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19/MHS01/093

MEDICINE & SURGERY.

MAT 102.

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

Let  $u = \sqrt{4x^2-1}$

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

$\frac{du}{dx} = \frac{1}{2} (4x^2-1)^{-1/2} \cdot 8x$

$\frac{du}{dx} = 4x(4x^2-1)^{-1/2}$

$dx = \frac{du}{4x(4x^2-1)^{-1/2}}$   
 $= \frac{(4x^2-1)^{1/2}}{4x} du$

$2 \int \frac{x}{u} dx = 2 \int \frac{x}{(4x^2-1)^{1/2}} \cdot \frac{(4x^2-1)^{1/2}}{4x} du$   
 $= \frac{1}{2} \int du$

$\int \frac{2x}{\sqrt{4x^2-1}} dx = \frac{1}{2} u + c = \frac{1}{2} \sqrt{4x^2-1} + c$

$$2. \int \frac{\sin^{-1} x}{\sqrt{1-x^2}} dx$$

$$\int \sin^{-1} x \cdot (1-x^2)^{-1/2} dx$$

$$\text{let } u = \sin^{-1} x$$

$$du = (1-x^2)^{-1/2} dx$$

$$\int u du = \frac{u^2}{2} + C$$

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

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

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

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

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

$$\int (\tan x)^6 \sec^2 x dx = \frac{(\tan x)^7}{7} + C$$