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WORKSHEET - THE BASIC 8 TRIG IDENTITIES

Simplify each expression to a single trig function or number.

1. $\sec \theta \sin \theta$

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

2. $\cos \theta \tan \theta$

$$\frac{\cos \theta}{1} \left(\frac{\sin \theta}{\cos \theta} \right) = \boxed{\sin \theta}$$

3. $\tan^2 \theta - \sec^2 \theta$

$$\frac{\sin^2 \theta}{\cos^2 \theta} - \frac{1}{\cos^2 \theta} = \frac{\sin^2 \theta - 1}{\cos^2 \theta} = \frac{-\cos^2 \theta}{\cos^2 \theta} = \boxed{-1}$$

OR use $1 + \tan^2 \theta = \sec^2 \theta$

4. $1 - \cos^2 \theta$

$$= \boxed{\sin^2 \theta}$$

OR $1 - (1 - \sin^2 \theta)$
 $1 - 1 + \sin^2 \theta$

5. $(1 - \cos \theta)(1 + \cos \theta)$ *Pyth. ident most likely needed*

$$1 - \cos^2 \theta$$

$$= \boxed{\sin^2 \theta}$$

6. $(\sec x - 1)(\sec x + 1)$

$$\sec^2 x - 1$$

$$= \boxed{\tan^2 x}$$

7. $\frac{1}{\sin^2 A} - \frac{1}{\tan^2 A}$

$$\frac{1}{\sin^2 A} - \frac{1}{\frac{\sin^2 A}{\cos^2 A}}$$

$$\frac{1}{\sin^2 A} - \frac{\cos^2 A}{\sin^2 A}$$

$$\frac{1 - \cos^2 A}{\sin^2 A} = \frac{\sin^2 A}{\sin^2 A} = \boxed{1}$$

8. $1 - \frac{\sin^2 \theta}{\tan^2 \theta}$

$$1 - \frac{\sin^2 \theta}{\frac{\sin^2 \theta}{\cos^2 \theta}}$$

$$1 - \cos^2 \theta$$

$$\frac{\sin^2 \theta}{1} \cdot \frac{\cos^2 \theta}{\sin^2 \theta}$$

$$= \boxed{\sin^2 \theta}$$

$$\frac{1}{\frac{\cos^2 \theta}{\sin^2 \theta}} = \frac{1}{1} \cdot \frac{\sin^2 \theta}{\cos^2 \theta}$$

9. $\frac{1}{\cos^2 \theta} - \frac{1}{\cot^2 \theta}$

$$\frac{1}{\cos^2 \theta} - \frac{\sin^2 \theta}{\cos^2 \theta}$$

$$\frac{1 - \sin^2 \theta}{\cos^2 \theta} = \frac{\cos^2 \theta}{\cos^2 \theta} = \boxed{1}$$

10. $\cos \theta (\sec \theta - \cos \theta)$

$$\frac{\cos \theta}{1} \left(\frac{1}{\cos \theta} - \cos \theta \right)$$

$$1 - \cos^2 \theta = \boxed{\sin^2 \theta}$$

11. $\cos^2 A (\sec^2 A - 1)$

$$\cos^2 A (\tan^2 A)$$

$$\cos^2 A \left(\frac{\sin^2 A}{\cos^2 A} \right)$$

$$\boxed{\sin^2 A}$$

12. $(1 - \cos x)(1 + \sec x)(\cos x)$

$$(1 - \cos x) \left(1 + \frac{1}{\cos x} \right) \cos x$$

$$(1 - \cos x)(\cos x + 1)$$

$$\cos x + 1 - \cos^2 x - \cos x$$

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

13. $\frac{\sin x \cos x}{1 - \cos^2 x}$

$$\frac{\sin x \cos x}{\sin^2 x} = \frac{\cos x}{\sin x} = \boxed{\cot x}$$

14. $\frac{\tan^2 \theta}{\sec \theta + 1} + 1$

$$\frac{\tan^2 \theta}{\sec \theta + 1} + \frac{\sec \theta + 1}{\sec \theta + 1}$$

$$\frac{\tan^2 \theta + \sec \theta + 1}{\sec \theta + 1}$$

$$\frac{\sec^2 \theta - 1 + \sec \theta + 1}{\sec \theta + 1} = \frac{\sec^2 \theta + \sec \theta}{\sec \theta + 1}$$

$$\frac{\sec \theta (\sec \theta + 1)}{\sec \theta + 1} = \boxed{\sec \theta}$$