

**Intro to Calculus Test 5 Mr. Holcomb 2008/2009**  
**Candy cane or sugar cookie?**

**Problem**

1. (15 points) Find the exact values for the following without using your calculator.

a.  $\log_8 \left( \sqrt[3]{4} \right)$

b.  $\left[ \log_2 (16) \right]^{\log \frac{1}{3} (9)}$

c.  $b^{\log \frac{1}{\sqrt{b}} (9)}$

2. (10 points) Simplify, without radicals or negative exponents. Combine like terms.

a. 
$$\frac{\frac{x}{y^2} \sqrt{\frac{y}{x}}}{(x^{-2}y)^3}$$

b. 
$$x^2(x-5)^{-\frac{5}{2}} + 3(x-5)^{-\frac{1}{2}}$$

3. (10 points) Solve the following for  $x$ , without using your calculator.

a. 
$$\frac{4^{-x}}{\sqrt{2}} = (8^x)^3 \sqrt{2}$$

b. 
$$\frac{3^{x^2}}{3^6} = \frac{1}{9}$$

Name: \_\_\_\_\_

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4. (5 points) A population of yeast is growing exponentially. When first examined, there are 3,000 yeast in the colony. The colony is doubling in size every 20 minutes. How many yeast will be present at 45 minutes? Justify with clear and complete work.

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5. (5 points) Find the inverse function for  $f(x) = \pi e^{2-x^3}$ .

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6. (5 points) Explain the meaning of the number e.

7. (10 points) Suppose that \$2 was invested in an account which paid 25% annual interest (don't you wish!)
- What would be the total amount after one year if the interest was compounded every 3 months? Justify with clear and complete work.
  
  
  
  
  
  
  
  
  
  
  - What would be the total amount after one year if the interest was compounded continuously? Justify with clear and complete work.

8. (10 points) Solve for  $x$ . Simplify your answer.

a.  $e^{3+\ln(x-2)} = 5$

b.  $\log_2(\log_3(x-4)) = 0$