

$$2) \int \frac{\cos \theta}{5 + 7 \sin \theta - 2 \cos^2 \theta} d\theta$$

$$\rightarrow \int \frac{\cos \theta}{5 + 7 \sin \theta - 2(1 - \sin^2 \theta)} d\theta$$

$$\text{Let, } \sin \theta = t$$

$$\cos \theta d\theta = dt$$

$$\Rightarrow \int \frac{dt}{5 + 7t + 2t^2 - 2}$$

$$\Rightarrow \int \frac{dt}{2t^2 + 7t + 3}$$

$$\Rightarrow \frac{1}{2} \int \frac{dt}{\left(t + \frac{7}{4}\right)^2 - \frac{25}{16}}$$

$$\Rightarrow \frac{1}{2 \times 2 \times \frac{5}{4}} \ln \left| \frac{t + \frac{7}{4} - \frac{5}{4}}{t + \frac{7}{4} + \frac{5}{4}} \right|$$

$$\Rightarrow \frac{1}{5} \ln \left| \frac{t + \frac{1}{2}}{t + 3} \right|$$

$$\Rightarrow \frac{1}{5} \ln \left| \frac{2 \sin x + 1}{2(\sin x + 3)} \right|$$