

# Math 106-Quiz #1

Name: \_\_\_\_\_

ID: \_\_\_\_\_

Serial number: \_\_\_\_\_

Evaluate the following integrals

a)  $\int \left( \frac{7}{x^4} + x \right) dx$

b)  $\int \frac{\sec x}{\cos x} dx$

c)  $\int x\sqrt{9-x^2} dx$

d)  $\int \cos x (1 - \sin x)^3 dx$

Ⓐ  $\int \left( \frac{7}{x^4} + x \right) dx = \int (7x^{-4} + x) dx = 7 \frac{x^{-3}}{-3} + \frac{x^2}{2} + C = -\frac{7}{3x^3} + \frac{x^2}{2} + C$

1.25

Ⓑ  $\int \frac{\sec x}{\cos x} dx = \int \frac{1}{\cos x} \cdot \frac{1}{\cos x} dx = \int \frac{1}{\cos^2 x} dx = \int \sec^2 x dx = \tan x + C$

1.25

Ⓒ  $\int x\sqrt{9-x^2} dx = \int x(9-x^2)^{1/2} dx$ . Let  $u = 9-x^2$ ,  $du = -2x dx \Rightarrow \frac{du}{-2x} = dx$   
 $\Rightarrow \int x(9-x^2)^{1/2} dx = \int x u^{1/2} \frac{du}{-2x} = -\frac{1}{2} \int u^{1/2} du = -\frac{1}{2} \cdot \frac{2}{3} u^{3/2} + C$   
 $= -\frac{1}{3} (9-x^2)^{3/2} + C$

1.25

Ⓓ Let  $u = 1 - \sin x$ ,  $du = -\cos x dx \Rightarrow -du = \cos x dx$   
 $\Rightarrow \int \cos x (1 - \sin x)^3 dx = -\int u^3 du = -\frac{u^4}{4} + C = -\frac{(1 - \sin x)^4}{4} + C$

1.25

Good Luck ☺