Algebra 3 Assignment # 9

Prove each of the following identities please.

(1) $\dfrac{1}{1 - \sin(\theta)} + \dfrac{1}{1 + \sin(\theta)} = 2\sec^2(\theta)$

(2) $\dfrac{\sin(x)}{\sin(x) + \cos(x)} = \dfrac{\tan(x)}{1 + \tan(x)}$

(3) $\dfrac{\sin(x) + \cos(x)}{\sec(x) + \csc(x)} = \dfrac{\cos(x)}{\csc(x)}$

(4) $\dfrac{\tan(\theta) + 1}{\tan(\theta) - 1} = \dfrac{1 + 2\sin(\theta)\cos(\theta)}{\sin^2(\theta) - \cos^2(\theta)}$

(5) $\dfrac{\sin^2(\phi) + 2\cos(\phi) - 1}{\sin^2(\phi) + 3\cos(\phi) - 3} = \dfrac{1}{1 - \sec(\phi)}$

(6) $\dfrac{\cos^2(x) + 3\sin(x) - 1}{\cos^2(x) + 2\sin(x) + 2} = \dfrac{1}{1 + \csc(x)}$

(7) $\dfrac{\tan(x) + \tan(y)}{1 - \tan(x)\tan(y)} = \dfrac{\cot(x) + \cot(y)}{\cot(x)\cot(y) - 1}$