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| Test 2Dusty Wilson Math 111 – Fall 2009 No work = no creditClosed Book & Closed Notes | **Name**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  *Seeing there is nothing that is so troublesome to mathematical practice, nor that doth more molest and hinder calculators, than the multiplications, divisions, square and cubical extractions of great numbers ... I began therefore to consider in my mind by what certain and ready art I might remove those hindrances.*  John Napier (1550 - 1617)  Scottish mathematician |

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| Warm-ups (1 pt each) | = \_\_\_\_\_\_\_\_ | = \_\_\_\_\_\_\_\_ | = \_\_\_\_\_\_\_\_ |

1.) (1 pt) The quote by Napier (see above) explains why he invented the logarithm. Why was the logarithm invented? Answer using complete sentences.

2.) (2 pts) A radioactive isotope is said to decay over time. That is, after *t* years, the original amount of an isotope,  grams, decays until the amount is *N* grams, where *N* is defined as . How much of this isotope, in terms of , remains at time ?

Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.) (2 pts) Solve the exponential equation  for *x*.

Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.) (2 pts) Use properties of logarithms to rewrite  as an expression with three terms and no exponents.

Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5.) (2 pts) Suppose that you have a formula to measure the loudness of sounds on a logarithmic scale. You do not know what base to use for your logarithms, but you have determined by experiment that  and that . Use this information and properties of logarithms to calculate .

Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6.) (2 pts) Use properties of logs to rewrite as a single logarithm.

Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7.) (2 pts) Use a calculator to approximate  to two decimal places.

Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8.) (2 pts) Solve  for *x*.

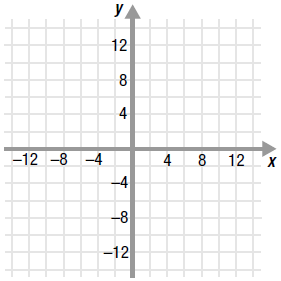
Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9.) (2 pts) Solve  for *x*. Round your answer to two decimal places.

Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10.) (3 pts) Find the constant term, leading coefficient, and degree of the polynomial function .

Constant term: \_\_\_\_\_ Leading coefficient: \_\_\_\_\_ Degree: \_\_\_\_\_

11.) (2 pts) Graph the polynomial function  without a graphing calculator (although you can use the calculator to check).

12.) (6 pts) Consider the function .

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| 1. What is the domain of *f* ?      1. Find **all** asymptotes of *f*.      1. Sketch a graph of *f* . |  |

13.) (4 pts) Given the matrices , , and , find the matrix  and the matrix .

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: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14.) (2 pts) Find the infinite sum, , of this geometric sequence: 81, 27, 9, 3, …

Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15.) (4 pts) Use the Gauss-Jordan Method to solve the following system of linear equations:



Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16.) (4 pts) Find the twenty-fourth term, , and the sum, , of the first 24 terms of the following arithmetic sequence: 3, 7, 11, 15, 19, …

: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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17.) (2 pts) Which expression below represents , the sum of the first twenty-four terms of the geometric sequence -2, 8, -32, 128, … **Circle one**

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