

$$4.) (9x^2y) dx dy$$

$$\int_1^2 \int_0^3 9x^2y dx dy \stackrel{\text{soln}}{=} \frac{243}{2}$$

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Assignment

$$1) \int \sin 7x \cos 2x dx = \int \frac{1}{2} \sin(A+B) + \sin(A-B)$$

$$= \int \frac{1}{2} \sin(7x+2x) + \sin(7x-2x) = \frac{1}{2} \int \sin(7x+2x) + \sin(7x-2x)$$

$$= \frac{1}{2} [\sin 9x + \sin 5x]$$

$$= \frac{1}{2} \left[-\frac{\cos 9x}{9} - \frac{\cos 5x}{5} \right] + C$$

$$2) \int \cos 3x \cos x dx = \int \frac{1}{2} \cos(A+B) + \cos(A-B)$$

$$= \frac{1}{2} \int \cos(3x+x) + \cos(3x-x) = \frac{1}{2} \int \cos 4x + \cos 2x$$

$$= \frac{1}{2} \left[\frac{\sin 4x}{4} + \frac{\sin 2x}{2} \right] + C$$

$$3) \int \frac{\cos x}{\sin^2 x} dx$$

Let $u = \sin x$

$$\frac{du}{dx} = \cos x \Rightarrow dx = \frac{du}{\cos x}$$

$$= \int \frac{\cos x}{u^2} \frac{du}{\cos x}$$

$$= \int \frac{1}{u^2} du = \left[\frac{u^{-2+1}}{-2+1} \right]$$

$$= \frac{1}{u} = \frac{1}{\sin x} + C$$