

$$1 = -\frac{1}{3} + \frac{\sin^3 \frac{x}{4}}{\cos^3 \frac{x}{4}} + C * (\cos^3 \frac{x}{4})$$

$$C * = \frac{5}{6}$$

$$\therefore \frac{dy}{y} = -\frac{\sin^3 x}{3 \cos^3 x} + \frac{5}{6} \cos^2 x$$

Q.2. Find the ortho. tra. of family of curves

$$X = Ce^{y^2}$$

Soln

$$X = C e^{y^2}$$

$$C = X e^{-y^2}$$

$$\Rightarrow 1 = C e^{y^2} \cdot 2y y'$$

$$\therefore y' = \frac{1}{2y e^{y^2} \cdot C}$$

$$y' = \frac{1}{2y e^{y^2} \cdot X e^{-y^2}} = \frac{1}{2xy}$$

$$\Rightarrow \frac{dy}{dx} = -2xy$$

$$\Rightarrow \frac{dy}{y} = -2x dx$$

$$\ln y = -x^2 + C$$

$$y = e^{-x^2 + C}$$

$$y = e^{-x^2} \cdot e^C$$