

### 5.1 Trigonometric Identities

Use the fundamental trigonometric identities to verify each identity.

1)  $1 + \sec(-\theta) \sin(-\theta) \tan(-\theta) = \sec^2\theta$  1) \_\_\_\_\_

2)  $\cos \theta \cot \theta + \sin \theta = \csc \theta$  2) \_\_\_\_\_

3)  $\cos \theta \sin^2\theta - \cos \theta = -\cos^3\theta$  3) \_\_\_\_\_

4)  $\frac{1 - \sec^2\theta}{\sec^2\theta} = -\sin^2\theta$  4) \_\_\_\_\_

5)  $\frac{\tan x - \sin(-x)}{1 + \cos x} = \tan x$  5) \_\_\_\_\_

6)  $\frac{\csc x - \sin x}{\sin x} = \tan^2 x$  6) \_\_\_\_\_

7)  $\frac{\sin x}{1 + \cos x} + \frac{1 + \cos x}{\sin x} = 2 \csc x$  7) \_\_\_\_\_

Exercises 5.1 pg 630 (3, 7, 15, 19, 27, 31)(5, 11, 13, 17, 25, 29,32)

### 5.2 Sum and Difference Formulas

Use identities to evaluate the expression. Do not use a calculator.

8)  $\sin 175^\circ \cos 65^\circ + \cos 175^\circ \sin 65^\circ$  8) \_\_\_\_\_

9)  $\cos 320^\circ \cos 20^\circ + \sin 320^\circ \sin 20^\circ$  9) \_\_\_\_\_

10)  $\frac{\tan 250^\circ - \tan 100^\circ}{1 + \tan 250^\circ \tan 100^\circ}$  10) \_\_\_\_\_

Use identities to write the expression as a single trigonometric function .

11)  $\cos 4x \cos 5x - \sin 4x \sin 5x$  11) \_\_\_\_\_

12)  $\sin 3x \cos 7x - \cos 3x \sin 7x$  12) \_\_\_\_\_

$$13) \frac{\tan(3x) + \tan(5x)}{1 - \tan(3x)\tan(5x)} \quad 13) \underline{\hspace{2cm}}$$

Use identities to write the expression as a single function of  $\theta$ .

$$14) \cos(\pi - \theta) - \sin\left(\frac{3\pi}{2} + \theta\right) \quad 14) \underline{\hspace{2cm}}$$

$$15) \tan(\pi - \theta) - \tan(2\pi + \theta) \quad 15) \underline{\hspace{2cm}}$$

Use the given information to find the exact value.

$$16) \tan A = -\frac{12}{5} \text{ and } \sec B = \frac{5}{4}, \quad 16) \underline{\hspace{2cm}}$$

with A in quadrant II and B in quadrant I.

Find  $\cos(A + B)$ .

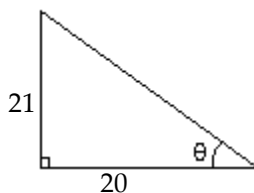
Exercises 5.2 pg 640 (5, 25, 29, 33, 37, 57) (7, 27, 31, 35, 38, 58)

### 5.3 Double-Angle and Half-Angle Identities

Use the given information to find the exact value.

$$17) \text{ Find } \csc 2\theta \text{ if } \tan \theta = -\frac{5}{12}, \theta \text{ lies in quadrant II.} \quad 17) \underline{\hspace{2cm}}$$

$$18) \quad 18) \underline{\hspace{2cm}}$$



Find  $\sec 2\theta$ .

Use identities to simplify the expression. Do not use a calculator.

$$19) \sin\left(\frac{5\pi}{8}\right) \cos\left(\frac{5\pi}{8}\right) \quad 19) \underline{\hspace{2cm}}$$

$$20) 1 - 2 \sin^2\left(\frac{11\pi}{12}\right) \quad 20) \underline{\hspace{2cm}}$$

$$21) \frac{\tan 15^\circ}{1 - \tan^2 15^\circ} \quad 21) \underline{\hspace{2cm}}$$

Use identities to simplify the expression.

22)  $12 \sin 4x \cos 4x$  22) \_\_\_\_\_

23)  $5 - 10 \cos^2 7x$  23) \_\_\_\_\_

24)  $\frac{6 \tan 3x}{\tan^2 3x - 1}$  24) \_\_\_\_\_

Find the exact value of the trigonometric function.

25)  $\cot \theta = \frac{3}{4}$ ,  $\theta$  lies in quadrant III Find :  $\sin \frac{\theta}{2}$ ,  $\cos \frac{\theta}{2}$ ,  $\tan \frac{\theta}{2}$ . 25) \_\_\_\_\_

Exercises 5.3 pg 652 (1, 9, 15, 17, 47, 55) (3, 11, 19, 21, 48, 57)

### 5.4: Product-to-Sum and Sum-to-Product Formulas

Express the product as a sum or difference.

26)  $\sin 3x \sin 8x$  26) \_\_\_\_\_

Express the product as a sum or difference. If possible, find the sum's exact value.

27)  $\cos \frac{\pi}{12} \sin \frac{\pi}{8}$  27) \_\_\_\_\_

Express the sum or difference as a product.

28)  $\cos 9x + \cos 5x$  28) \_\_\_\_\_

Express the sum or difference as a product. If possible, find the product's exact value.

29)  $\sin \left( \frac{\pi}{12} \right) - \sin \left( \frac{\pi}{8} \right)$  29) \_\_\_\_\_

Exercises 5.4 pg 661 (1, 6, 9, 13) (3, 7, 11, 14)

### 5.5 Solving Trigonometric Equations

Find all solutions of the equation in the interval  $[0, 2\pi)$ .

30)  $3 \sin x - 2 = 5 \sin x - 1$  30) \_\_\_\_\_

31)  $\cos x + \sqrt{2} = -\cos x$  31) \_\_\_\_\_

**Find all solutions of the equation in the interval  $[0, 2\pi)$ .**

**Round the answer to two decimal places.**

32)  $4\csc x + 9 = 0$

32) \_\_\_\_\_

33)  $2\sec x - 7 = 0$

33) \_\_\_\_\_

**Find all solutions of the equation in the interval  $[0, 2\pi)$ .**

34)  $2 \sin^2 x - \sin x - 1 = 0$

34) \_\_\_\_\_

**Find all solutions of the equation in the interval  $[0, 2\pi)$ .**

**Round to the nearest tenth.**

35)  $3 \cos^2 x - 5 \cos x - 2 = 0$

35) \_\_\_\_\_

**Solve the equation on the interval  $[0, 2\pi)$ .**

36)  $2 \sin x \tan x = \tan x$

36) \_\_\_\_\_

**Find all solutions of the equation in the interval  $[0, 2\pi)$ .**

**Round to the nearest tenth.**

37)  $\cos 2x = \cos x$

37) \_\_\_\_\_

Exercises 5.5 pg 674

(39, 41, 43, 45, 53, 59, 69, 99, 109) (47, 57, 73, 101, 105, 110)