PRINT Your Name:_____

Remove everything from your desk except this page and a pencil or pen.

$\boxed{\text{Circle}}$ your answer. **Show your work.** **Check** your answer.
The quiz is worth 5 points.

Find $\int \sin^3 x \cos^2 x \, dx$**. Check your answer.**

There is an odd power of $\sin x$; so, we save one $\sin x$ and convert everything else to $\cos x$. The integral is

$$\int (1 - \cos^2 x) \cos^2 x \sin x \, dx.$$

Let $u = \cos x$. It follows that $du = \sin x \, dx$. This integral is

$$-\int (1 - u^2) u^2 \, du = -\int (u^2 - u^4) \, du = -\left(\frac{u^3}{3} - \frac{u^5}{5} \right) + C$$

$$= \boxed{-\left(\frac{\cos^3 x}{3} - \frac{\cos^5 x}{5} \right) + C}$$

Check. The derivative of the proposed answer is

$$-\left(\cos^2 x(-\sin x) - \cos^4 x(-\sin x) \right) = -\cos^2 x(-\sin x) \left(1 - \cos^2 x \right)$$

$$= \cos^2 x(\sin x) \sin^2 x. \ \checkmark$$