Exam 3

Prob.	1	2	3	4	5	6	7	8	9	10	11	EC	
Value	9	10	10	6	10	5	10	10	12	12	6	4	100
Points													

Show all work for credit. Answers with little or no supporting work will receive little or no credit.
Compound Interest: $A = P(1 + \frac{r}{k})^{kt}$
Continuous-Compounding Model: $A = Pe^{rt}$
Exponential Model: $P(t) = P(0)e^{kt}$

1. Solve for x algebraically: Show Work!

   (a) $5^x = 125$.

   (b) $1.03^{6x} = 7.3$.

   (c) $5x^2 = 45$.

2. Solve algebraically: $\left(\frac{1}{3}\right)^{.03x} = .7\left(\frac{1}{4}\right)^{.015x}$

3. Sales at the Bozeman Hemp and Nuclear Arms store went down 12% three years in a row, and then up 36% the fourth year.

   (a) What was the total change over the four years?

   (b) What was the average change over the four years?

4. Find the equation of a function such that it has no roots; holes at 3, 5, and 7; vertical asymptotes at 1 and 4; and a horizontal asymptote at $y = \frac{3}{4}$.

5. Find the roots, holes, vertical asymptotes, horizontal asymptotes, and the End-Behavior Model of $\dfrac{3x^2(x^2+1)(x-4)^2(x+5)}{5(x-1)(x+5)(x-7)(x+1)^2}$.

6. Solve for x algebraically in $\sqrt{2x}+\sqrt{x+7}=1$.

7. (a) Box A is 45% smaller then box B. How much larger is box B then box A?

   (b) The sale price on a shirt is \$18.74. It had been marked down 25%. How much money would you save on the shirt?

8. Solve algebraically: $\dfrac{\frac{4}{3}x^{1/3}(1+x)^2 - 2x^{4/3}(1+x)}{(1+x)^4} = 0$

9. You have been given \$1000 to invest. The best options you have found are: an investment firm that will give you a 7.9% APR compounded every fourth month; or a semi-legitimate gasoline price ring that will charge a \$75 set up fee, but will give an 8% APR compounded continuously. For which lengths of an investment would it be better to go with the gas ring?

10. Crazy Charley, professional mime and part-time chemist, has developed a self-removing radio-active face paint. When he first made it, there was 30 grams of face paint. Now, 45 min later, there is only 21 grams left.
    (a) What is the half-life of the face paint?
    (b) How much face paint must he put on to have 5 grams left after a 10 hour day of miming?

11. Use the properties of logs to rewrite the following expression as an equivalent expression without logs of products, logs of quotients, or logs of powers.
    $log\left(\frac{x^2(1+x)^3}{(x+7)^4}\right)$

12. (Bonus) Find a function, $f(x)$, such that $f(x+1) = 3f(x)$