



**Nombre de alumno: luis jaime madrid  
sanchez**

**Nombre del profesor: ojeda trujillo  
juan jose**

**Nombre del trabajo: "problemario"**

**PASIÓN POR EDUCAR**

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**Grupo: a**

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$$\begin{aligned}
 1) \int \sin^4 3x \cos^3 3x \, dx &= \\
 &= \cos^3(3) \sin^4(3) \int x^2 \, dx \\
 &= \cos^3(3) \sin^4(3) \left[ \frac{x^3}{3} \right] + C \\
 &= \frac{\cos^3(3) \sin^4(3)}{3} x^3 + C
 \end{aligned}$$

$$\begin{aligned}
 2) \int \sin 3x \sin 2x \, dx &= \\
 &= \int \frac{[\cos 5x - \cos x]}{2} \, dx \\
 &= \frac{1}{2} \int [-\cos 5x + \cos x] \, dx \\
 &= \frac{1}{2} \left[ -\cos 5x \, dx + \frac{1}{2} \int \cos x \, dx \right] \\
 &= -\frac{1}{2} \left( \frac{\sin 5x}{5} \right) + \frac{1}{2} [\sin x] + C \\
 &= -\frac{\sin 5x}{10} + \frac{\sin x}{2} + C
 \end{aligned}$$

$$\begin{aligned}
 3) \int \sin 3x \cos 5x \, dx &= \\
 &= \int \frac{\sin 8x - \sin 2x}{2} \, dx \\
 &= \frac{1}{2} \int \sin 8x \, dx - \frac{1}{2} \int \sin 2x \, dx \\
 &= -\frac{\cos 8x}{16} + \frac{\cos 2x}{4} + C
 \end{aligned}$$

$$\begin{aligned}
 4) \int \cos 4x \cos 2x \, dx &= \int \cos u \cos 2u \, du \\
 \int \cos 2u &= \cos^2 u - \sin^2 u \\
 \cos 2u &= 1 - \sin^2 u = \int \cos u (1 - 2 \sin^2 u) \, du \\
 &= -\int (2v^2 - 1) \, dv = -2 \int v^2 - \int dv = -\frac{2v^3}{3} + v
 \end{aligned}$$

$$\begin{aligned}
 5) \int \sqrt{1 - \cos x} \, dx &= \int \sqrt{2} \sin \frac{x}{2} \, dx \\
 u &= \frac{x}{2} \quad \frac{du}{dx} = \frac{1}{2} \, dx = 2 \, du \\
 2 \int \frac{3}{2} \sin u \, du &= -2^{3/2} \cos \frac{x}{2} + C
 \end{aligned}$$