

Written Assignment 4
Due Tuesday, October 30th

1. Ch. 2.9, # 18
2. Ch 2.9, (a) # 43, (b) # 44. For this problem, recall that the *half life* is a time value, t , for the amount of carbon-14 to be *half* of the starting value. [Hint: to find the half-life, set $Q(t) = \frac{1}{2}Q_0$ and solve for t .]
3. Consider the function $y = 14e^{-0.02x}$.
 - (a) Calculate $\frac{dy}{dx}$.
 - (b) Write out the quantity $(-0.02y)$ in terms of x and show that it matches your answer from part (a)¹.
4. Ch. 2.7 (a) # 5, (b) # 6, (c) # 7, (d) # 8.
5. Ch. 2.7 # 34
6. For the functions below, (i) describe the intervals where f is increasing/decreasing, and (ii) describe the intervals where f is concave up and down using the interval method.
 - (a) $f(x) = x^2 \ln(x)$
 - (b) $f(x) = e^{-x^2}$
 - (c) $f(x) = \frac{1}{x} - \frac{1}{\sqrt{x}}$

¹In the future, we will understand this process as showing that $y = 14e^{-0.02x}$ is a *solution to the differential equation* $\frac{dy}{dx} = -0.02y$.