Solutions for Practice Exam 2

October 16, 2014

1 PART 1, PROBLEM 9

$$\begin{aligned}(sinx-cosx)^2 &= sin^2x - sinxcosx - sinxcosx + cos^2x \\ &= (sin^2x + cos^2x) - 2sinxcosx \\ &= 1 - sin(2x)\end{aligned} \tag{1.1}$$

2 PART 2, PROBLEM 2

$$\begin{aligned}\frac{1}{1-cosx} + \frac{1}{1+cosx} &= \frac{1+cosx}{(1-cosx)(1+cosx)} + \frac{1-cosx}{(1-cosx)(1+cosx)} \\ &= \frac{1+cosx}{1-cos^x} + \frac{1-cosx}{1-cos^2x} \\ &= \frac{1+cosx+1-cosx}{1-cos^2x} \\ &= \frac{2}{sin^2x} = 2csc^2x\end{aligned} \tag{2.1}$$

3 PART 2, PROBLEM 6

Remark: use the identity $tan^2x + 1 = sec^2x$

$$\begin{aligned}\frac{sec^2x-1}{1-cos^2x} &= \frac{tan^2x}{sin^2x} \\ &= \frac{sin^2x}{cos^2x}\frac{1}{sin^2x} \\ &= \frac{1}{cos^2x} \\ &= sec^2x\end{aligned} \tag{3.1}$$