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MECHATRONICS ENGINEERING

19/ENG05/032

MAT 104

ASSIGNMENT FOR DR. DYLANI'S GO

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

well first  $\sin a \cdot \cos b = \frac{1}{2} [\sin(a+b) + \sin(a-b)]$

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

$$= \frac{1}{2} (\sin 9x + \sin 5x)$$
$$\therefore \frac{1}{2} \int \sin 9x + \frac{1}{2} \int \sin 5x$$

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

$$= -\frac{1}{18} \cos 9x - \frac{1}{10} \cos 5x + C.$$



## CELEBRATION OF LIFE

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

using,  $\cos a \cdot \cos b = \frac{1}{2} (\cos(a-b) + \cos(a+b))$

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

$$= \frac{1}{2} \int \cos 2x + \frac{1}{2} \int \cos 4x$$

$$= \frac{1}{2} \left( \frac{1}{2} \sin 2x \right) + \frac{1}{2} \left( \frac{1}{4} \sin 4x \right) + C$$

$$= \frac{1}{4} \sin 2x + \frac{1}{8} \sin 4x + C$$

of our beloved father, grandfather & great grandfather  
**ALHAJI CHIEF ABDUL-AZEEZ  
OLALEKAN JOGUN-OMI**

Saturday 21st December, 2019

Courtesy: CHILDREN





## CELEBRATION OF LIFE

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

$$\text{let } u = \sin x$$

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

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

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

$$= \int \frac{1}{u^2} \cdot du$$

$$= \int u^{-2} \cdot du$$

$$= \frac{u^{-1}}{-1}$$

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

of our beloved father, grandfather & great grandfather

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$$\text{Q.1) } \int_1^2 \int_0^3 9x^2y \, dx \, dy$$

$$\int_0^3 9x^2y \, dx$$

$$\begin{aligned} & \int_0^3 \left[ \frac{9x^3}{3} y \right]_0^3 \\ & \left[ 3x^3 y \right]_0^3 \\ & \left[ 3(3)^3 y \right] - \left[ 3(0)^3 y \right] \\ & = 81y - 0 \\ & = 81y \end{aligned}$$

$$\int_1^2 (81y) \, dy$$

$$\begin{aligned} & \left[ \frac{81y^2}{2} \right]_1^2 \\ & = \left[ \frac{81(2)^2}{2} \right] - \left[ \frac{81(1)^2}{2} \right] \end{aligned}$$

$$= \frac{162}{1} - \frac{81}{2} = \frac{324 - 81}{2} = \frac{243}{2}$$