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Grupo: A

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1) $\int_{-2} \operatorname{sen}^2 x\,dx = \dfrac{\cos x \operatorname{sen} x}{2} + \dfrac{1}{2}\int 1\,dx$

$= \dfrac{-\cos x \operatorname{sen} x}{2} + \dfrac{x}{2} + c = \dfrac{x - \cancel{\frac{\operatorname{sen} 2x}{2}}}{2} \Big]_{-2}^{2} + c$

$= -\dfrac{\operatorname{sen} 4 - 4}{2} = 2,378$

2) $\int_{-3}^{2} \operatorname{sen}^3 \dfrac{x}{3}\,dx = 3\int_{-3}^{3} \operatorname{sen} u\,du$

$u = \dfrac{x}{3}$ $\quad \dfrac{du}{dx} = \dfrac{1}{3}$ $= \int_{-3}^{3} (1 - \cos^2(u))\,du$

$dx = 3\,du$

$v = \cos u$

$\dfrac{dv}{du} = \operatorname{se} u$ $\quad = \int_{-3}^{3} (v^2 - 1)\,dv = \int_{-3}^{3} v^2\,dv - \int_{-3}^{3} 1\,dv$

$du = \dfrac{1}{\operatorname{sen} u}\,du$

$= \dfrac{v^3}{3} - v = \dfrac{\cos^3 u}{3} - \cos u$

$= \cos^3 \dfrac{x}{3} - 3\cos \dfrac{x}{3} \Big]_{-3}^{3} = 0$

3) $\int_{\pi/2}^{\pi} \operatorname{sen}^2 x + \cos^2 x\,dx = \int_{\pi/2}^{\pi} 1\,dx = x \Big]_{\pi/2}^{\pi} = 1.57$

4) $\int_{\pi/2}^{\pi} \cos^3 \dfrac{2x}{3}\,dx = \int_{\pi/2}^{\pi} \cos^3 u\,du = \int_{\pi/2}^{\pi} \cos u\,(1 - \operatorname{sen}^2 u)\,du$

$u = \dfrac{2x}{3}$ $\quad \dfrac{du}{dx} = \dfrac{2}{3}$ $= \int_{\pi/2}^{\pi} (1 - v^2)\,dv = \int_{\pi/2}^{\pi} 1\,du = \int v^2\,dv$

$dx = \dfrac{3}{2}u$

$v_1 = \operatorname{sen} u$ $\quad \dfrac{du}{du} = \cos u$ $\quad = \dfrac{3\operatorname{sen}\left(\frac{2x}{3}\right)}{2} - \dfrac{\operatorname{sen}\left(\frac{2x}{3}\right)}{2} \Big]_{\pi/2}^{\pi} = 0$

$du = \dfrac{1}{\cos u}\,dv$

5- $\int_{-\frac{\pi}{2}}^{\pi} \sec^4 2x\,dx = \int_{-\frac{\pi}{2}}^{\pi} \sec^2 u\,(\tan^2 u + 1)\,du$

$u = 2x \quad \frac{du}{dx} = 2 \quad = \int_{-\frac{\pi}{2}}^{\pi} (v^2+1)\,dv = \frac{v^3}{3} + v = \frac{\tan^3 u}{3} + \tan u$

$dx = 1/2\, du$

$= \frac{\tan^3 (2x)}{6} + \frac{\tan 2x}{2}\Big]_{-\pi/2}^{\pi}$

$v = \tan u \quad \frac{dv}{du} = \sec^2 u$

$du = \frac{1}{\sec u}\, dv$

6- $\int_{\pi/2}^{\pi} \sin 2x \cos 3x\,dx = \int_{-\pi/2}^{\pi} \frac{\sin 5x\,dx - \sin x\,dx}{2}$

$u = 5x \quad \frac{du}{dx} = 5 \quad = \frac{1}{2}\int_{-\pi/2}^{\pi} \sin 5x\,dx - \frac{1}{2}\int_{-\pi/2}^{\pi} \sin x\,dx$

$dx = \frac{1}{5}\,du$

$= \frac{1}{2}\left[\frac{-\cos 5x}{5} - \frac{\cos x}{2}\right]_{-\pi/2}^{\pi}$

$= \frac{\cos 5x - 5\cos x}{10}\Big]_{-\pi/2}^{\pi} = -\frac{2}{5}$

7- $\int_{-3}^{3} (1+\cos 3x)\frac{3}{2}\,dx = \int_{-3}^{3} \frac{3(\cos(3x)+1)}{2}\,dx$

$u = 3x \quad \frac{du}{dx} = 3 \quad = \frac{3}{2}\int \cos 3x\,dx + \frac{3}{2}\int 1\,dx$

$du = 3\,dx$

$= \frac{3}{2}\left[\frac{\sin 3x}{3} - x\right]_{-3}^{3} = \sin\frac{3x}{3} + \frac{3x}{2}\Big]_{-3}^{3}$

$= \sin 9 + 9 = 9.412$

8- $\int_{-4}^{1} 1 - \sin 2x\,dx = \int_{-4}^{1} dx - \int_{-4}^{1} \sin 2x\,dx = x - \cos u\Big]_{-4}^{1}$

$u = 2x \quad \frac{du}{dx} = 2 \quad = x - \int\left(-\cos\frac{2x}{2}\right)\Big]_{-4}^{1}$

$dx = \frac{1}{2}\,du \quad = \cos\frac{2x}{2} + x\Big]_{-4}^{1}$

$= \frac{\cos 8 - \cos 2}{2} - 10 = 4.86$