

## Written Assignment 5

Due Wednesday, July 27th

1. (Ch. 6 # 11-18, and some of my own) Solve the following equations. Be sure to write your answers in *exact form* and then round them. Exact means purely in terms of symbols. For example,  $\sqrt{5}$  is exact, but 2.236 is not exact.
  - (a)  $3^{t-1} = 14$ ; solve for  $t$ .
  - (b)  $3 - 10^{2-t} = 1$ ; solve for  $t$ .
  - (c)  $\log_2(4 - r) = -3$ ; solve for  $r$ .
  - (d)  $\ln(t) + \ln(t + 2) = 2$ ; solve for  $t$ .
  - (e)  $\log(m - 1) - \log(m + 1) = -1$ ; solve for  $m$ .
  - (f)  $e^{2t} + 5e^t - 6 = 0$ ; solve for  $t$ . (Hint: try substituting  $u = e^t$ .)
2. (Ch. 6 #20) Identify the **continuous** growth rate of the function  $g(t) = 3 \cdot (0.75)^t$ .
3. Joey wants to reach a goal of \$40,000 in his savings account to make a down payment on a house. He has \$24,000 right now, and his bank account accrues a 2% annual interest rate compounded monthly. How long must he wait to reach his goal?
4. (Ch. 6 #48) The mass of an organism's brain can be modeled as proportional to the one-half power of the organism's body mass. (This applies to almost any animal!) Suppose an elephant weighs 6000 kg and has a brain mass of 4.783 kg.
  - (a) Find a formula for the brain mass as a function of body mass. (Be sure to define your variables.)
  - (b) What body mass could be predicted for a horse, assuming a brain mass of 0.532 kg?
5. (My brain.) Suppose we have two bank accounts, account A and account B, and we want to know when they reach the same size. Account A starts with \$3,000 and grows at a continuous rate of 2%. Account B grows at a 3% annual rate compounded monthly, and starts with \$1,800. How long do we wait until they reach the same size?