

7 (i) Prove the identity $\frac{1 + \cos \theta}{1 - \cos \theta} - \frac{1 - \cos \theta}{1 + \cos \theta} \equiv \frac{4}{\sin \theta \tan \theta}$. [4]

(ii) Hence solve, for $0^\circ < \theta < 360^\circ$, the equation

$$\sin \theta \left(\frac{1 + \cos \theta}{1 - \cos \theta} - \frac{1 - \cos \theta}{1 + \cos \theta} \right) = 3. \quad [3]$$