Name: Adeyemi Aisha Abolore
Matric: 19/SCI01/007
Dept: Computer Science.
Course: MAT 104

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

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

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

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

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

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

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

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

Let $u = \sin^2 x$

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

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

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

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

4/ Double integral with limits from 1 to 2, from 0 to 3
$(5xe^2y)dxe\,dy$

Solution.

$$\int_1^2 \int_0^3 5xe^2y\,dx\,dy = \frac{243}{2}$$