

## Unit 3 Review

Use identities to find the value of each expression.

1) Find  $\sin \theta$  and  $\tan \theta$

if  $\sec \theta = 2$  and  $\csc \theta < 0$ .

2) Find  $\csc \theta$  and  $\tan \theta$

if  $\sec \theta = 4$  and  $\sin \theta < 0$ .

Verify each identity.

3) 
$$\frac{\sin^2 x}{\cot^2 x} = \frac{\tan^2 x}{\csc^2 x}$$

4)  $\sin x \cot x = \cos x$

5)  $\cot^2 x - \tan^2 x = \csc^2 x - \sec^2 x$

6)  $\csc x \sin x \tan^2 x = \sec^2 x - 1$

$$7) \frac{\tan x \sec x}{\sin x} = \tan^2 x + 1$$

$$8) \cos x \cot^2 x \sec x = \csc^2 x - 1$$

$$9) \frac{\tan^2 x}{\sin^2 x} = \tan^2 x + 1$$

**Write each product as a sum or difference.**

$$10) -3\sin 77^\circ \sin 40^\circ$$

$$11) \cos 70^\circ \sin 63^\circ$$

12)  $4\sin 5A\cos 4A$

**Write each sum or difference as a product.**

13)  $\cos 35^\circ + \cos 241^\circ$

14)  $-2(\sin 158^\circ + \sin 118^\circ)$

15)  $\cos 7\theta + \cos 13\theta$

Use the sum and difference formulas to find the exact value of each.

16)  $\sin 105^\circ$

17)  $\sin \frac{5\pi}{12}$

18)  $\cos 195^\circ$

19)  $\cos \frac{19\pi}{12}$

20)  $\tan 165^\circ$

21)  $\tan \frac{11\pi}{12}$

Use the half-angle identities to find the exact value of each.

22)  $\sin 285^\circ$

23)  $\cos 165^\circ$

24)  $\tan 202.5^\circ$

Verify each identity.

25)  $\frac{2\sin^2 x}{1 + \cos 2x} = \tan^2 x$

$$26) \frac{\sin 2x}{\sec^2 x} = 2\sin x \cos^3 x$$

$$27) \frac{\cos 2x}{2\sin x \cos x} = \frac{1}{\tan 2x}$$

$$28) \frac{2\cos^2 x}{1 - \cos 2x} = \cot^2 x$$

**Solve each equation for  $0 \leq \theta < 2\pi$ .**

29)  $-\sqrt{3}\sin \theta - \sin \theta = -3\sin \theta \tan \theta - \sin \theta$

30)  $-4\sin^2 \theta = \sin \theta - 2\sin^2 \theta$

31)  $5 = -\tan^2 \theta + 4\sec \theta$

32)  $-\cos^2 \theta + 4\sin \theta = -3\sin^2 \theta - 2$

$$33) -\sin^2 2\theta = -2\sin^2 \theta + 3\sin^2 \theta$$

$$34) \cos 2\theta + 2 + 3\cos \theta = 0$$