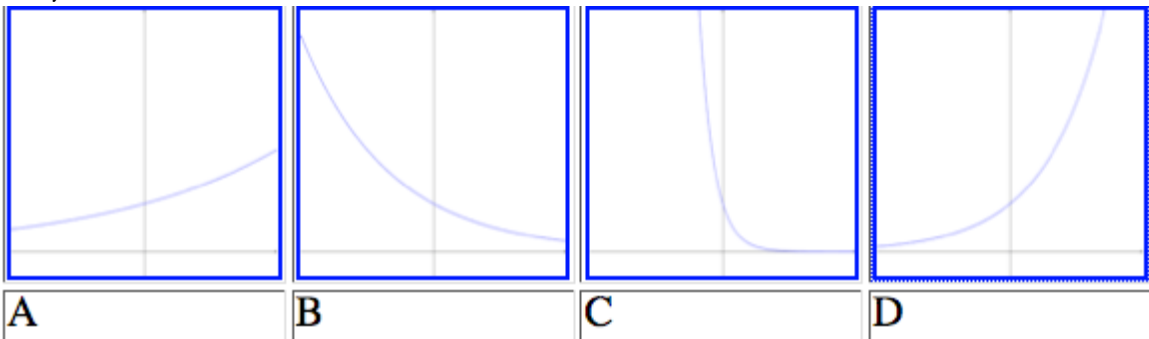


Dimensional Analysis and Exponential Models Review

1. Given 13 morks is 1 gloe, 5 gloes is 1 flit, 7 kits is one lonk, and 10 lonks is 1 gall. Convert 90 morks per kit to flits per gall.
2. Given that one ork is equivalent to 5 umphs, convert 2.14 square orks to square umphs.
3. Given a brunk is equivalent to 5 plops, and a plop is equivalent to 4 nerd, convert 20 nerds to brunks.
4. a. Use a calculator to estimate $5e^{0.2204*2}$ with four decimal place accuracy.
b. Use a calculator to estimate $\ln(7)$ with four decimal place accuracy.
5. Match the equations 1 through 4 to the graphs A through D below:
 1. $y = ae^{0.25t}$
 2. $y = ae^{0.75t}$
 3. $y = ae^{-0.5t}$
 4. $y = ae^{-3t}$



6. Bacteria X has a relative growth rate of 230% under ideal conditions. Some bacteria X are accidentally introduced into some potato salad. Two hours after contamination, there were 24000 bacterial X in the potato salad.
 - a. Find the initial number of bacteria X introduced into the potato salad.
 - b. Estimate the number of bacteria in the food 3 hours after contamination.

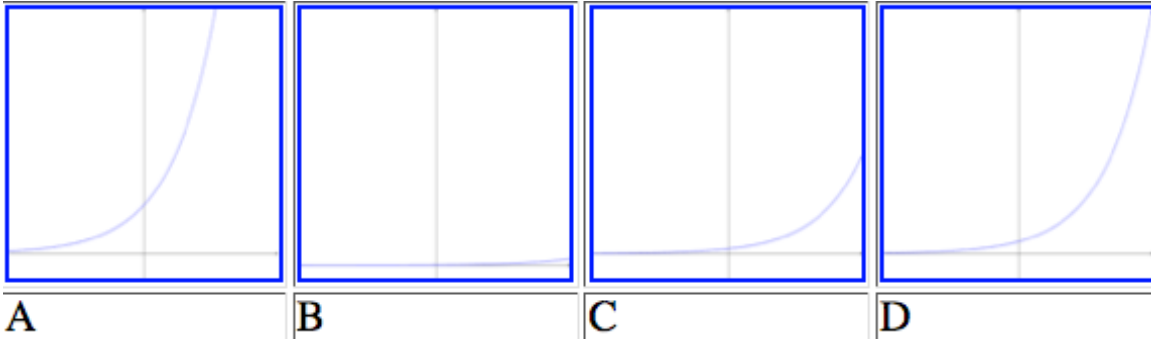
7. Match the equations 1 through 4 to the graphs A through D below:

1. $y = \frac{1}{4} e^{kt}$

2. $y = 2e^{kt}$

3. $y = 20e^{kt}$

4. $y = 5e^{kt}$



8. Write the inverse of the exponential function $n(t) = 17800e^{0.09t}$.

9. A bacteria culture initially contains 2000 bacteria and doubles every half hour. The formula for the population is $p(t) = 2000e^{kt}$ for some constant k .

- Find k for this bacteria culture.
- Find the size of the bacterial population after 20 minutes.
- Find the size of the bacterial population after 7 hours.

10. The number of bacteria in a culture is given by the function

$$n(t) = 975e^{0.4t} \text{ where } t \text{ is measured in hours.}$$

- What is the relative growth rate of this bacterium population?
- What is the initial population of the culture?
- How many bacteria will the culture contain at time $t = 5$?

11. At the beginning of an experiment, a scientist has 148 grams of radioactive goo. After 150 minutes, her sample has decayed to 4.625 grams.

- What is the half-life of goo in minutes?
- Find a formula for $G(t)$, the amount of goo remaining at time t .
- How many grams of goo will remain after 62 minutes?