Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Math 165 Unit 1 Exam

Directions:

Solve each equation for “x” show all work with the exact answers and the decimal answer rounded to the nearest tenth if needed.

1. $4^{x-2}=48$
2. 6 log2 x + 3 = 195
3. ln(2x + 1) – ln(x – 1) = 2
4. log4 (x) + log4 (x + 8) = log4 (2x + 16)
5. 2log (x + 1) + log (2x) = log (2x3 – 4x + 4)
6. Evaluate the expression : log¼ 16 + log2 (1/32) – log6 216 =

Rewrite each expression as a single logarithm: (Simplify if needed)

1. 4 log (x) – 3 log (y) + 5 log (z) =
2. log x + log (x2 – 16) – log 20 – log (x – 4) =

Expand the expression using properties of logarithms: (Simplify if needed)

1. log $\left( \frac{3a^{2}}{5b^{3}}\right)$ =

10) If you invest $500 in an account that pays 5% annual interest and it is compounded monthly. Then how long would it take before you had $850 in the account?

11) The Richter scale is used for measuring the magnitude of an earthquake. The Richter magnitude is given by the equation:

 R = 0**.**67 log(0**.**37E) + 1**.**46

…where E is the energy (in kilowatt-hours) released by the earthquake.

1. An earthquake releases 15,500,000,000 kilowatt-hours of energy. What is the earthquake’s magnitude?
2. How many kilowatt-hours of energy would an earthquake have to release in order to be an 8.5 on the Richter scale?

12) What is the domain of the logarithmic function below:

 f(x) = log6 (2x – 9)

13) Sketch a graph of the function f(x) = log2 (x + 3) – 1 (Make sure to label all important aspects of the graph)

14) What is the equation of a circle given the center of the circle is the point (-3, 5) and the radius is 8?

15) What is the equation of a parabolic function with a vertex at the point (7, -3) and also passing through the point (2, 4)?

16) What is the center and radius of a circle with the given equation?

 (x – 4)2 + (y – 3)2 + 4 = 29

Find the partial fraction decomposition for each expression below:

17) $\frac{2x}{\left(x^{2}+5x+6\right)}$ =

18) $\frac{x^{3}+x^{2}+x}{\left(x + 1\right)^{2}}$ =

 19) $\frac{3x^{2}+ 4x + 4}{\left(x^{3} + 4x\right)}$ =

**Extra Credit**

 Use the number 4, exactly four times in each equation in order to try and get a total of each integer from 1 – 20 using any math operations or symbols as long as you only write the number 4 exactly four times in each problem without writing any other numbers.

Example: If you had to get the number 0 you could use the equation:

 44 – 44 = 0 (Four 4’s)

…or if you had to get the number 43, then you could use the equation:

 44 – (4/4) = 43 (Four 4’s)

You have to try to get as many Integers from 1 – 20 using the same method.

  **FORMULAS:**