

SECTIONS 2, 3

MTH 131 FALL 2000

QUIZ #9NAME:

KEY

1. If f is measured in meters/sec², and t is measured in seconds, what are the units of $\int_1^3 f(t) dt$?

The units of $\int_1^3 f(t) dt$ are meters/sec² \times sec = meters/sec

2. Find the antiderivatives of the following functions.

(a) $f(x) = 4 \sin x - \frac{1}{x}$

$$\int f(x) dx = \int (4 \sin x - \frac{1}{x}) dx = -4 \cos x - \ln|x| + C$$

(b) $g(x) = x^2 + e^{-5x}$

$$\int g(x) dx = \int (x^2 + e^{-5x}) dx = \frac{x^3}{3} - \frac{1}{5} e^{-5x} + C$$

3. Use the Fundamental Theorem of Calculus to evaluate the definite integral

$$\int_1^4 \sqrt{x} dx$$

First $\int \sqrt{x} dx = \int x^{1/2} dx = \frac{1}{\frac{1}{2}+1} x^{\frac{1}{2}+1} + C = \frac{2}{3} x^{3/2} + C$

So an antiderivative of \sqrt{x} is $F(x) = \frac{2}{3} x^{3/2}$

Fundamental Thm of Calculus:

$$\int_1^4 \sqrt{x} dx = F(4) - F(1) = \left(\frac{2}{3}\right) 4^{3/2} - \frac{2}{3} = \frac{16}{3} - \frac{2}{3} = \frac{14}{3}$$