

Math Analysis

Complete without a calculator! Show all work.

Approximate to the hundredths.

1. 5.21597

2. 7.3623

Simplify

3. $7 - 2 \cdot 5 + 4 \cdot 3 - 5$

4. $-2(5 + 3) + 7(3 - 2 \cdot 5)$

5. $-\frac{16}{(-2)(-4)}$

6. $-3(x - y) + 4(3x - 2y)$

Perform the indicated operation and simplify.

7. $\frac{x}{4} - \frac{x}{3}$

8. $\frac{y}{3} + \frac{y}{5} - \frac{y}{6}$

9. $\frac{12}{7} \cdot \frac{21}{4}$

10. $\frac{a^2}{b^3} \div \frac{2a}{b^2}$

Exponents and Radicals

Simplify using properties of exponents

11. $(-2z)^3$

12. $81^{1/4}$

13. $(-64)^{1/3}$

14. $\frac{(2x^2y^3)^2}{(4xy)^3}$

15. Express 0.00000215 in scientific notation.

16. Express 7.2×10^9 as a real number.

Simplify

17. $\frac{(3x^{2/3})^2}{(4x^{1/3})^2}$

18. $\sqrt{20}$

19. $(2 + \sqrt{5})(1 - \sqrt{5})$

20. $\frac{1}{2 - \sqrt{3}}$

Perform the indicated operation and write the results in standard form.

21. $(14z^2 + 2) + (3z - 4)$

22. $(27y^2 - 6y + 2) - (y^2 + 3y - 7)$

23. $5xy^2(3x - 4y)$

24. $-2st^2(-t + s - 2st)$

25. $(x - 7)(x + 9)$

26. $(2x + 1)(3x - 2)$

27. $(2x - 3)^2$

28. $(5x - 7)(5x + 7)$

29. $(x^2 + 1)^2$

30. $(1 - x^2)^2$

Factor

31. $14x^2y^2 - 100xy^3$

32. $30x^4 - 20x^3 + 10x^2$

33. $2x^2 + 9x - 5$

34. $6x^2 - 19x - 7$

35. $16x^2 - 25$

36. $9x^2 - 30x + 25$

37. $2x^3 + 4x^2 - 30x$

38. $6x^3 - 5x^2 + x$

39. $x^3 + x^2 - 2x - 2$

40. $2x^3 - x^2 + 6x - 3$

State the Domain of the Rational Expression.

41. $\frac{4x^2 - 3}{x^2 - 9}$

42. $\frac{1}{x^2 + 1}$

Simplify.

43. $\frac{x^2 - 4}{x - 2}$

44. $\frac{x - 5}{x - 5}$

45. $\frac{t^2 + t - 6}{t^2 - t - 2}$

46. $\frac{z^3 - z}{z^2 + z}$

47. $\frac{x^2 + 3x - 10}{x^2 + 2x - 3} \cdot \frac{x^2 + x - 2}{x^2 + x - 6}$

48. $\frac{x^2 - x - 2}{x^3 + 3x^2} \div \frac{x + 1}{x^2 + 2x}$

49. $\frac{1}{x + 1} - \frac{1}{x + 3}$

50. $\frac{1}{x} - \frac{1}{x + 1} + \frac{1}{x + 2}$

Solve the equation.

51. $3(z + 2) - 1 = 4z + 10$

52. $6x + 6 = 8x + 3$

53. $\frac{1}{5}y - \frac{1}{3}y = -2$

54. $y^2 + 100 = 0$

55. $x^2 - 144 = 0$

56. $x^2 = 5x$

57. $x^2 - 6x + 8 = 0$

58. $y^3 - 4y = 0$

59. $x^3 - x^2 - 4x + 4 = 0$

60. $x^3 + x^2 + 3x + 3 = 0$

Simplify.

61. $\sqrt{-169}$

62. $\sqrt{-32}$

63. i^{19}

64. i^9

65. $(\sqrt{-4} + 2)(3 - \sqrt{-9})$

66. $(\sqrt{-36} + 1)(1 + \sqrt{-25})$

67. $\frac{1}{2-i}$

68. $\frac{1}{3+i}$

69. $\frac{6-5i}{3-2i}$

70. $\frac{7+2i}{4+5i}$

Divide and simplify. Use either polynomial long division or synthetic division.

71. $\frac{x^2 + 2x - 3}{x + 3}$

Solve each quadratic equation for x using either factoring techniques, or the quadratic formula.

72. $(x - 1)(x + 3) = 0$

73. $x(x-4)=2(4-x)$

74. $x^2 + 4x = -3$

75. $2x^2 - 32x = 0$

If $f(x) = x^2 - 4$ and $g(x) = \sqrt{2x+4}$, determine

76. $f(3)$

77. $f(x) = 0$ when $x = ?$

78. $f(g(4))$

79. $f(g(x))$

80. Domain of $f(g(x))$

81. $g(f(0))$

Graph the functions using a calculator. Sketch it on your paper. Describe the following characteristics for each function:

- a. domain and range b. zeros c. y-intercept d. end behavior
e. intervals where the function is increasing and/or decreasing

82. $f(x) = x^3 - 3x^2 + x + 1$

83. $f(x) = x^2 + 2x + 1$

84. $g(f(a + 2))$

85. $f^{-1}(x)$

Graph the following functions using a table of values. Also identify:

- a. domain b. range c. asymptotes

86. $f(x) = \frac{2x}{x+4}$

87. $h(x) = \frac{3}{x+1} - 2$

88. $k(x) = \frac{4}{x-2}$