

YOUR NAME: _____

George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Explain using a **diagram** and a **short, but precise, sentence** why, for any angle θ , $\sin^2 \theta + \cos^2 \theta = 1$.
2. Use the identity of the previous part to show that, for any angle θ for which $\sin \theta \neq 0$, $1 + \cot^2 \theta = \csc^2 \theta$. Please, explain all your steps.
3. Use the method of the conjugate to show that, for any angle θ , $\frac{\sin \theta}{1 + \cos \theta} = \frac{1 - \cos \theta}{\sin \theta}$. Please, explain all your steps.