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3. $\int_0^{\pi/2} \sin^7\theta \cos^5\theta \, d\theta = \int_0^{\pi/2} \sin^7\theta \cos^4\theta \cos\theta \, d\theta$

$$= \int_0^{\pi/2} \sin^7\theta (1 - \sin^2\theta)^2 \cos\theta \, d\theta$$

$U = \sin\theta$

$du = \cos\theta \, d\theta$

$$= \int_0^1 U^7 (1 - U^2)^2 \, dU$$

$U(0) = \sin 0 = 0$

$U\left(\frac{\pi}{2}\right) = \sin \frac{\pi}{2} = 1$

$$\int_0^1 U^7 (1 - 2U^2 + U^4) \, dU$$

$$\int_0^1 U^7 - 2U^9 + U^{11} \, dU$$

$$\frac{1}{8}U^8 - \frac{2}{10}U^{10} + \frac{1}{12}U^{12} \Big]_0^1$$

$$\left(\frac{1}{8} - \frac{1}{5} + \frac{1}{12}\right) - (0) = \boxed{\frac{1}{120}}$$

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13. $\int \sqrt{\cos \theta} \, \sin^3 \theta \, d\theta$

$\int \sqrt{\cos \theta} \, \sin^2 \theta \, \sin \theta \, d\theta$

$\int (\cos \theta)^{1/2} (1 - \cos^2 \theta) \sin \theta \, d\theta$

$U = \cos \theta$

$du = -\sin \theta \, d\theta$

$-du = \sin \theta \, d\theta$

$-\int u^{1/2} (1 - u^2) \, du$

$-\int u^{1/2} - u^{5/2} \, du$

$-\left(\frac{2}{3} u^{3/2} - \frac{2}{7} u^{7/2} \right)$

$$\boxed{\frac{2}{7} u^{7/2} - \frac{2}{3} u^{3/2} + C}$$