

3/26/19

$$1a) \frac{\tan(x) \csc(x)}{\sec(x)} = \frac{\frac{\sin(x)}{\cos(x)} \cdot \frac{1}{\sin(x)}}{\sec(x)} = \frac{\frac{1}{\cos(x)}}{\sec(x)} = \frac{\sec(x)}{\sec(x)} = 1$$

$$1b) \frac{\sin(x)}{\csc(x)} + \cos(x)^2 = \sin(x) \cdot \frac{\sin(x)}{1} + \cos^2(x) = 1$$

$$1c) \frac{\cos(x)}{\sec(x)} + \sin(x)^2 = \cos(x) \cdot \frac{\cos(x)}{1} + \sin(x)^2 = 1$$

$$1d) \frac{1}{\sin^2 x} - \frac{1}{\tan^2 x} = \frac{1}{\sin^2 x} - \frac{1}{\left(\frac{\sin^2 x}{\cos^2 x}\right)} = \frac{1}{\sin^2 x} - \frac{\cos^2 x}{\sin^2 x}$$

$$= \frac{1 - \cos^2 x}{\sin^2 x} = \frac{\sin^2 x}{\cos^2 x} = 1, \text{ notice } \cos^2 x + \sin^2 x = 1$$

$$3b) \frac{\sec(x) - \cos(x)}{\cos(x)} = (\tan(x))^2$$

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

$$3f) \ln[\sec(\theta)] = -\ln[\cos(\theta)]$$

$$\Rightarrow \ln\left[\frac{1}{\cos(\theta)}\right] = \ln(1) - \ln[\cos(\theta)] = -\ln[\cos(\theta)]$$

Note:  $\ln(1) = 0$