

6

(a) Prove that $\frac{\sin \theta}{1 - \cos \theta} - \frac{1}{\sin \theta} = \cot \theta$. **[4]**

(b) Hence find the exact roots of the equation $\frac{\sin \theta}{1 - \cos \theta} - \frac{1}{\sin \theta} = 3 \tan \theta$ in the interval $0 \leq \theta \leq \pi$. **[3]**