5.1 Homework Day 1

9. $\tan x \cos x = \dfrac{\sin x}{\cos x} \cdot \cos x = \sin x$

10. $\cot x \tan x = \dfrac{\cos x}{\sin x} \cdot \dfrac{\sin x}{\cos x} = 1$

11. $\sec y \sin\left(\dfrac{\pi}{2} - y\right) = \dfrac{1}{\cos y} \cdot \cos y = 1$

12. $\cot u \sin u = \dfrac{\cos u}{\sin u} \cdot \sin u = \cos u$

13. $\dfrac{1 + \tan^2 x}{\csc^2 x} = \dfrac{\sec^2 x}{\csc^2 x} = \dfrac{1/\cos^2 x}{1/\sin^2 x} = \dfrac{\sin^2 x}{\cos^2 x} = \tan^2 x$

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

15. $\cos x - \cos^3 x = \cos x(1 - \cos^2 x) = \cos x \sin^2 x$

16. $\dfrac{\sin^2 u + \tan^2 u + \cos^2 u}{\sec u} = \dfrac{1 + \tan^2 u}{\sec u} = \dfrac{\sec^2 u}{\sec u} = \sec u$

17. $\sin x \csc(-x) = \sin x \cdot \dfrac{1}{\sin(-x)} = -1$

18. $\sec(-x) \cos(-x) = \dfrac{1}{\cos(-x)} \cdot \cos(-x) = 1$

19. $\cot(-x) \cot\left(\dfrac{\pi}{2} - x\right) = \dfrac{\cos(-x)}{\sin(-x)} \cdot \dfrac{\cos\left(\dfrac{\pi}{2} - x\right)}{\sin\left(\dfrac{\pi}{2} - x\right)}$

$= \dfrac{\cos(-x)}{\sin(-x)} \cdot \dfrac{\sin(x)}{\cos(x)} = -1$

20. $\cot(-x) \tan(-x) = \dfrac{\cos(-x)}{\sin(-x)} \cdot \dfrac{\sin(-x)}{\cos(-x)} = 1$

21. $\sin^2(-x) + \cos^2(-x) = 1$