Whittier Tech

Honors Pre-Calculus
Summer Project

In exercises #1-10, use any method to solve the quadratic equation.

1. $15 + x - 2x^2 = 0$
2. $2x^2 - x - 28 = 0$
3. $6 = 3x^2$
4. $16x^2 = 25$
5. $(x + 4)^2 = 18$
6. $(x - 8)^2 = 15$
7. $x^2 - 12x + 30 = 0$
8. $x^2 + 6x - 3 = 0$
9. $-2x^2 - 5x + 27 = 0$
10. $-20 - 3x + 3x^2 = 0$

In exercises #11-24, find all solutions of the equation. Check your solutions in the original equation.

11. $5x^4 - 12x^3 = 0$
12. $4x^3 - 6x^2 = 0$
13. $x^4 - 5x^2 + 6 = 0$
14. $9x^4 + 27x^3 - 4x^2 - 12x = 0$
15. $\sqrt{x + 4} = 3$
16. $\sqrt{x - 2} - 8 = 0$
17. $\sqrt{2x + 3} + \sqrt{x - 2} = 2$
18. $5\sqrt{x} - \sqrt{x - 1} = 6$
19. $(x - 1)^{\frac{2}{3}} - 25 = 0$
20. $(x + 2)^{\frac{3}{4}} = 27$
21. $|x - 5| = 10$
22. $|2x + 3| = 7$
23. $|x^2 - 3| = 2x$
24. $|x^2 - 6| = x$

In exercises #25 and 26, find (a) $(f+g)(x)$, (b) $(f-g)(x)$, (c) $(fg)(x)$, and (d) $\left(\frac{f}{g}\right)(x)$. What is the domain of $\left(\frac{f}{g}\right)$?

25. $f(x) = x^3 + 3, \qquad g(x) = 2x - 1$

26. $f(x) = x^2 - 4, \qquad g(x) = \sqrt{3 - x}$

In exercises #27 and 28, find (a) $f \circ g$ and (b) $g \circ f$. Find the domain of each function and each composite function.

27. $f(x) = \frac{1}{3}x - 3, \qquad g(x) = 3x + 1$

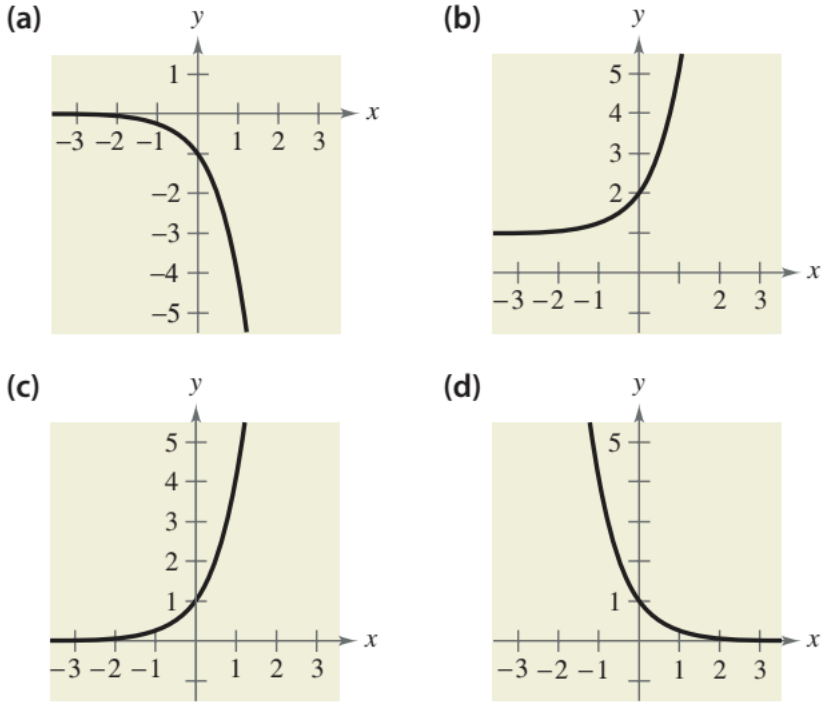
28. $f(x) = x^3 - 4, \qquad g(x) = \sqrt[3]{x + 7}$

In exercises #29 and 30, find the inverse function of f informally. Verify that $f\left(f^{-1}(x)\right) = x$ and $f^{-1}\left(f(x)\right) = x$.

29. $f(x) = x - 7$

30. $f(x) = x + 5$

In exercises #31-34, match the function with its graph. [The graphs are labeled (a), (b), (c), and (d).]



31. $f(x) = 4^x$

32. $f(x) = 4^{-x}$

33. $f(x) = -4^x$

34. $f(x) = 4^x + 1$

In exercises #35-39, use the graph of *f* to describe the transformation that yields the graph of *g*.

31. $f(x) = 5^x; \quad g(x) = 5^{x-1}$

32. $f(x) = 4^x, \quad g(x) = 4^x - 3$

33. $f(x) = \left(\frac{1}{2}\right)^x, \quad g(x) = -\left(\frac{1}{2}\right)^{x+2}$

34. $f(x) = \left(\frac{2}{3}\right)^x, \quad g(x) = 8 - \left(\frac{2}{3}\right)^x$

In exercises #40 and 41, use the One-to-One Property to solve the equation for *x*.

40. $3^{x+2} = \frac{1}{9}$

41. $\left(\frac{1}{3}\right)^{x-2} = 81$

In exercises #42 and 43, write the exponential equation in logarithmic form.

42. $4^3 = 64$

43. $25^{\frac{3}{2}} = 125$

In exercises #44 and 45, use the One-to-One Property to solve the equation for *x*.

44. $\log_4(x+7) = \log_4 14$

45. $\log_8(3x - 10) = \log_8 5$

In exercises #46-49, evaluate the logarithm using the change-of-base formula. Round the results to three decimal places.

46. $\log_4 9$

47. $\log_{12} 200$

48. $\log_{\frac{1}{2}} 5$

49. $\log_3 0.28$

In exercises #50-53, write the complex number in standard form.

50. $6 + \sqrt{-4}$

51. $3 - \sqrt{-25}$

52. $i^2 + 3i$

53. $-5i + i^2$

In exercises #54-59, perform the operation and write the result in standard form.

54. $(7+5i)+(-4+2i)$

55. $\left(\frac{\sqrt{2}}{2}-\frac{\sqrt{2}}{2}i\right)-\left(\frac{\sqrt{2}}{2}+\frac{\sqrt{2}}{2}i\right)$

56. $5i(13-8i)$

57. $(1+6i)(5-2i)$

58. $(10-8i)(2-3i)$

59. $i(6+i)(3-2i)$

In exercises #60 and 61, write the quotient in standard form.

60. $\frac{6+i}{4-i}$

61. $\frac{3+2i}{5+i}$

In exercises #62 and 63, perform the operation and write the result in standard form.

62. $\frac{4}{2-3i}+\frac{2}{1+i}$

63. $\frac{1}{2+i}-\frac{5}{1+4i}$