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**(a)** Show that  $\frac{2 \tan \theta}{1 + \tan^2 \theta} = \sin 2\theta$  . **[3]**

**(b) In this question you must show detailed reasoning.**

Solve  $\frac{2 \tan \theta}{1 + \tan^2 \theta} = 3 \cos 2\theta$  for  $0 \leq \theta \leq \pi$  . **[3]**