

Name: _____ Day/Time Class Meets: _____

Instructions:

- Use pencil only.
- Work problems completely and clearly in the space provided. Place your answer(s) on the line(s) provided.
- Use backs of sheets for additional writing space, if necessary.
- Credit (partial or full) will be given only if sufficient steps leading to the solution are shown. In most problems, no credit will be given for answers only.
- No books or notes may be used on the exam.
- This exam has a total of 5 pages (including the cover page). Check to make sure you have a complete exam.
- Erase or cross out work that you do not want graded.

1. Give the equation of the function whose graph translated $f(x) = \log_2(x)$ 2 units to the left, reflected it about the y-axis, and then translated this graph up 1. (Be sure to show your steps!)

2. Solve the following:

(a) $4^{2x+1} = \frac{1}{4}$

(b) $\log_2 x + \log_2(x + 2) = 3$

(c) $\log_3(x - 2) - \log_3(x - 4) = \log_3(7)$

3. The function $f(x) = 2x^5 - 7$ is one-to-one.

(a) Find a formula for $f^{-1}(x)$.

(b) Verify the formula you found is actually $f^{-1}(x)$.

4. Write the following as a sum or difference of logarithms:

$$\log\left(\frac{10a^2b^3}{cb^2}\right).$$

5. Hank invests \$20,000 in a money market account at 3.45% interest, compounded quarterly. Find the doubling time for his investment.

6. Evaluate the following:

(a) $\log_3 63 - \log_3 7 + \log_3 1$

(b) $\log 100 + \log \frac{1}{10} + \log \sqrt[3]{10}$

7. Solve $\frac{x+4}{2(x-2)} \leq 0$.

8. I am modeling the growth of Bald Eagles in Alaska using an exponential growth function. In 1997, there were 170 Bald Eagles. In 2003, there were 230 Bald Eagles in Alaska.

(a) What is the growth rate of Bald Eagles in Alaska?

(b) According to this model, what is the population of Bald Eagles in Alaska today?
