

**Question 3****(5 marks)**

By using one or more of the following identities:

$$\cos^2 x + \sin^2 x = 1$$

$$\cos 2x = \cos^2 x - \sin^2 x$$

$$\sin 2x = 2 \sin x \cos x$$

evaluate exactly  $\int_0^{\frac{\pi}{2}} (\sin x + \cos x)^2 dx$ .