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COLLEGE/DEPT ; MHS / MBBS

COURSE CODE ; MAT 104

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1) $\int \frac{2x}{\sqrt{4x^2-1}}\,dx$

Let $u = 4x^2 - 1$

$du = 8x\,dx$

$dx = \frac{du}{8x}$

$= \int \frac{2x}{\sqrt{u}} \times \frac{du}{8x}$

$= \frac{1}{4} \int \frac{1}{\sqrt{u}}\,du$

$= \frac{1}{4} \int \frac{1}{u^{1/2}}\,du = \frac{1}{4} u^{-1/2}\,du$

$= \frac{1}{4} \frac{u^{-1/2+1}}{-1/2+1} + c$

$= \frac{1}{4} \frac{u^{1/2}}{1/2} + c$

$= 1/4 \frac{u^{1/2}}{1/2} + c$

$= \frac{1}{2} u^{1/2} + c$

$= 1/2 (4x^2-1)^{1/2} + c$

$= 1/2 \sqrt{(4x^2-1)} + c$

2) $\int \frac{\sin^{-1}(x)}{\sqrt{1-x^2}}\,dx$

$\int \sin^{-1}(x) \times \frac{1}{\sqrt{1-x^2}}\,dx$

$u = \sin^{-1}(x) \quad du = \frac{1}{\sqrt{1-x^2}}\,dx$

$\int u\,du = \frac{u^2}{2}$

$= \frac{[\sin^{-1}(x)]^2}{2} + c$

3 $\int (\tan x)^6 \sec^2 x \, dx$

$u = \tan x$

$du = \sec^2 x \, dx$

$\int u^6 \, du = \frac{u^7}{7}$

$= \frac{[\tan x]^7}{7} + C$