Math 111I-006 Basic College Mathematics

Practice Exam #3
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Name: _____

Answer the following questions. *You must show your work to receive full credit.* Be sure to make reasonable simplifications. Give exact answers. Indicate your final answer with a $\boxed{\text{box}}$.

1. State the Quadratic Formula.

2. State the formula for the amount of money after t years if P dollars is invested at a rate of r compounded n times per year.

3. State the formula for the amount of money after t years if P dollars is invested at a rate of r compounded continuously.

4. State the definition of the logarithmic function.

5. State the Change of Base Formula.

6. A function is one-to-one if different inputs produce _____ _____. You can tell from the graph that a function is one-to-one by using the _____ _____ Test.

7. For a function to have an inverse, it must be _____.

8. Let $f(x)$ be a function and assume it has an inverse, $f^{-1}(x)$. Then $f(f^{-1}(x)) = f^{-1}(f(x)) =$_____, the _____ function.

9. State the General Form of a quadratic function:_____. State the Standard Form of a quadratic function:_____.

10. The bacteria population is a certain culture grows exponentially. **(a)** Find the one-hour growth rate if the 20-minute growth rate is 0.08. **(b)** Find the 10-minute growth rate if the 20-minute growth rate is 0.08. *Give an exact answer. Do not use your calculator to approximate.*

11. If \$10,000 is invested at an interest rate of 8% per year, compounded monthly, find the value of the investment after 4 years. *Give an exact answer.*

12. Find the function $f(x) = Ca^x$ given the following two points on the graph: $(2, \frac{13}{4})$ and $(0, 13)$.

13. Evaluate the logarithm:

    (a) $\log_8 64$

    (b) $\log_2 2$

    (c) $\log 1$

    (d) $3^{\log_3 x}$

    (e) $\ln e^5$

14. Solve for x: $\log_4 x = 3$

15. Solve for x: $\log_x 9 + \log_x 3 + 1 = 4$

16. Use the Laws/Properties of Logarithms to expand the given expression:

$$\log\left(\frac{x^3\sqrt{y}}{z^4}\right)$$

17. Use the Laws/Properties of Logarithms to combine the given expression (*Be sure to simplify your answer completely!*:

$$\frac{1}{3}\log x + \log(x^2 - 4) - \log(x + 2)$$

18. Find a model for the amount $A(t)$ after t years if \$5,000 is invested at a rate of 5% compounded continuously. *Give an exact answer.*

19. Find $f^{-1}(x)$ if $f(x) = \ln x + 6$. Check to make sure your answer is correct (evaluate $f(f^{-1}(x))$ and $f^{-1}(f(x))$).

20. Let $f(x) = 2x^2 - 4x + 2$.

(a) Write the function in Standard Form by completing the square.

(b) What is the vertex of the parabola?

(c) Does the function have a maximum or a minimum value? What is the maximum/minimum value?

(d) Calculate the discriminant. How many x-intercepts does the function have?

(e) Find the x- and y-intercepts. If there are none, write NONE.

x-intercepts:_____

y-intercept:_____

(f) Using parts (a)-(e), sketch a graph of the function. Be sure to label the vertex and intercept(s).