Quiz 17

MATH 139-01 and -02
Thursday, November 13, 2003

Be sure to **show your work**. Unsupported answers receive no credit.

1. Find each of the following.

   (a) $\displaystyle\int x^9\ dx = \frac{x^{9+1}}{9+1} + C = \frac{1}{10}x^{10} + C.$

   (b) $\displaystyle\int \sqrt{x}\ dx = \int x^{1/2}\ dx = \frac{x^{(1/2)+1}}{(1/2)+1} + C = \frac{x^{3/2}}{3/2} + C = \frac{2}{3}x^{3/2} + C.$

   (c) $\displaystyle\int \frac{1}{x}\ dx = \ln|x| + C.$

   (d) $\displaystyle\int (3e^{4x} - 5x^3 + 2)\ dx = 3 \cdot \frac{e^{4x}}{4} - 5 \cdot \frac{x^4}{4} + 2x + C = \frac{3}{4}e^{4x} - \frac{5}{4}x^4 + 2x + C.$

2. Find the average value of x^2 on the interval $[-1, 1]$.

   Solution: The average value is $\displaystyle\frac{1}{1-(-1)}\int_{-1}^{1} x^2\ dx = \frac{1}{2} \cdot \frac{x^3}{3}\bigg|_{-1}^{1} = \frac{1}{6}(1^3 - (-1)^3) = \frac{1}{3}.$