

WRITE YOUR NAME:

MAC 2312 Quiz 10
Tuesday February 20th

Evaluate the integral.

$$\int_0^{\pi/2} \cos^3 x \, dx$$
$$\int_0^{\pi/2} \underbrace{\cos^2 x}_{\substack{\text{Even power} \\ \text{Easy to rewrite}}} \cdot \underbrace{\cos x}_{\substack{\text{"Candidate"} \\ \text{for } du}} \, dx = \int_0^{\pi/2} (1 - \sin^2 x) \cos x \, dx$$

Sub $u = \sin x$

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

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

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

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

$$= \left[u - \frac{u^3}{3} \right]_0^1 = 1 - \frac{1}{3} = \boxed{\frac{2}{3}}$$