

Please do the problems that you feel will help your group the most first (you don't have to do them in order). All handouts are available at <http://alex.knaust.info/pltlfall2011/>

1. Solve for P , then solve for t in

(a) $A = Pe^{rt}$

(b) $A = P\left(1 + \frac{r}{n}\right)^{nt}$

2. Use one of the above equations for compound interest to determine the principal P that must be invested at a rate of $r = 5\%$, compounded monthly, so that \$500,000 will be available after t years.

3. Complete the table for the time t (in years) necessary for P dollars to triple if interest is compounded continuously at rate r . Describe the relationship between r and t .

r	2%	4%	6%	8%	10%
t					

4. The amount of yeast in a brew of beer is increasing according to the law of exponential growth. ($y(t) = ae^{bt}$) After 3 hours, there are 100 yeast, and after 5 hours, there are 400 yeast. How many yeast will there be after 6 hours?

5. Which values of x satisfy the equation? $2 \cdot 3^{-x+1} = 4e^{2x-1}$

6. The age of artifacts can be estimated using Carbon-14 dating with following equation, where R is the ratio of Carbon-14 to Carbon-12 in the artifact and t is time

$$R = \frac{1}{10^{12}}e^{-t/8823}$$

(a) What is the ratio of Carbon-14 in a fossil after 300 years?

(b) The ratio of Carbon-14 to Carbon-12 in a piece of paper is $R = 1/13^{11}$. Estimate the age of the paper.

7. Sketch the graph of the following equations shifted 3 units down and 2 to the right

(a) $f(x) = e^{-x+1} - 2$

(b) $g(x) = \ln(x - 5) + 2$

8. Find Vertical and horizontal asymptotes, holes and intercepts of the rational function

$$q(x) = \frac{2x^2 + 6x + 4}{x^2 + 5x + 4}$$

9. Show that the following identities are true

(a) $\log_a b = \frac{1}{\log_b a}$

(b) $(\log_a b) \cdot (\log_c d) = (\log_c b) \cdot (\log_a d)$

Hint : Use change of base