

$$4. \int \sin^2(\underline{7x}) dx$$

RECALL
 $\sin^2 u = \frac{1 - \cos 2u}{2}$

$$= \int \frac{1 - \cos(2 \cdot 7x)}{2} dx$$

$$= \frac{1}{2} \int 1 - \cos(14x) dx$$

$$= \frac{1}{2} \left[\int 1 dx - \int \cos(14x) dx \right]$$

$u = 14x \quad du = 14 dx$

$$= \frac{1}{2} \left[x - \frac{1}{14} \int 14 \cos(14x) dx \right]$$

$$= \frac{1}{2} \left[x - \frac{1}{14} \int \cos u du \right]$$

$$= \frac{1}{2} \left[x - \frac{1}{14} \sin u \right] + C$$

$$= \frac{1}{2} \left[x - \frac{1}{14} \sin(14x) \right] + C$$

$$= \frac{1}{2} x - \frac{1}{28} \sin(14x) + C$$