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Recitation Instructor and Time: _____

Studio College Algebra – Exam 3
November 6, 2007

1. Rewrite the formula $y = \frac{x^2}{5}$ by taking the logarithm of both sides.

2. Rewrite the formula $y = (56)x^{1.2}$ by taking the logarithm of both sides.

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3. If $\log(a) = 2.4$ and $\log(b) = -1.2$, what is $\log\left(\frac{\sqrt[3]{a}}{b}\right)$?

4. Solve $2e^x - 1 = 5$

5. Solve $2\log(x-3) + 7 = 13$.

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6. What is the future value in 10 years of an initial investment of \$500 at an annual interest rate of 4%, compounded semi-annually?

7. The value V of an initial investment of \$2000 compounded continuously at a 5% rate of return is given by the function $V(t) = 2000e^{.05t}$, where t is the time in years from the initial investment. If the investment is now worth \$20,000, how long has the money been invested?

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8. The formula for loudness on the decibel scale is given by $L = 10 \log \left(\frac{I}{I_0} \right)$, where I_0 is the intensity of sound just before the threshold of hearing. If the decibel level of a speaking voice measures 60 dB, and that of a lawnmower (up close) is 90 dB, how much more intense is the sound of a lawnmower than that of a speaking voice?

9. What is a 4th degree polynomial with single roots at $x = 1$ and $x = 2$, and a double root at $x = -1$? Write the polynomial in standard form $a_n x^n + \dots + a_1 x + a_0$.

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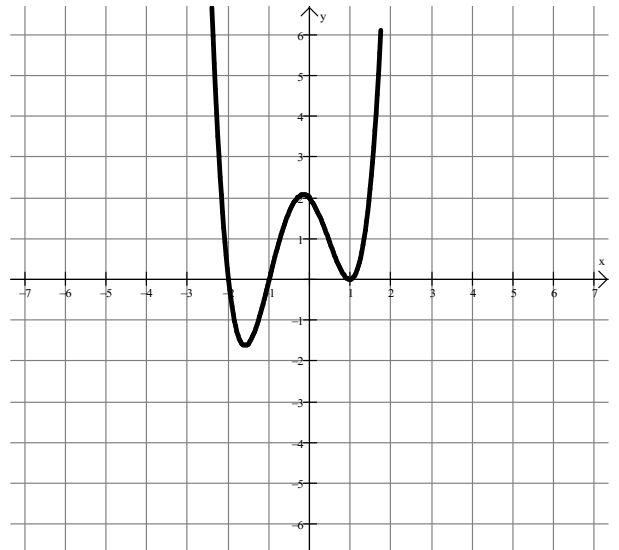
10. Find all solutions, both real and complex, of the following equation: $x^3 - 2x^2 + 4x - 8 = 0$, given that 2 is a solution.

11. Let $R(x) = x^3 + 2x^2 - 13x$. Then $R(2) = -10$. For what other values of x is $R(x) = -10$? To receive full credit, you must show all of your work.

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12. Given that 1 and -1 are roots of the following polynomial, find all other roots, real and complex, of the following polynomial $f(x) = x^4 - 2x^3 + x^2 + 2x - 2$.

13. Given the graph on the right, answer the following questions. You may assume nothing interesting happens outside the window shown.



a) Is the leading coefficient of this polynomial positive or negative?

b) What are the roots of this polynomial?

c) Does this polynomial have any repeated roots?

d) Does this polynomial have an even or odd degree?

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14. What is the domain of the function $f(x) = \ln(4 - 3x) + 6$?

15. What is the horizontal asymptote of the function $f(x) = 7^x - 4$?

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16. A data set is plotted below in standard, log-log, and semi-log plots. Explain whether a power or exponential model would be appropriate, and explain your reasoning clearly.

