ON A SEPARATE SHEET OF PAPER, PROVE THE FOLLOWING EXPRESSIONS.

1. $\csc x \cdot \tan x = \sec x$
2. $\sec x \cdot \cot x \cdot \sin x = 1$
3. $\sin^2 \theta \cdot \sec \theta \cdot \csc \theta = \tan \theta$
4. $\tan x + \cot x = \csc x \cdot \sec x$
5. $\sec \theta - \cos \theta = \sin \theta \cdot \tan \theta$
6. $\tan x (\sin x + \cot x \cdot \cos x) = \sec x$
7. $\cos x (\sec x + \cos x \cdot \csc^2 x) = \csc^2 x$
8. $(\sec x - 1)(\sec x + 1) = \tan^2 x$
9. $(\cos \phi - \sin \phi)^2 = 1 - 2 \cos \phi \cdot \sin \phi$
10. $(1 - \tan \phi)^2 = \sec^2 \phi - 2 \tan \phi$
11. $(\cos x - \sec x)^2 = \tan^2 x - \sin^2 x$
12. $\dfrac{\csc^2 x - 1}{\cos x} = \cot x \cdot \csc x$
13. $\dfrac{1 - \cos^2 \theta}{\tan \theta} = \sin \theta \cdot \cos \theta$
14. $\dfrac{1 + \cot^2 \phi}{\sec^2 \phi} = \cot^2 \phi$
15. $\dfrac{\sec A}{\sin A} - \dfrac{\sin A}{\cos A} = \cot A$
16. $\dfrac{\csc B}{\cos B} - \dfrac{\cos B}{\sin B} = \tan B$
17. $\dfrac{1}{1 - \cos \theta} + \dfrac{1}{1 + \cos \theta} = 2 \csc^2 \theta$
18. $\dfrac{1}{\sec x - \tan x} + \dfrac{1}{\sec x + \tan x} = 2 \sec x$

Simplify.

19. $\cos^2 x + \sin^2 x + \cot^2 x$
20. $\sin x \csc x - \dfrac{\sin x}{\csc x}$
21. $\dfrac{\sqrt{1 - \sin^2 x}}{\sqrt{1 + \tan^2 x}}$
22. $\sin x \sec x \left(\cos x + \dfrac{\csc x}{\sec^2 x} \right)$
23. $(1 - \sin x)(\sec x + \tan x)$