

Math 188 Ch. 4 Sample Test Name _____
Show all your work if you want to receive credit.

1. Completely simplify $\log\left(\frac{\sqrt{yz}}{x^3}\right)$.

2. Solve each of the following. Do not use a calculator.

(a) $3^{3x+2} = 27$

(b) $\log_2(x+1) - \log_2(2x-1) = 2$

(c) $10^{2x} - 10^x - 6 = 0$

(d) $5^x - 2(5^{-x}) - 1 = 0$

3. Use algebra and a calculator to solve the following.

(a) $2e^{-0.6t} = 47.1$

(b) A car loan of \$18,000 has monthly payments. If the interest rate is 6.99%, and the loan will be paid off in 5 years, what are the monthly payments and how much interest is paid on the loan?

(c) A car loan of \$24,000 has monthly payments of \$722.39. If the interest rate is 6.99%, how long (in months) will it take to pay off the loan?

(d) A bacteria culture doubles in size every 5 hours. What is the exponential growth constant for this bacteria? How long will it take a bacteria population of 10,000 to become a population of 20,000? Assume that the population grows according to the model $y = P_0e^{kt}$.

(e) The half-life of a radioactive isotope is 4 years. How long will it take 12 grams of isotope to decay to 1 gram?

(f) A roast is taken from the oven and has an internal temperature of 120°F. After 15 minutes, the internal temperature is 110°F. If the room temperature is 68°F, how long will it take the roast to cool to 100°F? $T(t) = M + (T_o - M)e^{-kt}$