

8 (a) Given that $\cos \theta \neq \pm 1$, prove the identity

$$\frac{1}{1 - \cos \theta} + \frac{1}{1 + \cos \theta} \equiv 2 \operatorname{cosec}^2 \theta$$

[4 marks]

8 (b) Hence, find the set of values of A for which the equation

$$\frac{1}{1 - \cos \theta} + \frac{1}{1 + \cos \theta} = A$$

has real solutions.

Fully justify your answer.

[3 marks]

8 (c) Given that θ is obtuse and

$$\frac{1}{1 - \cos \theta} + \frac{1}{1 + \cos \theta} = 16$$

find the exact value of $\cot \theta$

[3 marks]