3-4 Day 1

1. Find the derivative of the function.

   (a) $g(x) = (2 + 3x - x^2)^5$

   (b) $h(x) = \dfrac{30}{\sqrt[3]{4x-5}}$

   (c) $f(t) = e^{t-t^2}$

   (d) $y = e^{ax}\cos(bx)$, where a and b are fixed constants

   (e) $f(x) = \sqrt{\dfrac{2x}{x-1}}$

2. (a) The volume of a snowball of radius r is $V(r) = (4/3)\pi r^3$, where r is measured in inches and V is in measured in inches cubed. Explain what $V'(2) \approx 50.265$ means in language your parents could understand.

(b) If you increase the radius of a snowball from 2 inches to 2.02 inches, estimate the change in volume of the snowball.

3. Under certain circumstances a rumor spreads according to the equation

$$p(t) = \frac{1}{1 + ae^{-kt}}$$

where $p(t)$ is the proportion of the population that has heard the rumor at time t and a and k are positive constants.

(a) Find $\lim_{t \to \infty} p(t)$ and interpret your answer.

(b) Find the rate of spread of the rumor.

(c) Find and interpret $p(0)$ and $p'(0)$.