

Calculus II - Quiz 1- Answers

Name: _____

Box # _____

1. Compute the following definite integrals

$$\int \frac{2x^2 - x^3}{5} dx = \frac{2}{15}x^3 - \frac{1}{20}x^4 + C$$

$$\int \frac{1}{2}\sqrt[3]{x} - \frac{2}{\sqrt[3]{x}} + \frac{1}{2x} dx = \frac{3}{8}x^{4/3} - 3x^{2/3} + \frac{1}{2} \ln |x| + C$$

$$\int (4 \cos(t) - 3 \sin(2t) + \sec^2(t)) dt = 4 \sin t + \frac{3}{2} \cos 2t + \tan t + C$$

$$\int \frac{e^{ax} - e^{-ax}}{5} dx =: \frac{1}{5a}e^{ax} + \frac{1}{5a}e^{-ax} + C$$

2. A car passes through an intersection at 50 ft/sec and accelerates at 10 ft/sec² until the speed is 70 ft/sec. How far did the car travel after the acceleration period.

$$a(t) = 10$$

$$v(t) = \int a(t) dt = \int 10 dt = 10t + C,$$

$$50 = v(0) = 0 + C, C = 50$$

$$v(t) = 10t + 50$$

$$s(t) = \int v(t) dt = \int (10t + 50) dt = 5t^2 + 50t + C$$

$$0 = s(0) = 5t^2 + 50t + C, C = 0$$

$$s(t) = 5t^2 + 50t$$

$$v(t) = 70 \text{ when } t = 2, s(2) = 5 \cdot 2^2 + 50 \cdot 2 = 120$$