6D Part 2 Reciprocal Trigonometric Identities

1. Prove that

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

2. Prove that
$$sec^2\theta - cos^2\theta \equiv sin^2\theta(1 + sec^2\theta)$$

3. Solve the equation
$$4cosec^2\theta - 9 \equiv cot\theta$$

in the interval
$$0 \leq \theta \leq 360$$