

$$\int \sin^4 X \sin 2X dX$$

$$= \int \sin^4 X \cdot 2 \sin X \cos X dX$$

$$= 2 \int \sin^5 X \cos X dX$$

$$= 2 \times \frac{\sin^6 X}{6} + C$$

$$= \boxed{\frac{\sin^6 X}{3} + C}$$