Problem Set 0

DO NOT HAND THIS ONE IN. It is for your own diagnostic usage only. These problems are a sampling of what types of math problems you need to be VERY familiar with before you enter the class. Anyone can look up these answers in a book - what is important is whether or not you can quickly derive the answers without a book. Solutions will not be handed out.

Problem 0.1: Find
\[ \int e^{-3x} \cos(4x) dx. \]

Problem 0.2: Find
\[ \int \sin^2(7y) dy. \]

Problem 0.3: Find
\[ \int_{-\infty}^{10} e^{-5x} u(4-x) dx, \]
where \( u(x) = 1 \) if \( x \geq 0 \) and \( u(x) = 0 \) if \( x < 0 \).

Problem 0.4: Find
\[ \sum_{n=5}^{100} 2^{-n}. \]

Problem 0.5: Find
\[ \sum_{n=0}^{\infty} n2^{-n}. \]

Problem 0.6: Find
\[ \int_{-1}^{1} \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} (x^2 + y^2) dy dx. \]
Problem 0.7: Compute
\[ \sum_{n=1}^{\infty} \frac{x^n}{(n!)2^n}. \]

Problem 0.8: Compute
\[ \int_{-1}^{2} \int_{x^2}^{x+2} x^2 \, dy \, dx. \]

Problem 0.9: Find the area bounded by the parabola \( y = x^2 \) and the line \( y = x + 2 \).