

Directions:

1. The following set of problems is designed to brief you on the information that must be understood from your other mathematics classes in order for you to be successful in this course.
2. **Do not wait until the last minute to complete this packet**, instead, pace yourself throughout the summer and complete this over an extended period of time.
3. The exact grading procedure for this material has yet to be determined, but most likely will be: two quiz grades (based on the accuracy of your responses), a notebook grade (based on the completeness of the packet), and a subsequent test on the material covered here.
4. **All work MUST be shown in a neat and orderly fashion on a separate sheet of paper.**
5. Place your answers in the space provided on this handout.
6. Staple your work to the back of this handout.
7. **Turn this packet in on the first full day of class.**

1. Given: A(4, 2) and B(6, -4). Find the equation of the line containing both A and B. \_\_\_\_\_

2. A graph of a line crosses the  $x$ -axis at 4 and the  $y$ -axis at -3. What is the equation of the line? \_\_\_\_\_

3. Find the equation of the line through B(-4, 3) and is parallel to the graph of  $2x - y = 6$ . \_\_\_\_\_

4. Write an equation for a line passing through S(3, 2) which is perpendicular to the line whose equation is  $2y - x = 4$ . \_\_\_\_\_

5. It has been shown experimentally that the temperature is related to the number of cricket chirps per minute. Suppose that when crickets chirp 40 times per minute, the temperature is 10 degrees Celsius and when they chirp 112 times per minute, the temperature is 20 degrees Celsius. Find a linear equation that fits this information. Use appropriate variables besides  $x$  and  $y$ . \_\_\_\_\_

6. One number is equal to 3 more than 4 times a second number. Twice the second number plus the first is equal to 27. Solve for both numbers. \_\_\_\_\_

7. It took the "Marybelle," a paddle boat on the Mississippi, 2 hours to travel 36 miles downstream. Because it had to fight the current, it took 3 hours for the Marybelle to return. What was the speed of the current? \_\_\_\_\_

8. The area of a rectangle is  $76 \text{ m}^2$ . The length is 3 m more than 4 times its width. What is the perimeter of the rectangle? \_\_\_\_\_

9. Joel is five times as old as Justin, while Jason is only two years older than Justin. The product of Joel's and Jason's ages is 175. How old is Jason? \_\_\_\_\_

10. Jake's boat travels 15 m.p.h. in still water. He can travel 36 miles downstream in the same amount of time it takes him to go 24 miles upstream. How long would it take him to go 54 miles downstream? (Assume the current is constant.) \_\_\_\_\_

11. Find the common solution set of  $y = 3x + 4$  and  $x - 2y = 2$ . \_\_\_\_\_

12. The length of a rectangle is 4 more than 3 times the width. The area of the rectangle is equal to 20 more than twice the perimeter. What is the area of the rectangle? \_\_\_\_\_

13. A pharmacist has one solution that is 20% HCl and another solution that is 80% HCl. How much of the 80% solution must be added to 10cm<sup>3</sup> of the 20% solution to make a solution that is 60% HCl? \_\_\_\_\_

14. Find the coordinates of the vertex of  $y = 2x^2 - 4x + 5$ . \_\_\_\_\_

15. An accurate graph of  $y = x^2 + 4x + 2$  would show that the  $x$ -intercepts are approximately: \_\_\_\_\_

16. Solve  $x^2 - 3x = -4$  for  $x$ . \_\_\_\_\_

17. Solve  $2x^2 + 3x = 3x - 98$  for  $x$ . \_\_\_\_\_

18. The solutions to a quadratic equation are  $\frac{1}{2}$  and  $-4$ . What is the equation? \_\_\_\_\_

19. The solution set for  $-7x - 3 > 2x^2$  is: \_\_\_\_\_

20. Solve for all possible solutions, both real and imaginary:  $x^4 - 1 = 0$  \_\_\_\_\_

21. Factor  $3x^5 - 108x$  completely. \_\_\_\_\_

22. Factor as the difference of two squares:  $c - 25b$  \_\_\_\_\_

23. Find the solution set:  $(x + 1)(x - 1)(x - 4)^3 < 0$  \_\_\_\_\_

24. If  $|3x + 9| = 12$ , then  $x =$  \_\_\_\_\_

25. Solve for  $n$ :  $|15 - 3n| > 6$  \_\_\_\_\_

26. Simplify:  $32^{\frac{4}{5}}$  \_\_\_\_\_

27. Solve for  $x$ :  $125^{x+1} = 625$  \_\_\_\_\_

28. Solve for  $x$ :  $9^{x-1} = 15$ . \_\_\_\_\_

29. Solve for  $b$ :  $2^{4b+3} = 128$  \_\_\_\_\_

30. Solve for  $x$ :  $3+2e^{4x} = 11$ . \_\_\_\_\_

31. Simplify:  $\text{Log}_8 4$  \_\_\_\_\_

32. Write as the Log of one expression:  $\text{Log } 2x + \text{Log } 4x - 2 \text{Log } y$  \_\_\_\_\_

33. Write as the Log of one expression:  $\text{Log } 4 + \text{Log } 2 + 3 \text{Log } r - \text{Log } 3$  \_\_\_\_\_

34. Solve for  $x$ :  $\text{Log } (x + 1) + \text{Log } (x + 2) = \text{Log } 12$  \_\_\_\_\_

35. Solve for  $x$ :  $\text{Log}_x 27 = -3$  \_\_\_\_\_

36. Solve for  $x$ :  $2+2\text{Lnx} = 4$  \_\_\_\_\_

37. Find the value of \$12,500 deposited for 20 years in an account that pays 6.5% annual interest compounded quarterly. \_\_\_\_\_

38. An investment of \$10,000 grows into \$16,000 in 7 years (compounded continuously) What must be the interest rate? \_\_\_\_\_

39. How long will it take an account to double at 6.3% compounded continuously? \_\_\_\_\_

40. Simplify:  $\sqrt{7a^6b^7}$  completely. \_\_\_\_\_

41. Simplify  $x^{3m-2}\sqrt{x^{4m+5}}$  completely. \_\_\_\_\_

42. Simplify:  $\sqrt{16a^2} - \sqrt{4a^3} - \sqrt{9a^3} + a\sqrt{25a}$  \_\_\_\_\_

43. Simplify:  $4\sqrt{2}(6\sqrt{3} - 2\sqrt{2})$  \_\_\_\_\_

44. Multiply and simplify:  $(\sqrt{x+1} - 5)(\sqrt{x+1} + 5)$  \_\_\_\_\_

45. Simplify:  $\frac{\sqrt{27n^9}}{\sqrt{3n^3}}$  \_\_\_\_\_

46. Simplify:  $3 \cdot \sqrt[4]{162a^{12}} - 4 \cdot \sqrt[4]{405a^{12}} + a \cdot \sqrt[4]{32a^8}$  \_\_\_\_\_

47. Solve  $\sqrt{y-3} = y-5$  for  $y$ . \_\_\_\_\_

48. Solve  $4 \cdot \sqrt[3]{y+2} = 8$  for  $y$ . \_\_\_\_\_

49. Solve  $5 \cdot \sqrt{3n-2} = 4\sqrt{4n+1}$  for  $n$ . \_\_\_\_\_

50. Simplify and rationalize the denominator:  $\frac{1+\sqrt{3}}{\sqrt{6}}$  \_\_\_\_\_

51. Simplify and rationalize the denominator:  $\frac{x+1}{\sqrt{x+1}}$  \_\_\_\_\_

52. Multiply and Simplify:  $(2+3i)(3-7i)$  \_\_\_\_\_

53. Multiply and Simplify:  $(6+3i)^2$  \_\_\_\_\_

54. Simplify this imaginary number:  $i^{15}$  \_\_\_\_\_

55. Multiply:  $(3x-y)(2x^2-2xy-5y^2)$  \_\_\_\_\_

56. Multiply:  $(4x-3)(x^2+3x-1)$  \_\_\_\_\_

57. Multiply:  $2x^2(3x+4)(x^2-3x+6)$  \_\_\_\_\_

58. When  $10x^3 - 34x + 4$  is divided by  $2x + 4$ , the remainder is: \_\_\_\_\_

59. For what value(s) of  $x$  is  $\frac{x^2-16}{x^2+x-12}$  undefined? \_\_\_\_\_

60. Simplify:  $\frac{16-c^2}{5c-20}$  \_\_\_\_\_

61. Simplify:  $\frac{4x^4y^2z^6}{-2x^7y^2z}$  \_\_\_\_\_

62. Simplify:  $\frac{8x^2-16x-120}{12x^2-72x+60}$  \_\_\_\_\_

63. Simplify:  $\frac{\frac{4}{x-2} + \frac{6}{x+8}}{1 + \frac{x+4}{x-2}}$  \_\_\_\_\_

64. Solve for  $x$ :  $\frac{2}{3} + \frac{1}{x} + \frac{2}{x} + \frac{3}{x} = 1$  \_\_\_\_\_

65. Solve for  $y$ :  $\frac{2}{3} + \frac{1}{y} + 2 = \frac{1}{2y}$  \_\_\_\_\_

66. Solve for  $a$ :  $\frac{2}{a+5} + \frac{3}{a-5} = \frac{7a-9}{a^2-25}$  \_\_\_\_\_

67. Solve for  $a$ :  $\frac{3a-5}{a^2+4a+3} - \frac{a-3}{a+1} = \frac{2a+2}{a+3}$  \_\_\_\_\_

68. Solve for  $x$ :  $\frac{8}{x+2} = \frac{x}{x-1}$  \_\_\_\_\_

69. Identify the vertical asymptote(s) of  $f(x) = \frac{-6x^2 + 14x - 22}{x^2 + 19}$  \_\_\_\_\_

70. Identify the horizontal asymptote of  $f(x) = \frac{-16x^2 + 34x - 17}{x^2 - 6x - 72}$  \_\_\_\_\_

71. Given  $t(x) = -x^2 + 2x$  and  $s(x) = 2x + 3$  find  $s \circ t$  and simplify. \_\_\_\_\_

72. Given  $t(x) = -x^2 + 2x$  and  $s(x) = 2x + 3$  evaluate  $2s - t$  when  $x = 1$ . \_\_\_\_\_

73. If  $f(x) = -2x^2 + 4$  and  $g(x) = x + 3$  find  $2f(3) - g(-2)$ . \_\_\_\_\_

74. Given the relation  $f(x) = \begin{cases} 2x - 3, & x < -2 \\ \frac{x}{x-3}, & -2 \leq x < 4, \\ \frac{x-3}{6}, & x \geq 4 \end{cases}$ , find  $f(-2)$ . \_\_\_\_\_

75. Given the relation  $f(x) = \begin{cases} 6, & x < -2 \\ \frac{x}{x-3}, & -2 \leq x < 4, \\ -5, & x \geq 4 \end{cases}$ , find  $f(6)$ . \_\_\_\_\_