

WRITE YOUR NAME:

MAC 2312 Quiz 2
Friday February 23rd

Question 1. Evaluate the integral.

$$\int_0^{\pi/6} \cos^3 x \, dx$$

$$\int_0^{\pi/6} \cos^2 x \cos x \, dx = \int_{x=0}^{x=\pi/6} (1 - \sin^2 x) \cos x \, dx$$

Let $u = \sin x$

$\Rightarrow du = \cos x \, dx$

If $x=0$, then $u = \sin 0 = 0$

If $x = \frac{\pi}{6}$, then $u = \sin \frac{\pi}{6} = \frac{1}{2}$

$$\int_{u=0}^{u=1/2} (1 - u^2) \, du = \left[u - \frac{u^3}{3} \right]_{u=0}^{u=1/2}$$

$$= \left(\frac{1}{2} - \frac{1}{3} \cdot \frac{1}{2^3} \right) - (0 - 0)$$

$$= \frac{1}{2} - \frac{1}{24} = \frac{12}{24} - \frac{1}{24} = \frac{11}{24}$$