Assignment 6.3

Prove the following identities.

1. $\sin\theta\cot\theta = \cos\theta$
2. $\cos A\tan A = \sin A$
3. $\frac{\sin^2\theta+\cos^2\theta}{\cos\theta} = \sec\theta$
4. $\frac{1+\sin}{\sin\alpha} = 1+\csc\alpha$
5. $\frac{\sin\alpha-1}{\cos} = \tan\alpha - \sec\alpha$
6. $1-\sin B\cos B\tan B = \cos^2 B$
7. $\sin\alpha + \cos\alpha\cot\alpha = \csc\alpha$
8. $1-2\sin^2 x = 2\cos^2 x - 1$
9. $\cos\theta(\csc\theta - \sec\theta) = \cot\theta - 1$
10. $\csc\beta(\csc\beta + \cot\beta) = \frac{1}{1-\cos}$
11. $\sin^4 x - \cos^4 x = 2\sin^2 x - 1$
12. $\tan^4\theta - \sec^4\theta = 1 - 2\sec^2\theta$
13. $\frac{\sin\beta+\tan\beta}{1+\cos\beta} = \tan\beta$
14. $\sec\theta + \tan\theta = \frac{\cos\theta}{1-\sin}$
15. $(1+\csc x)(1-\sin x) = \cot x\cos x$
16. $(1+\tan\theta+\sec\theta)^2 = 2(1+\sec\theta)(\tan\theta+\sec\theta)$
17. $(1+\sec\theta)(\sec\theta-1) = \frac{\sin\theta\sec\theta}{\cos\theta\csc\theta}$
18. $(\csc\theta-1)(1+\csc\theta) = \frac{\csc\theta\cos\theta}{\sec\theta\sin\theta}$
19. $\frac{\sin x\cos x}{1+\cos x} - \frac{\sin x}{1-\cos} = -(\cot x\cos x + \csc x)$
20. $\frac{\sin\alpha+\cos\alpha}{\sec\alpha+\tan\alpha} + \frac{\cos\alpha-\sin\alpha}{\sec\alpha-\tan\alpha} = 2 - 2\sin^2\alpha\sec\alpha$
21. $\frac{\sec\theta}{1-\cos\theta} = \frac{\sec\theta+1}{\sin^2\theta}$
22. $\frac{\tan x}{\tan x+\sin x} = \frac{1-\cos x}{\sin^2 x}$
23. $\frac{1+\sec}{\sec\theta-1} + \frac{1+\cos\theta}{\cos\theta-1} = 0$
24. $\frac{\sec^2\theta(1+\csc\ )-\tan\theta(\sec\theta+\tan\theta)}{\text{cs}\quad(1+\sin\ )} - 1 = 0$