Math 1470 – Fall 2007   Names_____

For full credit circle answers and **show all your work**. Each problem is worth four points.

1) Find the x-intercepts of $f(x) = x^2 - 4x - 5$ algebraically.

2) Find the vertex and line of symmetry of $f(x) = x^2 - x + \dfrac{5}{4}$

3) Determine all real zeros algebraically of $f(x) = 5x^4 - 15x^2 + 10$ and determine the Multiplicity of each zero.

4) Find a degree four polynomial with zeros at -3, 0, and 7. Please leave answer in factored form.

5) Divide $10x^4 - 50x^3 - 800$ by $(x - 6)$ using **both** synthetic **and** long division.
Long division: Synthetic division:

Let $f(x) = x^2 - x + 1$ and $g(x) = 2x^3$.

6) Find $f(5 + h)$

7) Find $\dfrac{f(5+h) - f(5)}{h}, h \neq 0$

8) Find $f^{-1}(x) =$

9) Find $g^{-1}(x) =$

10) Find $(f \circ g)(x) =$

11) Write an equation which has the shape of $y = 2x^2$ but with vertex at (2, -3) and opens downward.

12) Let $f(x) = x^2 - x + 1$ and find: $\dfrac{f(3+h) - f(3)}{h}, h \neq 0$.

For #'s 13 - 17 let $f(x) = |x - 4|$ and $g(x) = 3 - x$.

13) Find $(f \circ g)(x) =$

14) Find $(g \circ g)(x) =$

15) Find an inverse for each equation:

$f(x) = x^2$

$g(x) = x^3$

16) Does this equation represent y as a function of x? $x^2 + y = 4$ Explain.

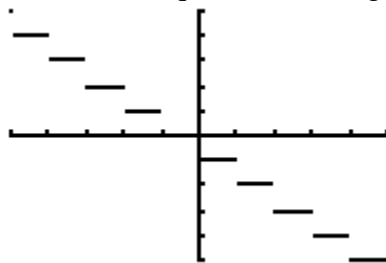17) Let $f(x) = x^2 - x + 1$ and find:

$\dfrac{f(3+h) - f(3)}{h}, h \neq 0$.

18) Find the zeros of the function

$f(x) = \dfrac{x^2 - 9x + 14}{4x}$.

19) Determine the relative minimum or maximum of: $h(x) = 3x^2 - 2x - 5$.

20) Find an equation for the graph below with the given window.


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WINDOW
Xmin=-5
Xmax=5
Xscl=1
Ymin=-5
Ymax=5
Yscl=1
Xres=1
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21) In which of the four quadrants is the following inequality true: $xy < 0$?

22) A line segment has (x_1, y_1) as one endpoint and (x_m, y_m) as the midpoint. Find the other endpoint in terms of x_1, y_1, x_m, and y_m.

23) Find the equation of a circle that has a diameter with endpoints at (0, 0) and (6, 8).

24) Use algebraic tests to determine if $y = \dfrac{-x}{x^2 + 1}$ has symmetry through the x-axis, y-axis, or origin.

25) Sketch a scatterplot of the data. Then determine the equation of a line of best fit.

Year	# of WalMarts
1996	3054
1997	3406
1998	3599
1999	3985
2000	4189
2001	4414
2002	4688
2003	4906

26) Divide: $(3x^3 - 17x^2 + 15x - 25) \div (x - 5)$

27) Write $\dfrac{5}{i}$ in standard form.

28) Write $\dfrac{2}{4 - 5i}$ in standard form.

29) Find all the rational zeros of the function: $f(x) = 9x^4 - 9x^3 - 58x^2 + 4x + 24$.

30) Find the upper and lower bounds for zeros of $f(x) = x^4 - 4x^3 + 15$.

31) Rewrite $\log_4 64 = 3$ as an exponent.

32) Rewrite $5^3 = 125$ as a logarithm.

33) Using a change of base property, evaluate: $\log_3 7$ to three decimals.

34) Solve the equation $(\frac{1}{2})^x = 64$ using logarithms.

35) Solve the equation $e^x = e^{x^2-2}$ using logarithms.

36) The number V of computers infected by a computer virus increases according to the model $V(t) = 100e^{4.6052t}$, where t is the time in hours. Suppose that BSU has 5,000 computers. Find out how many hours it would take for 5,000 computers to be infected.

37) Solve the following rational equation: $\dfrac{3a-1}{a^2+4a+4} - \dfrac{3}{a^2+2a} = \dfrac{3}{a}$.