

UNIVERSITY OF NOWHERE
Mechanical Engineering
BIO 5678 - Applied Pyrohydrodynamics – Winter 2025-2026 (202525)
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ASSIGNMENT 1: RANDOM TOPICS
Due January 13, 2026

1. (25 pts.) **Simple Arithmetic.** Solve the following arithmetic problems:
 - a. What is 12×3 ?
 - b. What is $45 \div 5$?
 - c. What is $7 + 8$?
2. (25 pts.) **Simple Derivatives.** Compute the derivatives of the following functions:
 - a. What is the derivative of $f(x) = 3x^3 + 2x^2 + x + 5$?
 - b. What is the derivative of $f(x) = \sin(x) + x^2$?
 - c. What is the derivative of $f(x) = e^{2x} + \ln(x)$?
3. (25 pts.) **Integration Problems.** Compute the following integrals:
 - a. What is the indefinite integral of $f(x) = 3x^2 + 2x + 1$?
 - b. What is the definite integral of $f(x) = \cos(x)$ from 0 to $\pi/2$?
 - c. What is the indefinite integral of $f(x) = e^{3x}$?
4. (25 pts.) **Numerics using Python.** Use Python to compute the roots of the following polynomial:

$$f(x) = x^3 - 3x + 2$$