Exam 2

SOLVE 10 QUESTIONS OUT OF 12

1. Solve the equation:

$$2^{2x} - 6 \cdot 2^x + 8 = 0$$

2. Write the expression as the logarithm of a single quantity.

$$3 \log(x - 1) + 2 \log(x + 3) - \log(x + 2)$$

3. Use the laws of logarithms to expand and simplify the expression.

$$\ln \frac{\sqrt{x - 1}}{x(1 + x)^3}$$

4. Solve the equation.

$$\log_3(x + 1) + \log_3(2x - 3) = 1$$

5. A culture of bacteria that initially contained 2000 bacteria has a count of 18,000 after 2 hr.
    a) Determine the function Q(t) that expresses the exponential growth of the number of cells of this bacterium as a function of time t (in minutes).

    b) Find the number of bacteria present after 4 hr.

6. Find the interest rate needed for an investment of $6,000 to double in 5 yr if interest is compounded continuously.

7. Five and a half years ago, Chris invested $10,000 in a retirement fund that grew at a rate of 10.82% compounded quarterly. What is his account worth today?

8. The Pirerras are planning to go to Europe 3 yr from now and have agreed to set aside $150/month for their trip. If they deposit this money at the end of each month into a saving account paying interest at the rate of 8%/year compounded monthly, how much money will be in their travel fund at the end of the third year?

9. The Betzes have leased an auto for 2 yr at $450/month. If money is worth 9%/year compounded monthly, what is the equivalent cash payment (present value) of this annuity?

10. Jessica wants to accumulate $10,000 by the end of 5 yr in a special bank account, which she had opened for this purpose. To achieve this goal, Jessica plans to deposit a fixed sum of money into the account at the end of each month over the 5-yr period. If the bank pays interest at the rate of 5%/year compounded monthly, how much does she have to deposit each month into her account?

11. Find the sum of the first 100 terms of the arithmetic progression 4, 11, 18, ...

12. Find the twenty-third term and the sum of the first 23 terms of the geometric progression 3, 9, 27, ...