

# Math 1613 - Trigonometry

## Quiz #14 - 2011.10.04

### Solutions

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1. Starting with the identity  $\sin(A + B) = \sin(A)\cos(B) + \cos(A)\sin(B)$ , what properties of sine and cosine do we use to arrive at the identity  $\sin(A - B) = \sin(A)\cos(B) - \cos(A)\sin(B)$ ?

We use the fact that sine is an odd function, and thus  $\sin(-B) = -\sin(B)$ , and that cosine is an even function, with  $\cos(-B) = \cos(B)$ .

2. Verify that the following equation is an identity:

$$\frac{\cos(\theta) + 1}{\tan^2(\theta)} = \frac{\cos(\theta)}{\sec(\theta) - 1}$$

We will work with the right side:

$$\begin{aligned}\frac{\cos(\theta)}{\sec(\theta) - 1} &= \frac{\cos(\theta)}{\sec(\theta) - 1} \cdot \frac{\sec(\theta) + 1}{\sec(\theta) + 1} \\ &= \frac{1 + \cos(\theta)}{\sec^2(\theta) - 1} \\ &= \frac{1 + \cos(\theta)}{\tan^2(\theta)} \\ &= \frac{\cos(\theta) + 1}{\tan^2(\theta)}\end{aligned}$$