

Ex 1 t) Find $\int \frac{dx}{5 \cos^2 x - 3}$

Let $u = \tan x$

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

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

$$I = \int \frac{du}{\sec^2 x (5 \cos^2 x - 3)}$$

$$= \int \frac{du}{5 - 3 \sec^2 x}$$

$$= \int \frac{du}{5 - 3 \tan^2 x - 3}$$

$$= \int \frac{du}{2 - 3u^2}$$

$$= \int \left(\frac{\frac{1}{2\sqrt{2}}}{\sqrt{2} - \sqrt{3}u} + \frac{\frac{1}{2\sqrt{2}}}{\sqrt{2} + \sqrt{3}u} \right) du$$

$$= \frac{1}{2\sqrt{2}} \left(-\frac{1}{\sqrt{3}} \ln |\sqrt{2} - \sqrt{3}u| + \frac{1}{\sqrt{3}} \ln |\sqrt{2} + \sqrt{3}u| \right) + C$$

$$= \frac{1}{2\sqrt{2}\sqrt{3}} \ln \left| \frac{\sqrt{2} + \sqrt{3}u}{\sqrt{2} - \sqrt{3}u} \right| + C$$

$$= \frac{\sqrt{6}}{12} \ln \left| \frac{\sqrt{2} + \sqrt{3} \tan x}{\sqrt{2} - \sqrt{3} \tan x} \right| + C$$