Prove the following identities:

1. $\tan\theta\cos\theta = \sin\theta$

2. $\sin\theta\cot\theta = \cos\theta$

3. $\sin\theta = \dfrac{\tan\theta}{\sec\theta}$

4. $\csc\theta(1+\sin\theta) = 1+\csc\theta$

5. $\cos\theta(\sec\theta-1) = 1-\cos\theta$

6. $\dfrac{1-\tan\theta}{1-\cot\theta} = -\tan\theta$

7. $\sin\theta\tan\theta + \sec\theta = \dfrac{\sin^2\theta+1}{\cos\theta}$

8. $\dfrac{1+\sin\theta}{1-\sin\theta} = \dfrac{\csc\theta+1}{\csc\theta-1}$

9. $\dfrac{\sin\theta+\tan\theta}{\cos\theta+1} = \tan\theta$

10. $\sin^2\theta\cot^2\theta = 1-\sin^2\theta$

11. $\csc^2\theta - 1 = \csc^2\theta\cos^2\theta$

12. $\sin^2\theta = \dfrac{\tan^2\theta}{1+\tan^2\theta}$

13. $\sin\theta\cos\theta\tan\theta = 1-\cos^2\theta$

14. $\dfrac{\cos\theta}{1+\sin\theta} + \dfrac{\cos\theta}{1-\sin\theta} = 2\sec\theta$

15. $\dfrac{\sin\theta+\cos\theta}{\csc\theta+\sec\theta} = \sin\theta\cos\theta$

16. $\dfrac{\tan\theta}{\sec\theta+1} = \dfrac{\sec\theta-1}{\tan\theta}$

17. $\dfrac{1}{1+\sin\theta} + \dfrac{1}{1-\sin\theta} = 2\sec^2\theta$

18. $\tan^2\theta(1+\cot^2\theta) = \sec^2\theta$

19. $(1-\cos^2\theta)(1+\tan^2\theta) = \tan^2\theta$

20. $\tan\theta + \cot\theta = \sec\theta\csc\theta$

21. $\sec^2\theta + \csc^2\theta = \sec^2\theta\csc^2\theta$

22. $\sin^2\theta = \cos\theta(\sec\theta - \cos\theta)$

23. $\dfrac{1}{1+\cos\theta} = \csc^2\theta - \dfrac{\cot\theta}{\sin\theta}$

24. $\tan\theta + \tan^3\theta = \dfrac{\sec^2\theta}{\cot\theta}$

25. $\dfrac{1+\csc\theta}{\cot\theta} - \sec\theta = \tan\theta$

26. $\dfrac{(1-\cos^2\theta)(\sec^2\theta-1)}{\cos^2\theta} = \tan^4\theta$