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**Math 100 Section G – Exam 3**  
**November 7, 2006**

1. Rewrite the formula  $y = \frac{7}{x^3}$  taking the logarithm of both sides (you may assume  $x > 0$ ).

2. Rewrite the formula  $y = (1.2)8^x$  taking the logarithm of both sides.

3. If  $\log(a) = 1.3$  and  $\log(b) = -2.2$ , what is  $\log\left(\frac{a^2}{\sqrt{b}}\right)$ ?

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4. Solve  $e^{2x-1} = 1$ .

5. Solve  $2\log(4x - 20) + 4 = 8$ .

6. What is the domain of the function  $f(x) = \log(5 - 2x) + 3$ ?



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9. pH (potential of Hydrogen) is defined as  $-\log |H^+|$  where  $|H^+|$  is the concentration of  $H^+$  ions in moles per liter. Battery acid has pH of around 0.5 while stomach acid has a pH of around 1.5. Which acid has the greater concentration of  $H^+$  ions **and** how many times larger is the concentration?

10. Find all real and complex solutions to  $x^3 + 9x^2 + 31x + 39 = 0$ , given that one solution is  $x = -3$ .

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11. Let  $R(x) = x^3 + 3x^2 - 16x$ . Then  $R(1) = -12$ . For what other values of  $x$  is  $R(x) = -12$ ?

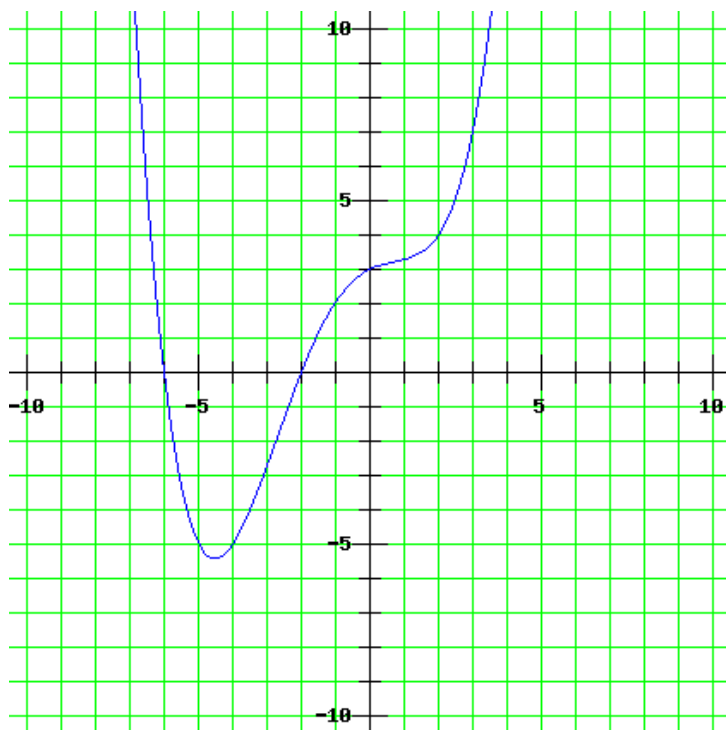
12. What are two different polynomials with single roots at  $x = 1$  and  $x = 3$ , and a double root at  $x = -2$ ? For full credit, write your answers in standard form,  $a_n x^n + \cdots + a_1 x + a_0$ .

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13. Find all real and complex solutions to  $x^4 - 25x^2 + 60x - 36 = 0$ , given that two solutions are  $x = -6$  and  $x = 1$ . (Be sure to read the polynomial carefully, it is 4<sup>th</sup> degree with no cubic term).

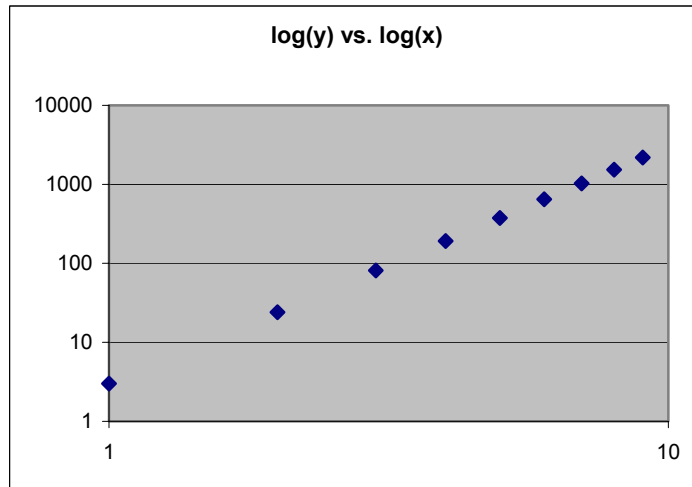
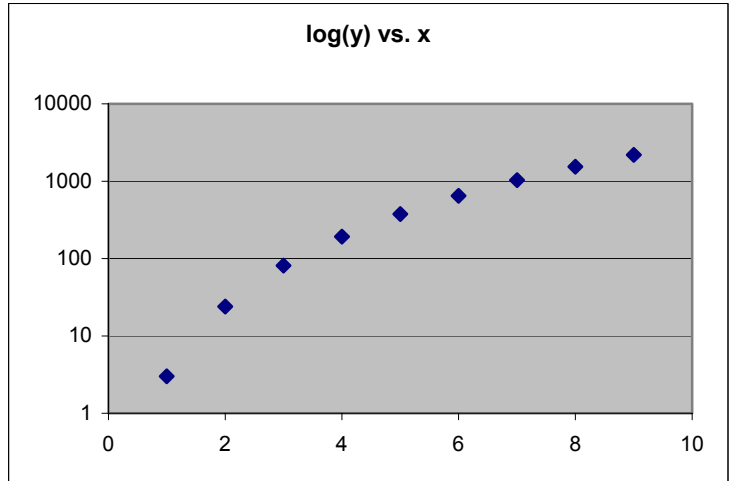
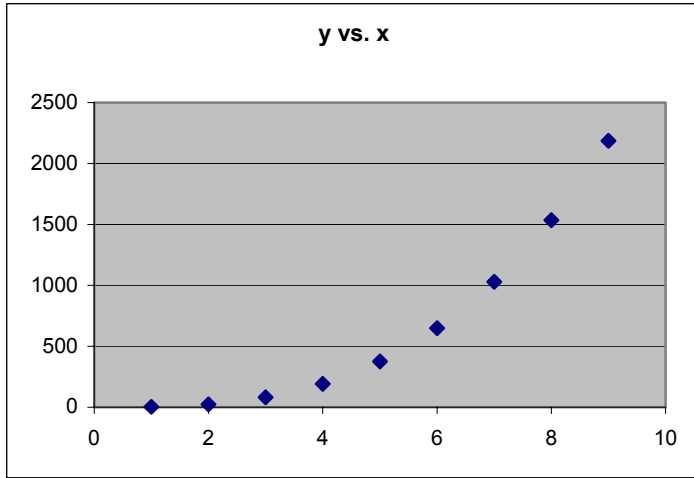
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14. What can you say about the polynomial graphed at the right? You may assume nothing interesting happens outside the window shown. Describe roots, turning point, degree, symmetry, limiting values, etc.



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15. A data set is plotted below on standard, semi-log, and log scales. What type of function would be best for modeling this data? Explain your reasoning.



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**Pledge:**

On my honor, as a student, I have neither given nor received unauthorized aid on this

examination: \_\_\_\_\_

(signature)

(date)