

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

4) $(9xy) dx dy$

solution

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

Name: AROUNDO Gbemisola Conventist

Dept: micro-biology

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MATH 104 ASSIGNMENT

1) Find the integral for the following

1) $\int \sin 7x \cos 2x \, dx$

2) $\int \cos 3x \cos x \, dx$

3) $\int \cos x / \sin^2 x \, dx$

Solution

1) $\int \sin 7x \cos 2x \, dx = \int \frac{1}{2} [\sin(A+B) + \sin(A-B)]$
 $= \int \frac{1}{2} [\sin(7x+2x) + \sin(7x-2x)] = \frac{1}{2} \int [\sin(9x) + \sin(7x-2x)]$
 $= \frac{1}{2} [\sin 9x + \sin 5x] + C$

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

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) $\int \cos x / \sin^2 x \, dx$

Let $u = \sin x$

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

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