

## TOPIC: COFUNCTIONS OF COMPLEMENTARY ANGLES

### Cofunction Identities

◆ Angles which add to  $90^\circ$  are **Complementary**.

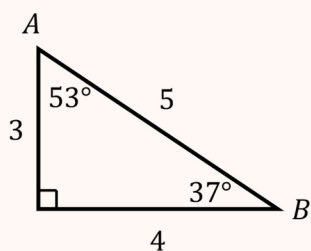
- ▶ In a right triangle, the \_\_\_\_\_ angles are *ALWAYS* complementary.

#### Complementary Angle Theorem

Cofunctions of complementary angles are equal.

New

#### Cofunction Identities



$$\sin A = \cos B \quad \sec A = \csc B \quad \tan A = \cot B$$

$$*B = 90^\circ - A \text{ or } \frac{\pi}{2} - A$$

$$\sin 37^\circ = \frac{3}{5} = \cos \underline{\hspace{2cm}}$$

#### EXAMPLE

Write the expression in terms of the appropriate cofunction.

(A)

$$\sin(37^\circ)$$

[ RADIAN | DEGREE ]

(B)

$$\tan\left(\frac{2\pi}{15}\right)$$

[ RADIAN | DEGREE ]

(C)

$$\sec(50^\circ)$$

[ RADIAN | DEGREE ]

(D)

$$\arctan\left(\frac{3}{4}\right) * \text{degrees}$$

[ RADIAN | DEGREE ]

## TOPIC: COFUNCTIONS OF COMPLEMENTARY ANGLES

### PRACTICE

Write the expression in terms of the appropriate cofunction.

$$\cos\left(\frac{19\pi}{45}\right)$$

### PRACTICE

Write the expression in terms of the appropriate cofunction.

$$\cot(25^\circ)$$

## TOPIC: COFUNCTIONS OF COMPLEMENTARY ANGLES

### Solving Equations Using Cofunction Identities

◆ To solve trig equations, rewrite one side, then set arguments of the functions equal.

$$\sin(x - 10) = \cos(x)$$

$$\sin(\underbrace{x - 10}) = \sin(\underbrace{90 - x})$$

$$x - 10 = 90 - x$$

Recall

#### Cofunction Identities

$$\sin A = \cos(90^\circ - A)$$

$$\sec A = \csc(90^\circ - A)$$

$$\tan A = \cot(90^\circ - A)$$

#### EXAMPLE

Solve for  $\theta$  in the following equation.

$$\cos(\theta) = \sin(2\theta - 30^\circ)$$

#### HOW TO: Solve Trig Equations Using Cofunctions

- 1) Use cofunction identities to get the \_\_\_\_\_ trig functions on both sides of the = sign
- 2) Set the \_\_\_\_\_ of the functions equal
- 3) Solve for the missing variable.

## TOPIC: COFUNCTIONS OF COMPLEMENTARY ANGLES

### PRACTICE

Find the acute angle solution to the following equation involving cofunctions.  $\theta$  is in degrees.

$$\cos(2\theta + 15) = \sin(5\theta + 12)$$

### PRACTICE

Find the acute angle solution to the following equation involving cofunctions.  $P$  is in degrees.

$$\sec\left(\frac{4P}{5} + 20\right) = \csc\left(\frac{5P}{8} + \frac{223}{4}\right)$$

### PRACTICE

Find the acute angle solution to the following equation involving cofunctions.  $M$  is in degrees.

$$\tan\left(\frac{M}{2} + 5\right) = \cot(M - 5)$$