

Directions: Verify each trigonometric identity. Complete all work on a separate piece of paper.

1)  $\cos^3 \theta + \sin^2 \theta \cos \theta = \cos \theta$

2)  $\csc^2 \theta - \cos^2 \theta \csc^2 \theta = 1$

3)  $\sec \theta \sin \theta = \tan \theta$

4)  $\frac{\csc \theta}{\sec \theta} = \cot \theta$

5)  $\frac{\sec^2 \theta - 1}{\tan \theta} = \tan \theta$

6)  $\frac{\cot \theta}{\csc^2 \theta - 1} = \tan \theta$

7)  $\sec \theta \sin \theta \cot \theta = 1$

8)  $\cot \theta \csc \theta \tan^2 \theta = \sec \theta$

9)  $\cos^2 \theta - \sin^2 \theta = 2 \cos^2 \theta - 1$

10)  $\cos^2 \theta - \sin^2 \theta = 1 - 2 \sin^2 \theta$

11)  $\cot \theta \sin \theta = \cos \theta$

12)  $\frac{\tan \theta}{\sec \theta} = \sin \theta$

13)  $\sin \theta (1 + \csc \theta) = \sin \theta + 1$

14)  $(1 + \tan \theta)^2 = \sec^2 \theta + 2 \tan \theta$

15)  $(1 + \tan^2 \theta) \cos^2 \theta = 1$

16)  $\cos \theta = \sec \theta - \sin \theta \tan \theta$

17)  $(\sec \theta + \tan \theta)(\sec \theta - \tan \theta) = 1$

18)  $\frac{\sec \theta}{\csc^2 \theta} = \sec \theta - \cos \theta$

19)  $\frac{1 - 2 \csc \theta}{\cot \theta} = \tan \theta - 2 \sec \theta$

20)  $\frac{\sec^2 \theta - 1}{\tan \theta} = \tan \theta$

21)  $\sin \theta + \cos \theta \cot \theta = \csc \theta$

22)  $\cos \theta (\csc \theta - \sec \theta) = \cot \theta - 1$

23)  $\frac{\cos \theta}{1 - \sin^2 \theta} = \sec \theta$

24)  $\tan^2 \theta - \tan^2 \theta \sin^2 \theta = \sin^2 \theta$

25)  $\frac{\cot \theta}{1 + \cot^2 \theta} = \sin \theta \cos \theta$

26)  $\frac{1 + \tan^2 \theta}{\cos^2 \theta} = \sec^4 \theta$

27)  $\frac{\sin \theta + \cos \theta}{\sin \theta \cos \theta} = \sec \theta + \csc \theta$

28)  $\frac{\sec \theta + \tan \theta}{\cos \theta + \cot \theta} = \sin \theta \sec^2 \theta$

29)  $\frac{(1 + \sin \theta)^2}{\cos^2 \theta} = \frac{1 + \sin \theta}{1 - \sin \theta}$

30)  $\frac{1 + \sec \theta}{\tan \theta + \sin \theta} = \csc \theta$

31)  $\csc \theta \cos^2 \theta + \sin \theta = \csc \theta$

32)  $\frac{\csc^2 \theta}{\csc^2 \theta - 1} = \sec^2 \theta$

33)  $\sin \theta \left( \frac{\cot \theta}{\sec \theta} + \csc \theta \right) = \cos^2 \theta + 1$

34)  $\frac{2 \cos^2 \theta - \sin^2 \theta + 1}{\cos \theta} = 3 \cos \theta$

35)  $\csc \theta - \sin \theta = \cot \theta \cos \theta$

36)  $\frac{1}{1 - \cos \theta} + \frac{1}{1 + \cos \theta} = 2 \csc^2 \theta$

### Extra Practice

$$1) \quad \frac{1+\tan \theta}{\tan \theta} = 1 + \cot \theta$$

$$2) \quad \frac{\cos \theta + \tan \theta}{\sin \theta} = \sec \theta + \cot \theta$$

$$3) \quad \csc^4 \theta - \cot^4 \theta = 2 \csc^2 \theta - 1$$

$$4) \quad \frac{\cos \theta + \cot \theta}{\csc \theta + 1} = \cos \theta$$

$$5) \quad \frac{1+\sec \theta}{\tan \theta + \sin \theta} = \csc \theta$$

$$6) \quad \frac{2-\sec^2 \theta}{\sec \theta} = \frac{1-2 \sin^2 \theta}{\cos \theta}$$

$$7) \quad \frac{1}{\sec \theta - \tan \theta} = \sec \theta + \tan \theta$$

$$8) \quad 1 + \cos \theta = \cot \theta (\sin \theta + \tan \theta)$$

$$9) \quad 1 - \sin \theta = \tan \theta (\cot \theta - \cos \theta)$$

$$10) \quad \frac{\tan \theta}{1+\tan^2 \theta} = \sin \theta \cos \theta$$

$$11) \quad (\sec \theta - \tan \theta)^2 = \frac{1-\sin \theta}{1+\sin \theta}$$

$$12) \quad \sqrt{\frac{1-\cos \theta}{1+\cos \theta}} = \frac{1-\cos \theta}{\sin \theta}$$

$$13) \quad \sqrt{\frac{\sec \theta + \tan \theta}{\sec \theta - \tan \theta}} = \frac{1+\sin \theta}{\cos \theta}$$

$$14) \quad \sin^4 \theta - \cos^4 \theta = 1 - 2 \cos^2 \theta$$

$$15) \quad \sin^2 \theta \left( \frac{\csc^2 \theta - 1}{\cos^2 \theta} - \cot^2 \theta \right) = \sin^2 \theta$$

$$16) \quad (\sin \theta - \cos \theta)^2 + 2 \sin \theta - \cos \theta = (1 + 2 \sin \theta)(1 - \cos \theta)$$