

Simplifying Trig Expressions WS 1

NAME Key

Simplify each of the following.

1. $(\tan \theta)(\cos \theta) = \frac{\sin \theta}{\cos \theta} \cdot \frac{\cos \theta}{1} = \boxed{\sin \theta}$

3. $\frac{1 - \cos^2 x}{\sin x} = \frac{\sin^2 x}{\sin x} = \boxed{\sin x}$

5. $(\cos y)(\sec y) = \frac{\cos y}{1} \cdot \frac{1}{\cos y} = \boxed{1}$

7. $\sin^2 x - 1 = \boxed{-\cos^2 x}$

9. $\tan^2 x - \sec^2 x = \boxed{-1}$

11. $\frac{1 + \tan^2 \theta}{1 + \cot^2 \theta} = \frac{\sec^2 \theta}{\csc^2 \theta} = \frac{1/\cos^2 \theta}{1/\sin^2 \theta} = \frac{\sin^2 \theta}{\cos^2 \theta} = \frac{1}{\cos^2 \theta} \cdot \frac{\sin^2 \theta}{1} = \frac{\sin^2 \theta}{\cos^2 \theta} = \boxed{\tan^2 \theta}$

13. $\sec^2 x (1 - \cos^2 x) = \frac{1}{\cos^2 x} \cdot \sin^2 x = \frac{\sin^2 x}{\cos^2 x} = \boxed{\tan^2 x}$

15. $\frac{\cos x + \tan x \sin x}{\cos x} = \frac{\cos x + \frac{\sin x}{\cos x} \sin x}{\cos x} = \frac{\cos x + \frac{\sin^2 x}{\cos x}}{\cos x} = \frac{\frac{\cos^2 x + \sin^2 x}{\cos x}}{\cos x} = \frac{1}{\cos^2 x} = \boxed{\sec^2 x}$

17. $\frac{\sec^2 x - 1}{\sec x + 1} + 1 = \frac{(\sec x - 1)(\sec x + 1)}{\sec x + 1} + 1 = \sec x - 1 + 1 = \boxed{\sec x}$

19. $(1 - \cos^2 x) \csc x = \sin^2 x \cdot \frac{1}{\sin x} = \boxed{\sin x}$

21. $\frac{1}{\tan^2 x + 1} = \frac{1}{\sec^2 x} = \boxed{\cos^2 x}$

23. $\frac{\tan x}{\tan x} \cdot \frac{\sec^2 x}{\tan x} = \frac{\tan^2 x}{\tan x} \cdot \frac{\sec^2 x}{\tan x} = \frac{1}{\tan x} \cdot \frac{1}{\tan x} = \frac{1}{\tan^2 x} = \boxed{\cot^2 x}$

25. $\frac{\sin^2 \theta - \cot \theta \tan \theta}{\cot \theta \sin \theta} = \frac{\sin^2 \theta - 1}{\cot \theta \sin \theta} = \frac{-\cos^2 \theta}{\frac{\cos \theta}{\sin \theta} \sin \theta} = \frac{-\cos^2 \theta}{\cos \theta} = \boxed{-\cos \theta}$

2. $(\cot A)(\sec A)(\sin A) = \frac{\cos A}{\sin A} \cdot \frac{1}{\cos A} \cdot \frac{\sin A}{1} = \boxed{1}$

4. $(\cos x)(\csc x)(\tan x) = \cos x \cdot \frac{1}{\sin x} \cdot \frac{\sin x}{\cos x} = \boxed{1}$

6. $\sin^4 x + 2\sin^2 x \cos^2 x + \cos^4 x = (\sin^2 x + \cos^2 x)(\sin^2 x + \cos^2 x) = (1)(1) = \boxed{1}$

8. $\cos^3 y + \cos y \sin^2 y = \cos y (\cos^2 y + \sin^2 y) = \cos y (1) = \boxed{\cos y}$

10. $\frac{\sin^4 \theta - \cos^4 \theta}{\sin^2 \theta - \cos^2 \theta} = \frac{(\sin^2 \theta + \cos^2 \theta)(\sin^2 \theta - \cos^2 \theta)}{\sin^2 \theta - \cos^2 \theta} = \frac{1 \cdot (\sin^2 \theta - \cos^2 \theta)}{\sin^2 \theta - \cos^2 \theta} = \boxed{1}$

12. $(1 + \sin x)(1 - \sin x) = 1 - \sin^2 x = \boxed{\cos^2 x}$

14. $\sin \theta (\csc \theta - \sin \theta) = \sin \theta \left(\frac{1}{\sin \theta} - \sin \theta \right) = 1 - \sin^2 \theta = \boxed{\cos^2 \theta}$

16. $\frac{\sin x \cos x}{1 - \sin^2 x} = \frac{\sin x \cos x}{\cos^2 x} = \frac{\sin x}{\cos x} = \boxed{\tan x}$

18. $\cot^2 x (\sec^2 x - 1) = \cot^2 x \tan^2 x = \frac{1}{\tan^2 x} \cdot \tan^2 x = \boxed{1}$

20. $\tan^2 x - \tan^2 x \sin^2 x = \tan^2 x (1 - \sin^2 x) = \frac{\sin^2 x}{\cos^2 x} (\cos^2 x) = \boxed{\sin^2 x}$

22. $\tan^4 x + 2 \tan^2 x + 1 = (\tan^2 x + 1)(\tan^2 x + 1) = \sec^2 x \sec^2 x = \boxed{\sec^4 x}$

24. $\frac{\tan \theta \csc \theta}{\sec \theta} = \frac{\frac{\sin \theta}{\cos \theta} \cdot \frac{1}{\sin \theta}}{\frac{1}{\cos \theta}} = \frac{1/\cos \theta}{1/\cos \theta} = \boxed{1}$

26. $\sec x - \tan x \sin x = \frac{1}{\cos x} - \frac{\sin x}{\cos x} \cdot \frac{\sin x}{1} = \frac{1 - \sin^2 x}{\cos x} = \frac{\cos^2 x}{\cos x} = \boxed{\cos x}$