

18 (a) Expand and simplify

$$(x^2 + y^2)(x^2 - y^2)$$

[1 mark]

18 (b) Prove the identity

$$\cot^4 \theta - \operatorname{cosec}^4 \theta \equiv \frac{\cos^2 \theta + 1}{\cos^2 \theta - 1}$$

where $\theta \neq n\pi, n \in \mathbb{Z}$

[4 marks]

18 (c) Hence show that

$$\cot^4 \theta - \operatorname{cosec}^4 \theta < 0$$

where $\theta \neq n\pi, n \in \mathbb{Z}$

[2 marks]