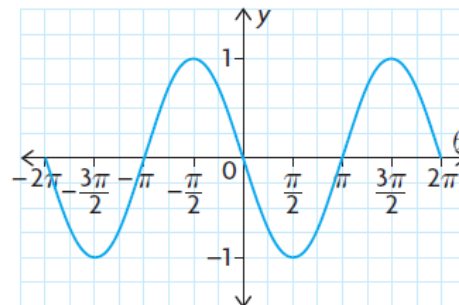


Equivalent Trigonometric Functions

Four students each wrote an equation for the function shown. Who is correct?

- A. $y = -\sin \theta$
- B. $y = \sin(\theta + \pi)$
- C. $y = \sin(\theta - \pi)$
- D. $y = \cos\left(\theta + \frac{\pi}{2}\right)$



Equivalent Trigonometric Functions:

Two expressions may be equivalent if the _____ created are equivalent over the entire _____ of both functions.

1. Using period of a function:

$$\sin \theta = \sin(\underline{\hspace{2cm}})$$

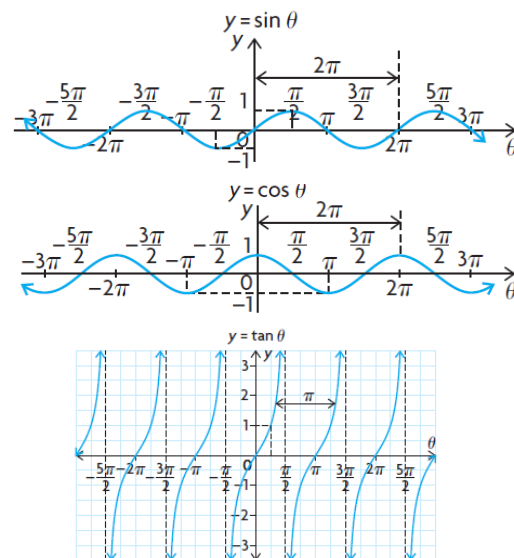
$$\cos \theta = \cos(\underline{\hspace{2cm}})$$

$$\tan \theta = \tan(\underline{\hspace{2cm}})$$

Special:

$$\sin \theta = \cos(\underline{\hspace{2cm}})$$

$$\cos \theta = \sin(\underline{\hspace{2cm}})$$



2. Using Odd or Even

Sine function is _____.

$$\sin(-\theta) =$$

Cosine function is _____.

$$\cos(-\theta) =$$

Tangent function is _____.

$$\tan(-\theta) =$$

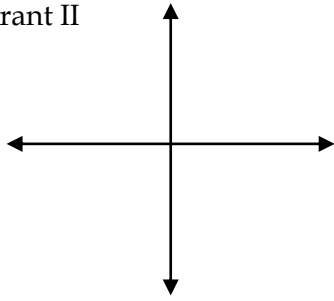
Recall:

Even Function $f(-x) = f(x)$

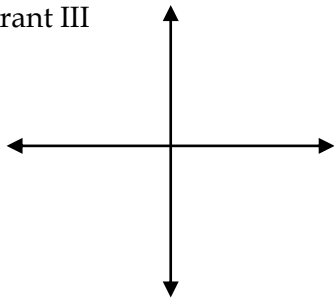
Odd Function $f(-x) = -f(x)$

3. Using CAST Rule and Related Acute Angle (α)

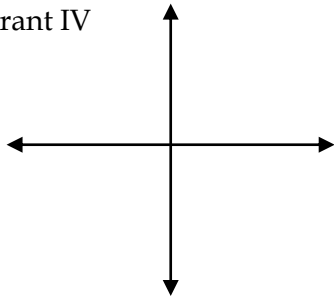
In Quadrant II



In Quadrant III

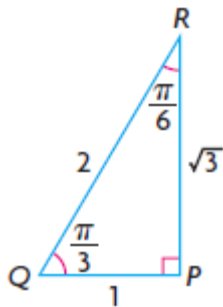


In Quadrant IV



4. Using Complementary Angles (_____)

Consider the special triangle:



$$\sin\left(\frac{\pi}{3}\right) =$$

$$\cos\left(\frac{\pi}{3}\right) =$$

$$\tan\left(\frac{\pi}{3}\right) =$$

$$\csc\left(\frac{\pi}{3}\right) =$$

$$\sec\left(\frac{\pi}{3}\right) =$$

$$\cot\left(\frac{\pi}{3}\right) =$$

$$\sin\left(\frac{\pi}{6}\right) =$$

$$\cos\left(\frac{\pi}{6}\right) =$$

$$\tan\left(\frac{\pi}{6}\right) =$$

$$\csc\left(\frac{\pi}{6}\right) =$$

$$\sec\left(\frac{\pi}{6}\right) =$$

$$\cot\left(\frac{\pi}{6}\right) =$$

Examples:

1. Determine if the following statement is true or false. Justify your reasoning.

$$\sin(\theta) = \cos(\theta + 3\pi)$$

2. Write an equivalent expression for $\sin\left(\frac{3\pi}{10}\right)$,

a) using period of a function

b) using symmetry

c) using related acute angle

d) using cofunction identities

3. Simplify each of the following expression in terms of one trigonometric function:

a) $\tan x + \tan(\pi - x) + \cot\left(\frac{\pi}{2} - x\right) - \tan(2\pi - x)$

b) $\sin(x - \pi)$