Bio 301 Homework

Assignment 2: Read Chapter 3 of Otto and Day. This homework focuses on reviewing some basics from algebra and calculus (due Thursday September 24).

Math Review Problems

Consult Appendices 1 and 2 in the textbook if needed.

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

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

(3) Solve \( z' = y \) for \( t \).

(4) Solve \( x^2 - 4x - 21 = 0 \) for \( x \)

(5) Solve \( 2 \ln(a \times) - \ln(b \times^2) + \ln(c \times) = d \) for \( x \)

(6) Solve \( 7 \times^3 + 7y \times^2 = x + y \) for \( x \)

(7) Factor \( \frac{x^2 - 9}{5x + 15} \)

(8) Factor \( 1 + \frac{7x}{x - 4} \)

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

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

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

\[ \int_0^1 5x \, dx, \quad \int \cos(x) + 7x^6 \, dx, \quad \int \frac{\cos(2)}{x} \, dx, \quad \int_0^\infty e^{-3x} \, dx \]

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