Bio 301 Homework

Assignment 2: Read Chapter 3 of Otto and Day. This homework reviews useful techniques from algebra and calculus (see Appendices 1 and 2 of the book for a refresher). To be completed within your study group and jointly handed in (one per group). Due Thursday September 20.

Math Review Problems

(1) Solve $\log_{10}(z^t) = y$ for $t$.

(2) Solve $\ln(z^t) = y$ for $t$.

(3) Solve $z^t = y$ for $t$.

(4) Factor and solve $x^2 - 9x + 14 = 0$ for $x$.

(5) Solve $2 \ln(a \cdot x) - \ln(b \cdot x^3) + \ln(c \cdot x^2) = d$ for $x$.

(6) Solve $2 \cdot x^3 + 2 \cdot y \cdot x^2 = x + y$ for $x$.

(7) Factor $\frac{x^2 - 9}{2x + 6}$

(8) Factor $2 + \frac{x}{3-x}$

(9) Find the derivative with respect to $x$ of the following functions:

\[ ax^3, \quad \frac{3x^2}{5x+1}, \quad e^{3x+7}, \quad x^n e^{ax}, \quad \ln(ax^2 - c), \quad \ln(3x^5), \quad \cos(ax), \quad \sin^2(3x) \]

(10) Integrate the following with respect to $x$:

\[ \int_0^3 2x \, dx, \quad \int \sin(x) + 3x^2 \, dx, \quad \int \frac{\tan(3)}{x} \, dx, \quad \int e^{-3x} \, dx \]

(11) Show how you can use integration by parts to integrate $\int \ln(x) \, dx$