MATH 145    
SAMPLE QUIZ 3

You may use a scientific calculator to complete this quiz. No notes please. Show all work for full credit.

1. Find the anti-derivatives.

   (a) \( \int e^{4x} - \sin x \, dx = \frac{1}{4} e^{4x} + \cos x + C \)

   (b) \( \int \frac{1}{x^6} \, dx = -\frac{1}{5x^5} + C \)

   (c) \( \int x(x + 1) \, dx = \frac{1}{3} x^3 + \frac{1}{2} x^2 + C \)

   (d) \( \int \left( \frac{1}{x} - x \right)^2 \, dx = -\frac{1}{x} - 2x + \frac{1}{3} x^3 + C \)

2. Find the value of the following integral by interpreting it as the area under the graph of a function and using formulas from geometry.

   \[ \int_{-5}^{5} 4 + \sqrt{25 - x^2} \, dx. \]

   ANSWER: \( \frac{25\pi}{2} + 40 \)

3. Compute the integral.

   (a) \( \int_{0}^{1} (5 - x) \, dx = \frac{9}{2} \)

   (b) \( \int_{4}^{9} \frac{1}{\sqrt{x}} \, dx = 2 \)

   (c) \( \int_{1}^{5} (2 - x)^2 \, dx = \frac{124}{208} \)

   (d) \( \int_{0}^{10} e^{\frac{1}{2}} \, dt = 2(e^5 - 1) \)