Honors Pre Calculus Summer Math Packet

Name _____   Date _____

Solve these problems on this worksheet. Show work. Your completed assignment is due on the first day of school. An in-class assessment will be given on the first Friday.

USEFUL WEB SITES:
www.purplemath.com/modules/index.htm

For problems 1-12, solve for x. Simplify all answers. Check where required.

1. $x^2 - 5x - 24 = 0$

2. $9x^2 = 18x + x^3$

3. $5x^2 - 1 = 6x$

4. $3x^2 + 2x = -6$

5. $(x + 5)^{\frac{3}{2}} = 125$

6. $(2x - 1)^{\frac{4}{3}} = 81$

7. $\sqrt{16 + 3x} = 2$

8. $\sqrt{3x^2 - 27x + 15} + 5 = 2x$

9. $|4x - 3| - 6 = 2$

10. $|7x + 4| + 10 = 6$

11. $x^2 + 52 = 0$

12. $3x^2 - 6x + 10 = 0$

13. Find all solutions to the equation $x^4 - 7x^3 + 18x^2 - 2x - 28 = 0$. Analytically verify that each of your answers is a solution (do not solely find zeros on your graphing calculator).

14. Use your graphing calculator to estimate all real zeros of this function. Round to **thousandths.**
$f(x) = 3x^4 + 4x^3 - 11x^2 - 5x + 2$

Sketch the graphs of the equations shown in problems 15-20 without using your calculator.

15. $y = 2x^2 - 8x + 3$

16. $y = (x + 3)^2 + 1$
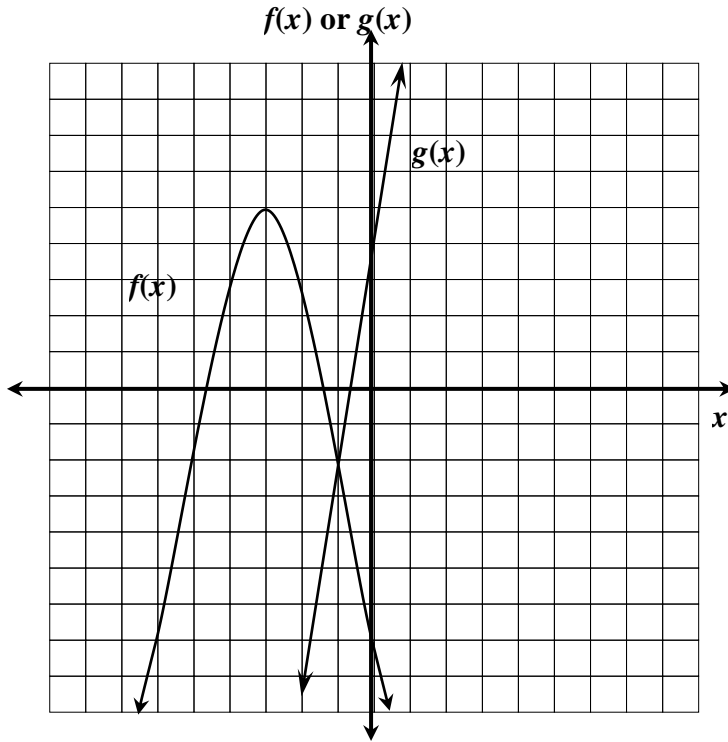
17. $y = \left| \dfrac{1}{2}x + 2 \right| - 3$

18. $y = -(x + 3)(x - 1)(x - 4)^2$

19. $y = -\sqrt{x - 2} + 4$

20. $y = \dfrac{x - 5}{x + 2}$

Use these definitions of $f(x)$, $g(x)$, $h(x)$ and $k(x)$ to answer problems 21-24.

$f(x)$ or $g(x)$

$h(x) = 2x^2 - 4$

$k(x) = 3x + 5$

21. Evaluate each of these functions

   a) $f(-2)$ b) $h(-6)$ c) $g(0)$ d) $h(k(-3))$

   e) $h(h(2))$ f) $f^{-1}(5)$ g) $g^{-1}(-2)$ h) $h^{-1}(10)$

22. What value of a makes $f(a) = g(a)$?

23. Write expressions for the following functions. Simplify your answers

    a) $k(h(x))$ b) $(h \circ k)(x)$ c) $k^{-1}(x)$ d) $2h(x) + k(x)$

24. Give the domain and range of $f(x)$, $g(x)$, $h(x)$ and $k(x)$.

Use this definition of $m(x)$ to answer questions 25-26.

$$m(x) = \begin{cases} 2x^2 + 4x - 3 & x < -1 \\ 4 & -1 \le x < 4 \\ -3x + 9 & x \ge 4 \end{cases}$$

25. Evaluate each of these functions.

    a) $m(6)$ b) $m(-2)$ c) $m(-1)$ d) $m(0)$

26. Sketch the graph of $m(x)$.

Solve the inequalities given in problems 27-32. Give <u>exact</u> answers (not decimal approximations).

27. $10 > 6 - 2x$

28. $|2x - 3| \le 11$

29. $\left| \dfrac{1}{3}x - 2 \right| > 3$

30. $x^2 - 4x + 3 \ge 0$

31. $-x^2 + 3x + 2 \ge \dfrac{1}{2}x - 1$

32. $x(x + 5)(x + 2)(x - 1) < 0$

For problems 33-42, perform indicated operations and give answers in simplest form (no calculator).

33. $\dfrac{2x\left(4x^3 y^{-2}\right)^{-2}}{10y^{-3}\left(x^2 y\right)^3}$

34. $\dfrac{2x^{\frac{3}{2}} - x^{-\frac{1}{2}}}{x^{-\frac{1}{2}}}$

35. $(3 - i)(6 + i)$

36. $i(5i - i^6)$

37. $\dfrac{6 - \sqrt{5}}{2 + \sqrt{20}}$

38. $\dfrac{8}{4 - i}$

39. $\log_3 81$

40. $\log_5 \dfrac{1}{25}$

41. $\log_6 1$

42. $\ln e^4$

43. Evaluate these expressions with a calculator. Round to hundredths.

a) $\sqrt[7]{300}$

b) $10^{\frac{5}{2}}$

c) $e^{2.5}$

d) $\log 30$

e) $\log_6 50$

f) $\ln 15$

Expand these log expressions

44. $\log_4 16x^2y$

45. $\ln\left(\dfrac{3x}{z^2}\right)^3$

Condense these log expressions

46. $\dfrac{1}{2}(\log x - 3\log y)$

47. $4\ln x + \ln t$

Solve for x. Round to hundredths, where necessary.

48. $4(3^x) = 21$

49. $60\left(\dfrac{1}{2}\right)^{\frac{x}{83}} = 31$

50. $\log_x 16 = 5$

51. $\log_7 3x = 4$