

Name: _____

Recitation Instructor and Time: _____

Studio College Algebra – Exam 3
November 11, 2008

Please show all your work for full credit. Every problem is worth 5 points.

1. Rewrite the formula $y = 103x$ by taking the logarithm of both sides, and simplify your answer.

2. Solve for S in the following equation: $\ln\left(\frac{S}{1500}\right) = 2$

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3. If $\log(a) = 2.4$ and $\log(b) = 4.8$, what is $\log(\sqrt[3]{ab})$?

4. Solve $3 + 2^x = 10$

5. Solve $3\ln(x+5) = 18$.

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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 6%, compounded monthly?

7. A certain type of bacteria grows according to the function $P(t) = 3500(2^t)$, where t is the number of hours that have passed by. How many bacteria will there be after 2 hours?

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8. The number of widgets (in thousands) demanded each year is given by the formula $D(x) = 5 + 10\log(x + 3)$, where x represents the number of years after 1980, and $x > 0$. In what year were 15,000 widgets demanded?

9. Find 2 possible 3rd degree polynomials with single roots at $x = 5$, $x = -1$, and $x = 2$. Write the polynomials in standard form $a_nx^n + \dots + a_1x + a_0$ (in other words, multiply everything out). (Show your work, but put answers in the lines given below).

First answer: _____

Second answer: _____

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10. Given that -5 is a solution, find all solutions, both real and complex, of the following equation:
 $x^3 + 5x^2 + 3x + 15 = 0$.

11. Is $x - 3$ a factor of $x^3 - 5x^2 + 10x - 12$? How do you know?

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12. Given that $x=2$ and $x=-1$ are roots of the following polynomial, find all other roots, real and complex, of the polynomial: $f(x) = x^4 - 2x^3 - 13x^2 + 14x + 24$

13. Given the graph on the right, decide whether the following statements are **True or False**. You may assume nothing interesting happens outside the window shown.

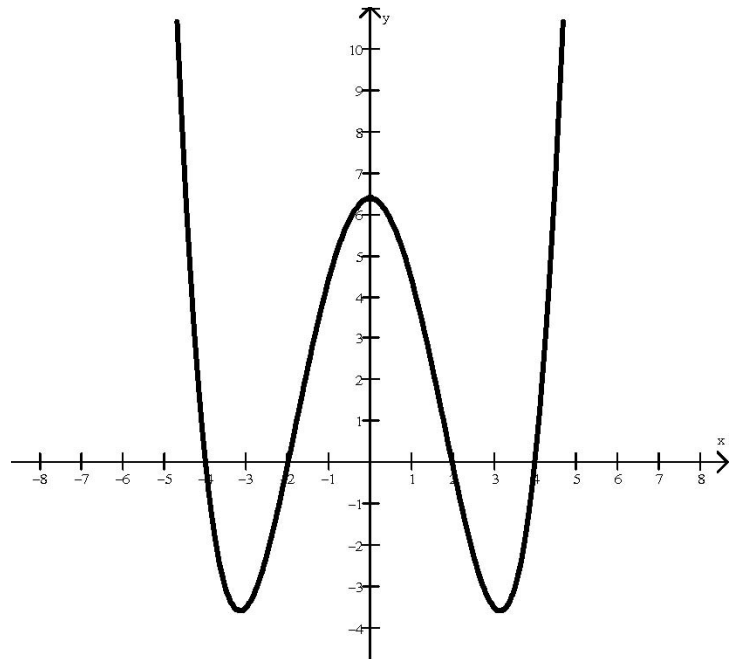
a) This polynomial has a positive leading coefficient.

b) The polynomial has a positive constant term.

c) The polynomial does not have any repeated roots.

d) The polynomial has odd degree.

e) As x tends to both positive and negative infinity, the polynomial tends towards negative infinity.



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14. What is the domain of the function $f(x) = 4 + 3\ln(-5x + 2)$?

15. What is the horizontal asymptote of the function $f(x) = e^x + 5$?

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16. Some students have a data set, for which they create standard, log-log, and semi-log plots. (The plots are given below). Would a power or exponential model would be an appropriate fit for the data set? How do you know?

