LOGARITHMIC FUNCTIONS (1.4) NAME_____

1. Find (if possible):

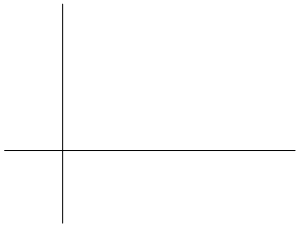
A. $\log(1.035)$ B. $\log_4\left(\frac{1}{64}\right)$ C. $\log_2(-4)$ D. $\ln\left(e^{\pi}\right)$ E. $\log_9(3)$

2. Derive the formula for the tripling time for $P = P_0 a^{nt}$. What does this tripling time depend on? Do we need to make any assumptions about a and n?

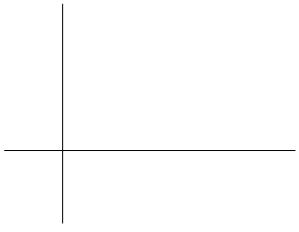
3. Consider $S(D) = 0.159 + 0.118\log(D)$. S is the slope of a beach and D is the average diameter (in mm) of the sand particles on the beach. Suppose a particular beach rises 9 meters for every 100 meters inland. What size sand would you expect to find on that beach?

4. Sketch a graph of each function. Include the domain.

A. $y = 7^{\log_7 x}$



B. $y = \ln e^x$



5. You and a friend plan to purchase cars in September. The initial value of your car will be $34,000 and will depreciate 17% each year. The initial value of your friend's car will be $16,500 and will depreciate 12% each year. You agree to exchange cars when their values are equal.

A. How long do you need to wait? (to the nearest month) What is the value of your car?

B. What would your depreciation rate have to be in order for the values of the cars to match at the end of 7 years? (assume your friend's car still depreciates 12% each year)

6. Prove that $y = \log_a(x)$ is proportional to $y = \log(x)$. What is the proportionality constant?