $(-\infty, 5)$ c) $[-5, \infty)$ d) $(-5, \infty)$ e) none of these

---

97. If $f(x) = x^2$, $x \neq 0$, find $\frac{f(x-3) - f(3)}{x}$

a) $\frac{9}{x}$ b) $x^2 + 6x + 9$ c) $x - 6$ d) $\frac{18 + x}{x}$ e) none of these

98. Describe the transformations of the graph of $f(x) = \sqrt{x}$ for the graph of $g(x) = \frac{1}{3}\sqrt{x+4}$

a) horizontal shift 4 units to the left, vertical shrink
b) horizontal shift 4 units to the left, vertical stretch
c) horizontal shift 4 units to the right, vertical stretch
d) horizontal shift 4 units to the right, vertical shrink e) none of these

---

99. Find an equation of the function whose graph is a vertical shift down 5 units and a vertical shrink (by 6) of the graph of $f(x) = |x|$.

a) $g(x) = \frac{1}{6}|x+5|$ b) $g(x) = \frac{1}{6}|x| - 5$ c) $g(x) = 6|x| - 5$
d) $g(x) = 6|x-5|$ e) none of these

---

100. Given $f(x) = \frac{1}{x^2}$ and $g(x) = \sqrt{x^2+4}$, find $(f \bullet g)(x)$

a) $\frac{1}{x^2+4}$ b) $\frac{1}{\sqrt{x^2+4}}$ c) x^2+4 d) $\frac{1}{x^2\sqrt{x^2+4}}$ e) none of these

---

101. Which of the following is the inverse of $f(x) = x + 1$?

a) $f^{-1}(x) = x + 1$ b) $f^{-1}(x) = x - 1$ c) $f^{-1}(x) = -(x+1)$
d) $f^{-1}(x) = \frac{1}{x+1}$ e) none of these

---

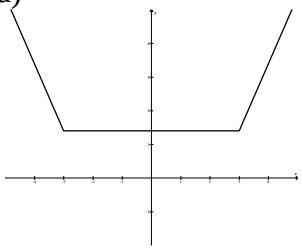
102. Determine which sets of functions are not inverses of each other.

a) $f(x) = x^2 + 1$, $g(x) = \sqrt{x-1}$ b) $f(x) = x^2 - 1$, $g(x) = \sqrt{x+1}$ c) $f(x) = 1 - x^2$, $g(x) = \sqrt{1+x^2}$
d) all of these are inverses of each other e) none of these are inverses of each other

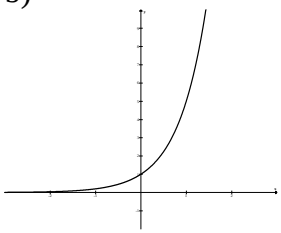
---

103. In which graph does y not represent a one-to-one function of x ?

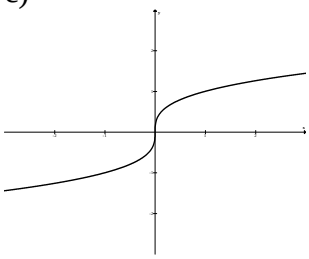
a)



b)



c)



d) all of these are one-to-one functions of x e) none of these are one-to-one functions of x

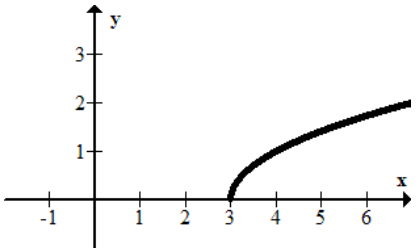
104. Find the minimum point on the graph of $f(x) = x^2 - 4x + 14$

a) (2, 18) b) (-2, 18) c) (-2, 26) d) (2, 10) e) none of these

---

105. Find the range of the function shown at the right.

a) [0, ∞)
b) (-∞, 3]
c) (3, ∞)
d) [3, ∞)
e) none of these



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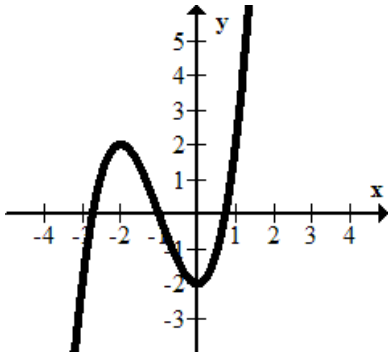
106. Determine the open intervals in which the function is increasing, decreasing, or constant.

a) increasing of (-∞, ∞)
b) increasing on (- ∞, 0)
decreasing on (0, ∞)
c) increasing on (-∞, -2) and (0, ∞)
decreasing on (-2, 0)
d) increasing on (-∞, 3)
decreasing on (3, ∞)
e) none of these



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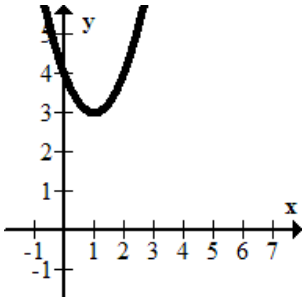
107. The graph at the right is a transformation of the graph of $f(x) = x^2$. Find an equation for the function.

a) $g(x) = (x + 3)^2 + 1$
b) $g(x) = (x + 1)^2 - 3$
c) $g(x) = (x - 3)^2 + 1$
d) $g(x) = (x + 1)^2 + 3$
e) none of these



---

108. Describe the transformations of the graph of $f(s) = x^2$ for the graph of $g(x) = 2x^2 + 1$

a) vertical shift 1 unit down, vertical stretch b) vertical shift 1 unit up, vertical shrink
c) horizontal shift 2 units to the left, vertical shrink d) vertical shift 1 unit up, vertical stretch
e) none of these

---

109. Given $f(x) = x^2 - 2x$ and $g(x) = 2x + 3$, find $f(g(x))$

a) $4x^2 + 8x + 3$ b) $2x^2 - 4x + 3$ c) $2x^3 - x^2 - 6x$ d) $3x^2 + x$ e) none of these

110. Determine which sets of functions are inverses of each other.

a) $f(x) = x^2 + 1$ $g(x) = \sqrt{x+1}$ b) $f(x) = x^2 - 1$ $g(x) = \sqrt{x+1}$ c) $f(x) = 1 - x^2$ $g(x) = \sqrt{1+x^2}$

d) all of these are inverses of each other e) none of these are inverses of each other

---

111. Given $f(x) = 7x + 2$, find $f^{-1}(x)$

a) $7x + 2$ b) $\frac{1}{7x+2}$ c) $\frac{x-2}{7}$ d) $\frac{x}{7} - 2$ e) none of these

---

112. Determine the left and right behavior of the graph $f(x) = 3x^5 - 7x^2 + 2$

a) down to the left, up to the right b) up to the left, down to the right

c) up to the left, up to the right d) down to the left, down to the right e) none of these

---

113. Determine the left and right behavior of the graph $f(x) = -2x^4 + 3x^3 + 5x^2$

a) up to the left, down to the right b) down to the left, up to the right

c) up to the left, up to the right d) down to the left, down to the right e) none of these

---

114. Find all the real zeros of the polynomial function $f(x) = x^3 - 3x^2 - 4x$

a) -1, 4 b) -4, 1 c) -1, 0, 4 d) 0, 4 e) none of these

---

115. Find all the real zeros of the polynomial function $f(x) = x^4 - 5x^2 - 36$

a) 3, 2 b) ± 3 c) $\pm 3, \pm 2$ d) ± 2 e) none of these

---

116. The function $f(x)$ has a zero of 3 with multiplicity 2. We know

a) since the zero is 3, the graph crosses the y-axis at 3

b) since the zero is 3, the graph goes up to the right

c) since the multiplicity is 2, the graph crosses the x-axis

d) since the multiplicity is 2, the graph touches but does not cross the x-axis

e) none of these

---

117. Divide $(2x^3 + 3x^2 - 19x - 1) \div (x + 4)$

a) $2x^2 - 5x + 1 - \frac{3}{x+4}$ b) $2x^2 - x - 15 + \frac{54}{x+4}$ c) $2x^2 - 5x + 1 - \frac{5}{x+4}$

d) $2x^2 + 11x + 25 + \frac{99}{x+4}$ e) none of these

---

118. Express $f(x) = 3x^4 - 2x^2 + x - 1$ in the form $f(x) = (x - k)q(x) + r$

a) $f(x) = (x + 1)(3x^3 + 3x^2 + x + 2) + 1$ b) $f(x) = (x + 1)(3x^3 - 3x^2 + x) - 1$

c) $f(x) = (x - 1)(3x^3 + x^2 + 2x) + 1$ d) $f(x) = (x + 1)(3x^3 - 5x^2 + 6x) - 7$

e) none of these

119. Find the real zeros of $f(x) = x^3 - \frac{9}{2}x^2 + \frac{11}{2}x - \frac{3}{2}$

a) $1,\ 4 \pm \sqrt{13}$ b) $\frac{3}{2}, \frac{3 \pm \sqrt{13}}{2}$ c) $\frac{3}{2}, \frac{3 \pm \sqrt{5}}{2}$ d) $1,\ 4 \pm \sqrt{19}$ e) none of these

120. Determine the number of real and imaginary roots of the function:
$f(x) = x^4 + 2x^3 + 7x^2 + 12x + 6$

a) 4 real roots, 0 imaginary roots b) 2 real roots, 2 imaginary roots
c) 0 real roots, 4 imaginary roots d) 1 real root, 1 imaginary root e) none of these

121. Find a polynomial with real coefficients that has zeros 0, 3, -3, i,$-i$

a) $f(x) = x^5 - 8x^3 - 9x$ b) $f(x) = x^5 - 10x^3 + 9x$ c) $f(x) = x^3 - 4x^2 + 3$
d) $f(x) = x^5 - 9x$ e) none of these

122. Find the vertical asymptote(s): $f(x) = \frac{x+2}{x^2 - 9}$

a) x = 3 b) x = -2, x = -3, x = 3 c) y = 0, x = -2 d) x = 3, x = -3 e) none of these

123. Find the vertical asymptote(s): $\frac{x+5}{x^2 + 4}$

a) x = 2, x = -2 b) x = -5 c) x = 0 d) y = 2, y = -2 e) none of these

124. Find the horizontal asymptote $f(x) = \frac{3x-1}{x+2}$

a) y = 0 b) x = -2 c) $x = \frac{1}{3}$ d) y = 3 e) none of these

125. Find the domain $f(x) = \frac{x+2}{x^2 - 3x + 2}$

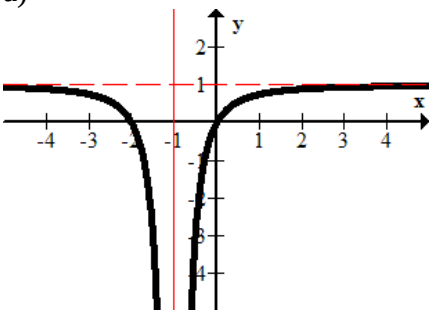
a) all reals except x = -2, 1, 2
b) all reals except x = - 2
c) all reals except x = 1, 2
d) all reals
e) none of these

126. Find the x-intercept(s) $f(x) = \frac{x+2}{x-1}$

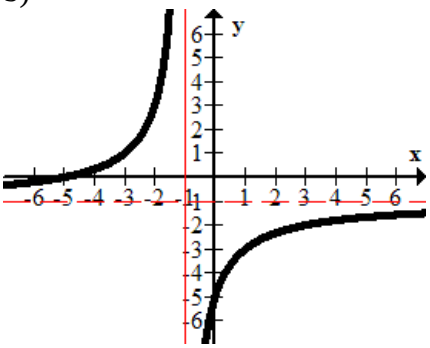
a) (1, 0) b) (-2, 0) (1, 0) c) (1, -2) d) (-2, 0) e) none of these

127. Match the rational function with the correct graph $f(x) = \dfrac{3+x}{x-1}$

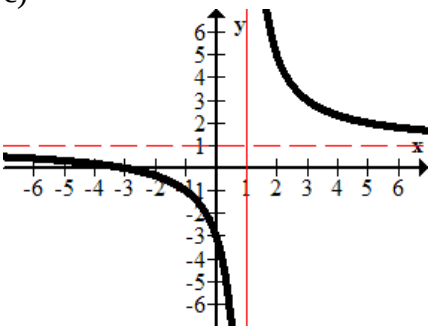
a)



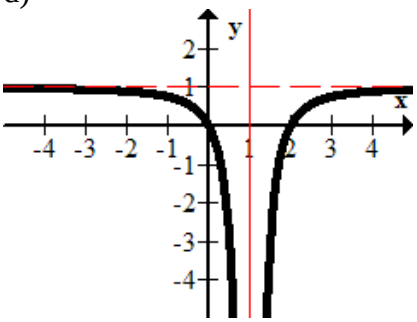
b)



c)



d)



e) none of these

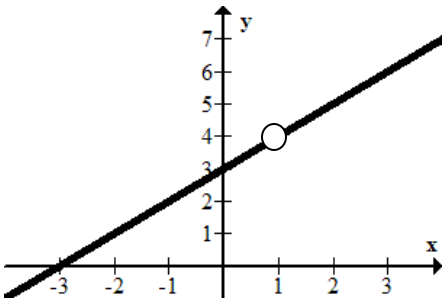
---

128. Match the graph with the correct function

a) $f(x) = \dfrac{x+3}{x-1}$ b) $f(x) = x + 3$

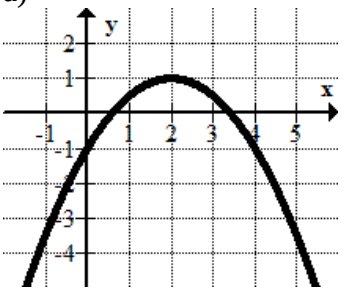
c) $f(x) = \dfrac{x-1}{x^2+2x-3}$ d) $f(x) = \dfrac{x^2+2x-3}{x-1}$

e) none of these

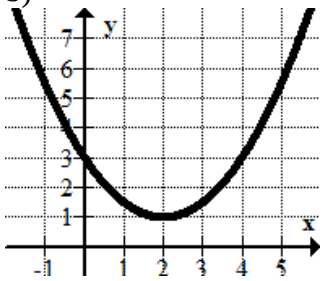


129. Match the correct graph with the function $f(x) = -\frac{1}{2}(x-2)^2 + 1$

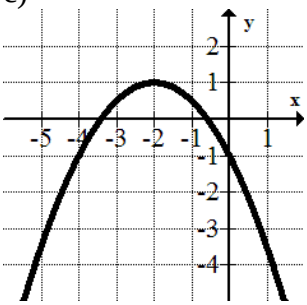
a)



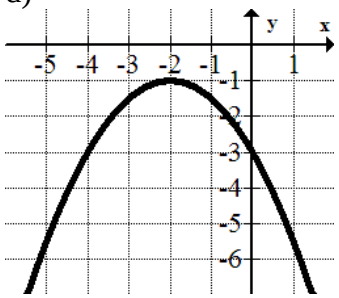
b)



c)



d)



e) none of these

---

130. Divide $(6x^3 + 7x^2 - 15x + 6) \div (2x - 1)$

a) $3x^2 + 2x - \frac{17}{2} - \frac{5}{2(2x-1)}$ b) $3x^2 + 5x - 5 + \frac{1}{2x-1}$ c) $3x^2 + 5x + 5 + \frac{11}{2x-1}$

d) $3x^2 + 4x - 17 + \frac{29/2}{2x-1}$ e) none of these

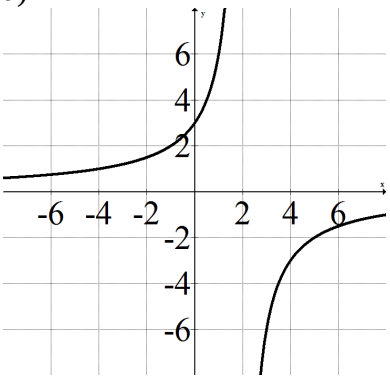
---

131. Write as a product of linear factors: $f(x) = x^4 - 3x^2 - 28$

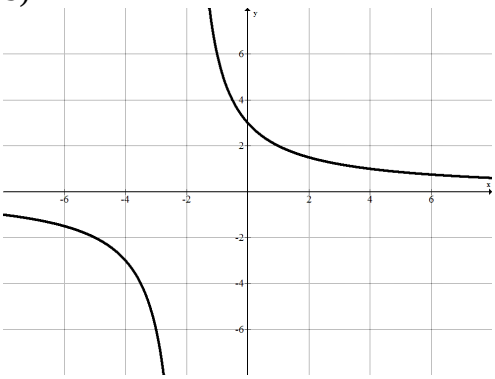
a) $(x^2 + 4)(x^2 - 7)$
b) $(x - 2i)(x + 2i)(x - \sqrt{7})(x + \sqrt{7})$
c) $(x + 2i)(x + 2i)(x - \sqrt{7})(x + \sqrt{7})$
d) $(x - 2i)(x - 2i)(x - \sqrt{7})(x + \sqrt{7})$
e) none of these

132. Match the rational function with the correct graph $f(x) = \frac{6}{x+2}$

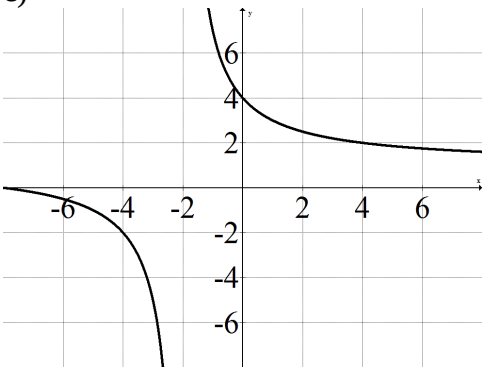
a)



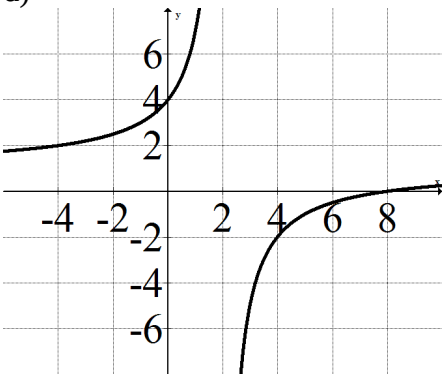
b)



c)



d)



e) none of these

---

133. The domain of $f(x) = 3 - e^{x}$ is

a) $(3, \infty)$ b) $[0, \infty)$ c) $(-\infty, \infty)$ d) $(-\infty, 3)$ e) none of these

---

134. If \$ 1500 is invested at a rate of 8 % compounded quarterly, what is the balance at the end of 5 years?

a) \$ 1624.67 b) \$2237.74 c) \$ 2228.92 d) \$ 2226.04 e) none of these

---

135. If \$3500 is invested at a rate of $4\frac{1}{2}\%$ compounded continuously, what is the balance at the end of 10 years?

a) \$ 315,059.96 b) \$ 5472.45 c) \$ 5221.39 d) \$ 5489.09 e) none of these

---

136. Evaluate $\log_a \frac{1}{a}$ a) 1 b) –1 c) a d) $\frac{1}{a}$ e) none of these

---

137. Evaluate $\ln e^{1-x}$

a) e^{1-x} b) e c) 1 – x d) ln (1 – x) e) none of these

138. Evaluate $\ln 3.76$

a) 1.3244 b) 0.5752 c) 42.9484 d) 5754.3994 e) none of these

---

139. Write in logarithmic form: $4^{3} = 64$

a) $4 \log 3 = 64$ b) $\log_{4} 64 = 3$ c) $\log_{3} 4 = 64$ d) $\log_{3} 64 = 4$ e) none of these

---

140. Write in exponential form: $\log_{b} 7 = 13$

a) $7^{13} = b$ b) $b^{13} = 7$ c) $b^{7} = 13$ d) $7^{b} = 13$ e) none of these

---

141. Find the domain of the function $f(x) = 3 \log (5x - 2)$

a) $(-\infty, \infty)$ b) $(-\frac{1}{3}, \infty)$ c) $(\frac{2}{5}, \infty)$ d) $(0.064, \infty)$ e) none of these

---

142. Identify the expression that is equivalent to $\log_{3} 5$

a) $\frac{\log 5}{\log 3}$ b) $\frac{\ln 3}{\ln 5}$ c) $5 \ln 3$ d) $\log \frac{5}{3}$ e) none of these

---

143. Write as a sum, difference, or multiple of logarithms: $\log \sqrt[3]{\frac{a^2 b}{c}}$

a) $\sqrt[3]{\frac{2\log a + \log b}{\log c}}$ b) $\frac{1}{3}\left(\frac{2\log a + \log b}{\log c}\right)$ c) $\frac{1}{3}(2 \log a + \log b - \log c)$

d) $\sqrt[3]{2\log a^2 + \log b - \log c}$ e) none of these

---

144. Write as a logarithm of a single quantity: $\frac{1}{4}\log_{b} 16 - 2 \log_{b} 5 + \log_{b} 7$

a) $\frac{14}{25}$ b) $\log_{b} \frac{2}{175}$ c) 1 d) $\log_{b} \frac{14}{25}$ e) none of these

---

145. Write as the logarithm of a single quantity: $\log_{2}(x - 2) + \log_{2}(x + 2)$

a) $-2 + 2 \log_{2} x$ b) $\log_{2}(x^{2} - 4)$ c) $2 \log_{2} x$ d) $\log_{2} 2x$ e) none of these

---

146. Evaluate $\log_{a} 24$, given $\log_{a} 2 = 0.4307$ and $\log_{a} 3 = 0.6826$

a) 0.8820 b) 1.9747 c) 0.2940 d) 1.1133 e) none of these

---

147. Solve for x $16 = 2^{7x - 5}$

a) 0.1143 b) -0.3010 c) $\frac{13}{7}$ d) $\frac{9}{7}$ e) none of these

---

148. Solve for x $\log_{x} 8 = -3$

a) 2 b) 512 c) ½ d) –2 e) none of these

149. Simplify $3\,e^{3\ln(x+1)}$

a) 3^{x} b) $3x\,e^{2}$ c) $3x^{2}$ d) $\ln x^{3}$ e) none of these

150. Simplify $3 + \ln e^{5x}$

a) $\frac{\ln 3}{5x}$ b) $\ln 3 + 5x$ c) $3 + 5x$ d) $5x \ln 3$ e) none of these

151. Solve for x: $3^{2x} = 5^{x-1}$

a) - 0.5563 b) –1 c) - 2.7381 d) 15.2755 e) N.O.T.

152. An initial deposit of $3000 is made in a savings account for which the interest is compounded continuously. The balance will double in seven years. What is the annual rate of interest for this account?

a) 4.3 % b) 6.2 % c) 8.1 % d) 9.9 % e) none of these

153. Solve for x: $\log(3x+7) + \log(x-2) = 1$

a) $\frac{8}{3}$ b) $3, -\frac{8}{3}$ c) 2 d) $2, -\frac{5}{3}$ e) none of these

154. Match the graph with the correct function.

a) $f(x) = 4^{x} - 5$ b) $f(x) = 4^{x} + 5$ c) $f(x) = 4^{-x} + 5$ d) $f(x) = 4^{-x} - 5$

e) none of these

155. Which sequence of transformations will yield the graph of $g(x) = (x+1)^{2} + 10$ from the graph of $f(x) = x^{2}$

a) horizontal shift 10 units to the right, vertical shift 1 unit up
b) horizontal shift 1 unit to the left, vertical shift 10 units up
c) horizontal shift 1 units to the right, vertical shift 10 units up
d) horizontal shift 10 units to the left, vertical shift 1 unit up
e) none of these

156. The equation for the quadratic function that has a maximum point of (-1, 17) and passes through the point (7, 1) is:

a) $y = \frac{1}{4}(-x^{2} - 3x + 16)$ b) $y = -\frac{1}{4}(x+1)^{2} + 17$ c) $y = (x-1)^{2} + 17$

d) $y = (x-7)^{2} + 1$ e) none of these

157. A certain population increases according to the model $P(t) = 250\,e^{0.47t}$ Use the model to determine the population when t = 5. Round your answer to the nearest integer.

a) 400 b) 1597 c) 1998 d) 2621 e) none of these

158. Solve for x: $\log(7-x) - \log(3x+2) = 1$

a) $\frac{19}{31}$ b) $-\frac{13}{31}$ c) $-\frac{27}{29}$ d) $\frac{9}{4}$ e) none of these

159. Two six-sided fair dice are tossed. What is the probability that the total is 12?

a. 1/12 b. 1/18 c. 1/36 d. 1/30 e. None of these

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160. A committee of four people is to be selected from a group of four men and four women. What is the probability that half the men and half the women are on the committee?

a) $\frac{{}_4P_2 \cdot {}_4P_2}{{}_8C_4}$ b) $\frac{{}_8C_4 \cdot {}_8C_4}{{}_8P_4}$ c) $\frac{{}_4C_2 \cdot {}_4C_2}{{}_8P_4}$ d) $\frac{{}_4C_2 \cdot {}_4C_2}{{}_8C_4}$ e) NOT

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161. Write the quadratic equation in vertex (h, k) form. Give the coordinates of the vertex and the equation of the axis of symmetry. $y = -7x^2 + 42x + 7$

a) $y = -7(x + 3)^2 + 63$; x = -3; (-3, 63)
b) $y = -7(x – 3)^2 + 9$; x = 3; (3, 9)
c) $y = -7(x + 3)^2 – 56$; x = -3, (-3, -56)
d) $y = -7(x – 3)^2 + 70$; x = 3; (3, 70)
e) none of these

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162. If the parabola $y = ax^2 + bx + c$ passes through points (17, -4), (11, 5), and (1, 8), then the value of $a + b + c$ is equal to

a) $\frac{17}{43}$ b) $\frac{5}{2}$ c) $\frac{14}{27}$ d) 8 e) -11

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163. If $f(x) = -x^2$ is translated three units to the left and one unit up, the result is $g(x)$. What is the value of g(-1.6)?

a) 2.96 b) -0.96 c) -1.56 d) -1.96 e) -2.96

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164. Positive integers *x*, *y*, and *z* satisfy the equations $x^{-\frac{1}{2}} = \frac{1}{3}$ and $y^z = 16$.

If $z > y$, what is the value of $x + y$?

a) 5 b) 6 c) 11 d) 13 e) 15

ALGEBRA 2 HONORS
Final Review Packet Answer Key:

1. B	2. B	3. D	4. B	5. C	6. D	7. C	8. D	9. E	10. B
11. D	12. C	13. B	14. D	15. C	16. C	17. D	18. B	19. C	20. A
21. A	22. D	23. A	24. B	25. B	26. D	27. A	28. T	29. C	30. A
31. C	32. C	33. A	34. A	35. 3	36. A	37. A	38.A	39.C	40. 70
41. B	42.5/4	43. D	44.D	45. D	46. B	47. C	48. A	49. B	50. B
51. E	52. B	53. C	54. B	55. C	56. D	57. D	58. D	59. B	60. B
61. C	62. B	63. A	64. D	65. B	66. B	67. A	68. B	69. D	70. C
71. A	72. D	73. D	74. A	75. A	76. D	77. D	78. C	79. D	80. C
81. B	82. B	83. C	84. A	85. C	86. T	87. D	88. D	89. C	90. D
91. C	92. A	93. B	94. B	95. C	96. A	97. C	98. A	99. B	100.A
101.B	102.C	103.A	104.D	105.A	106.C	107.E	108.D	109.A	110.B
111.C	112.A	113.D	114.C	115.B	116.D	117.C	118.B	119.C	120.B
121.A	122.D	123.E	124.D	125.C	126.D	127.C	128.D	129.A	130.B
131.B	132.B	133.C	134.C	135.D	136.B	137.C	138.A	139.B	140.B
141.C	142.A	143.C	144.D	145.B	146.B	147.D	148.C	149.E	150.C
151.C	152.D	153.A	154.A	155.B	156.B	157.D	158.B	159.C	160.D
161.D	162.D	163.B	164.C						