

Assignment

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

$$u = \sqrt{4x^2-1} = (4x^2-1)^{1/2}.$$

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

$$dx = \frac{du}{4x}$$

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

$$dx = \frac{\sqrt{4x^2-1}}{4x} \cdot du.$$

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

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

$$\int \frac{1}{2} du = \frac{1}{2} \int du.$$

$$= \frac{1}{2} \cdot u + C$$

$$= \frac{1}{2} \cdot \sqrt{4x^2-1} + C$$

$$\frac{u^2 + C}{2}$$

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

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

$$u = \tan x$$

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

$$dx = \frac{du}{\sec^2 x}$$

$$\sec^2 x$$

$$\int u^6 \cdot \sec^2 x \cdot \frac{du}{\sec^2 x}$$

$$\int u^6 \cdot du$$

$$\frac{u^7 + C}{7}$$

$$= \frac{(\tan x)^7 + C}{7}$$

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

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

$$u = \sin^{-1} x.$$

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

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

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

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

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

$$\int u \cdot du$$