1. Solve the following system of equations by any method you wish. (Hint: some systems are solved more easily by specific methods.)
$x + y = 6$ $y = 2x - 3$

2. Solve the following system of equations by any method you wish. (Hint: some systems are solved more easily by specific methods.)
$y = 2x - 4$ $y = -2x + 4$

3. Solve the following system of equations by any method you wish. (Hint: some systems are solved more easily by specific methods.)
$3x - 5 = y$ $2y = 6x - 9$

4. Solve the following system of equations by any method you wish. (Hint: some systems are solved more easily by specific methods.)
$x + 2y = 2$ $2x + 4y = 4$

5. Solve the following system of equations by any method you wish. (Hint: some systems are solved more easily by specific methods.)
$x + y + z = 8$ $x - y - z = -4$ $-x + y - z = -8$

6. Solve the following system of equations by any method you wish. (Hint: some systems are solved more easily by specific methods.)
$x + y = 5$ $x + 2z = 6$ $y + 3z = 4$

7. You realize how much my brother Jim fishes by now. The last time he went fishing he only caught three fish. The

total weight was 64 ounces. The first one was twice as big as the second fish. The third one was half as large as the first. How many ounces did each fish weigh?

8. My greenhouse roof has 1.5 times the surface area of the floor. I want to coat both the roof and the floor with clear-coat plastic sealer. The total square footage for both is 750 ft^2. What is the square footage of the floor?

Simplify (all exponents should be positive):

9. $4x^3 * (3y)^4$

10. $(3x4y^3 - 5y) - (2x + 3y^3 - 5y)$

11. $(4x^3 + 2y)(2x^3 - 3y)$

12. $(x + 4)^2$

13. $(x + 5y)(x - 5y)$

Write the result in scientific notation:

14. $(3.86 \times 10^{15}) * (2.15 \times 10^{-7})$

15. $(3.86 \times 10^{15}) / (4.15 \times 10^{-7})$

Factor completely:

16. $a^2 - 4a + 4$

17. $2x^2y - 32y$

18. $x^8 - 1$

19. $y^3 + 125$

Solve each equation:

20. $x^3 = 4x$

21. $4m^2 + 14m - 30 = 0$

22. $| x^2 + 2x - 36 | = 12$

23. The bottom of Jim's rectangular bait box is 3 inches longer than it is wide. The diagonal is 15 inches. What is the area of the bottom of the box?

24. The greenhouse heats up in the sun according to the following formula: $T = 55 + 2.356 \times 10^{-2} * h^3$ where h is the number of hours the sun hits the building. In December the average number of hours that the sun will hit the greenhouse is 6.72. How warm should we expect the greenhouse to get the end of an average day in December?

State the domain for the following expressions:

25. $\frac{6}{4x^3}$

26. $\frac{x + 5}{x^2 - 36}$

27. $\frac{x + 5}{x^2 + 36}$

Simplify and reduce to lowest terms:

28. $\frac{4x^3\ y}{2x^2\ y}$

29. $\frac{1}{x} + 4$

30. $\frac{1}{x + 5y} - \frac{5}{x-5y} + \frac{3}{x^2 - 25y^2}$

31. $\frac{w}{45} + \frac{3w+2}{30}$

Solve:

32. $\frac{5}{x} = \frac{3}{2}$

33. $\frac{a-2}{a^2 -4} = 1$

34. $\frac{2x-4}{2x} = \frac{3x-6}{3x}$

35. $\frac{1}{r} = \frac{1}{s} + \frac{1}{t}$ solve for s

36. $W = \frac{a^2}{}$ solve for t

Simplify:

37. $\dfrac{\dfrac{c^2}{d^3} + \dfrac{d}{c^2}}{\dfrac{c^4}{} + \dfrac{}{d^4}}$

38. $\dfrac{\dfrac{a^{-2}\, b^2}{ac}}{\dfrac{ab}{b^{-2}\, c^3}}$

39. The number of fish Jim catches is dependent upon the lures he uses. He also loses lots of these expensive lures. Here in South Dakota each fisherman can use two poles at one time so Jim can use two different lures. If L_1 represents the number of fish caught per hour for the lure on the pole that holds and L_2 represents the number of fish caught per hour for the lure on the pole that he puts in the "dummy" holder, then the formula below represents the relation between the two lures used and the total number of lures lost per hour using the two poles. (C is the rate of lures lost per hour using both poles.) If the combined loss rate and the rate for fish on lure 2 are known, write a function for the rate of fish on the first lure (i.e. solve the equation below for L_1.)

$$\frac{\mathbf{1}}{\mathbf{C}} = \frac{\mathbf{1}}{\mathbf{L_1}} + \frac{\mathbf{L_2}}{\mathbf{L_1}}$$

40. The greenhouse cools down (after the sun sets) according to the following formula below where n is the number of hours after the sun stops hitting the building. In December the average number of hours that the sun does not hit the greenhouse is 16.25. How cool should we expect the greenhouse to get by sunrise of an average day in December?

$$T = 85 - \frac{n^2 - 1}{n+1}$$

41. $(x^3 + 7x^2 + 7x - 15) / (x + 3)$

Write the quotient:

42. $4x^3 + 4x^2 - 4) / (x - 2)$

43. $\frac{(2x^3 + x^2 - x + 4)}{(2x - 5)}$

Simplify and reduce to lowest terms (rationalize when required):

44. $64^{5/6}$

45. $8^{-2/3}$

46. $\frac{\sqrt{16}}{\sqrt{32}}$

47. $\sqrt{8} + \sqrt{32}$

48. $(2\sqrt{3} - 1)(3\sqrt{3} + 4)$

49. $\sqrt[3]{-8x^{12}}$

50. $\sqrt{(20m^3b)}$

51. $\frac{1}{\sqrt{t} - 5} + \frac{3}{\sqrt{t} + 5}$

52. $\frac{\sqrt{3}}{(\sqrt{3} + \sqrt{2})}$

Solve for all real roots:

53. $(x - 4)^2 = 36$

54. $2\sqrt{(x + 4) = 3}$

55. $\sqrt{2x^2 + x - 12)} + x$

56. $\sqrt{z} - \sqrt{(z-1)} = 1$

Solve:

57. The amount of money Jim spends on fishing is dependent upon the average temperature during any month. It varies according to the function: $m = 5t^{3/5} + 45$. If the average temperature last July was 87.45 degrees, how much did Jim spend on fishing?

58. The greenhouse floor has a diagonal equal to 28 feet. The sides are square. What is the length of one side?

Find the product of these complex numbers

59. $(3 - 2i)(2 - 5i)$

Find the product of the given complex number and its conjugate

60. $4 - 6i$

Calculate the discriminant and state how many real solutions each equation has:

61. $4x^2 - 6x + 4 = 0$

62. $4x^2 - 4x + 1 = 0$

Solve:

63. $-3x^2 + 5x - 1 = 0$

64. $x^2 + 6x + 6 = 0$

65. $x^4 + 10x^2 + 9 = 0$

66. $y - 2 - 8\sqrt{(y-2)} + 15 = 0$

67. The length of Jim's leader is always 2 feet shorter than the length of his fishing rod. If the product of the length of the leader and the length of the rod equals the strength of his line in pounds and he uses a 16-lb line, what is the length of his leader

68. Kay wants a rectangular area in the greenhouse reserved for African Violets. She says the width of the area must be one foot less than the length. She also tells me the area must be at least 12 square feet. What widths would satisfy Kay's requirements?

69. $f(x) = 8 + x$
$g(x) = x - 5$
If $d(x) = f(x) - g(x)$, find $d(x)$

70. $g(x) = x^2 + 3x$
$h(x) = (x + 3)/2$
Find: $(h \circ g)(-1)$

71. $f(x) = e^{2x}$
What is $f(1/4)$?

72. What is x if: $\log_x(16) = -2$

73. log (10,000) = ?