

- (1) Evaluate $\lim_{h \rightarrow 0} \frac{\ln(3+h) - \ln(3)}{h}$.
- (2) A biologist observes the growth of cells in a petri dish. Suppose that they grow at a rate of .1 times the amount of cells present. If there are about 2,718 cells after 10 days, how many cells did she start with?
- (3) An investor initially invests 15,000 in a venture. Suppose that the investment initially earns 10% interest compounded continuously for the first 5 years and then 5% interest compounded continuously for the next 5 years. How much is the investment worth after 10 years?
- (4) Let $P(t)$ model the amount in grams of a sample of some isotope of uranium after t years. Assume $P(t)$ satisfies the differential equation

$$P'(t) = -0.00057P(t) \text{ and } P(0) = 60$$

- (a) Find the formula for $P(t)$.
- (b) What is the weight of the sample when it is disintegrating at a rate of 0.0057 grams per year?
- (c) What is the half life of this isotope?