

$$Q2) \int \frac{\cos x \, dx}{\sqrt{\sin^2 x - 2\sin x - 3}}$$

$$\text{Put } \sin x = t \Rightarrow \cos x \, dx = dt$$

$$\int \frac{dt}{\sqrt{t^2 - 2t - 3}} = \int \frac{dt}{\sqrt{(t-1)^2 - 4}}$$

$$= \int \frac{dt}{\sqrt{(t-1)^2 - 2^2}}$$

$$= \log \left| (t-1) + \sqrt{(t-1)^2 - 4} \right| + C$$

$$= \log \left| (\sin x - 1) + \sqrt{\sin^2 x - 2\sin x - 3} \right| + C$$