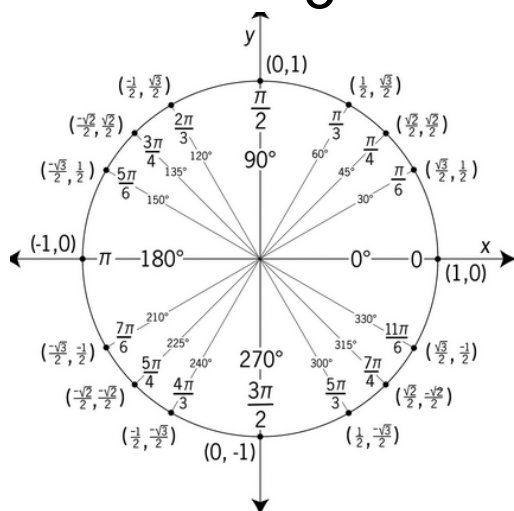


Warm Up

Examples: Find the reference angle for the following:

a) $\sin \frac{4\pi}{3}$

b) $\tan \frac{7\pi}{4}$

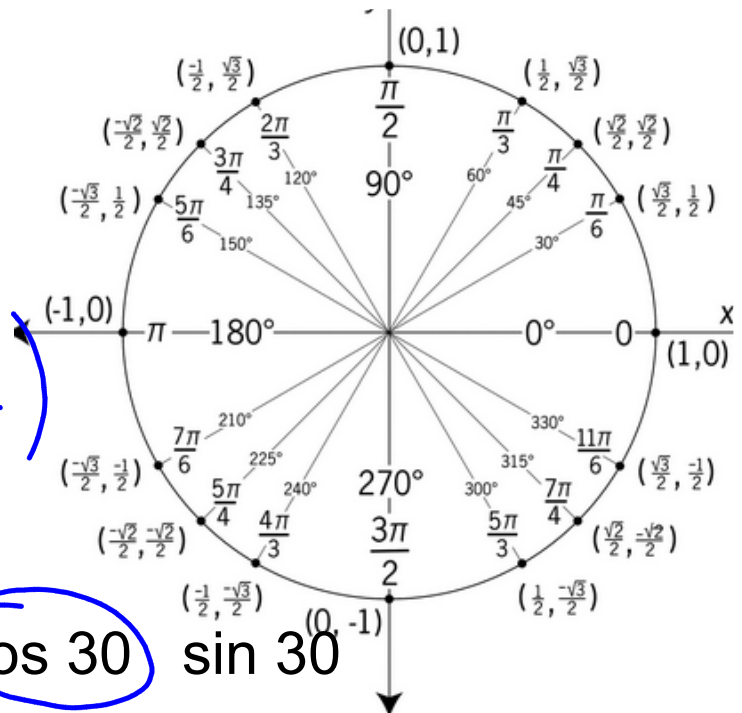


Helpful Hint for Reference Angles

Helpful Hint

$$\left(\frac{\sqrt{\#}}{2}, \frac{\sqrt{\#}}{2} \right)$$

$$\left(\frac{\sqrt{3}}{2}, \frac{1}{2} \right)$$



*Find the following:

A) $\cos 0$ $\sin 0$ B) $\cos 30$ $\sin 30$

C) $\cos 45$ $\sin 45$ D) $\cos 60$ $\sin 60$

E) $\cos 90$ $\sin 90$

Review

1) What is the $\cos(\pi/6)$?

4) What is the $\tan(45)$?

2) What is the $\sin(90)$?

5) What is the $\cos(\pi)$?

3) What is the $\tan(270)$?

6) What is the $\sin(3\pi/2)$?

Steps to evaluating any angle:

- 1) Find the reference angle.
- 2) Evaluate reference angle.
(Might need to draw a triangle)
- 3) Is it positive or negative?
(All Students Take Calculus)
- 4) Put it all together!

Evaluating Angles

1) $\cos 315^\circ$

2) $\csc 240^\circ$

3) $\sin \frac{-2\pi}{3}$

4) $\tan 210^\circ$

More Practice

1) $\sin (30)=$

2) $\tan (315)=$

3) $\sec \frac{3\pi}{2}$

4) $\tan (60)=$

***Quiz on 13.1-13.3

When finished work on
Evaluating Angles Quiz Practice ws



Homework

★ Evaluating Angles Quiz on _____! ★

Set Up

1) Solve each equation by factoring.

a) $x^2 + 7x + 15 = 5$

b) $x^2 + 8x = -15$

2) When does the $\cos x = 0$?

3) When does the $\sin x = 1/2$

Solving Trigonometric Functions

Objectives:

- *Solve trigonometric equations.
- *Solve trigonometric equations by factoring.
- * Write the general solution of a trigonometric equation.

Solving Trigonometric Functions

Find all the solutions.

a) $\sin(\theta) = -1/2$

b) $\cos(\theta) = -1$

Interval Notation

Find all the solutions.

a) $\sin(\theta) = 1$

b) $\cos(\theta) = -1/2$



Solving Trigonometric Functions

Solve the following for $0 \leq x < 2\pi$.

A) $\sin(x) + 2 = 3.$

B) $\tan^2(x) - 3 = 0$

C) $2\cos^2(x) - \sqrt{3}\cos(x) = 0$

TOYO Solving Trigonometric Functions

Solve the following for $0 \leq x < 2\pi$.

A) $2 \cos(x) + 1 = 3$

Solve the following for $0 \leq x < 2\pi$.

B) $4 \sin^2 x = 3$

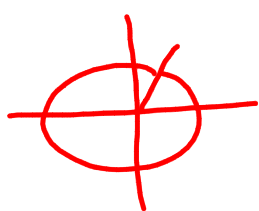
Warm Up

*Evaluating DLT

*Go over ws

*Quiz 20 minutes for 20 problems
(4 bonus-half point each)

General Solution ~~*~~



$$2 \sin x - \sqrt{3} = 0$$

$$\frac{2 \sin x}{2} = \frac{\sqrt{3}}{2}$$

$$\sin x = \frac{\sqrt{3}}{2}$$

$$\textcircled{60^\circ} \quad \frac{\pi}{3}$$

$$\textcircled{120^\circ} \quad \frac{2\pi}{3}$$

$$x = \underline{\underline{\pi/3 + 2n\pi}}$$

$$x = \underline{\underline{2\pi/3 + 2n\pi}}$$

$y = \sin x$ is periodic

TOYO

1) Find the general solution of the equation

$$2 \sin x + 4 = 5.$$

$$\frac{2 \sin x}{2} = \frac{1}{2}$$
$$\sin x = \frac{1}{2}$$

$$30^\circ$$

$$\frac{\pi}{6} + 2n\pi$$

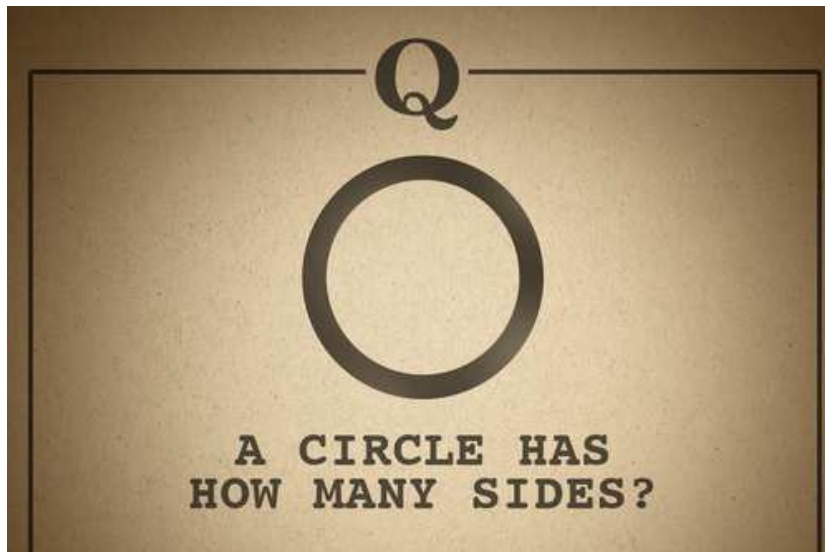
$$\underline{\text{radian}} + 2n\pi$$

$$150^\circ$$

$$\frac{5\pi}{6} + 2n\pi$$

<http://themetapicture.com/this-should-be-the-first-thing-shown-in-all-trigonometry-classes/>

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Solving Trigonometric Functions

Solve the following for $0 \leq x < 2\pi$.

A) $\sin x + \sqrt{2} = -\sin x$

+sinx +sinx

$$2 \sin x + \sqrt{2} = 0$$

~~$$\sin x = -\frac{\sqrt{2}}{2}$$~~

$$\sin x = -\frac{\sqrt{2}}{2}$$

S	A
$\sqrt{2}$	C

$$\frac{225}{4}$$

$$\frac{5\pi}{4}$$

$$\frac{315}{4}$$

$$\frac{7\pi}{4}$$

*What is the best way to communicate with a fish?

Drop them a line



Solving Trigonometric Functions

Solve the following for $0 \leq x < 2\pi$.

A) $\cos^2(x) + 2\cos(x) = -1$

$$\cos^2 x + 2\cos x + 1 = 0$$

$$(\cos x + 1)(\cos x + 1) = 0$$

$$\cos x + 1 = 0$$

$$\cos x = -1$$

180° or π

$$x^2 + 2x + 1 = 0$$

$$(x+1)(x+1) = 0$$

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

$$(2\sin x + 1)(\sin x - 1) = 0$$

$$2\sin x = -1$$

$$\sin x = 1$$

$$\sin x = -\frac{1}{2}$$

$$90^\circ$$

$$210^\circ \quad 330^\circ$$

$$2x^2 - 1x - 1 = 0$$

$$(2x^2 - 2x) + (1x - 1) = 0$$

$$2x(x-1) + 1(x-1) = 0$$

$$(2x+1)(x-1) = 0$$


EXAMPLE 4 Standardized Test Practice

What is the general solution of $\sin^3 x - 4 \sin x = 0$?

- (A) $x = \frac{\pi}{2} + 2n\pi$ or $x = \frac{3\pi}{2} + 2n\pi$ (B) $x = \frac{\pi}{2} + 2n\pi$ or $x = \pi + 2n\pi$
 (C) $x = \pi + 2n\pi$ (D) $x = 2n\pi$ or $x = \pi + 2n\pi$

Solution

$$\sin^3 x - 4 \sin x = 0 \quad \text{Write original equation.}$$

$$\sin x (\sin^2 x - 4) = 0 \quad \text{Factor out } \sin x.$$

$$\sin x (\sin x + 2)(\sin x - 2) = 0 \quad \text{Factor difference of squares.}$$

Set each factor equal to 0 and solve for x , if possible.

$$\begin{array}{c|c|c}
 \sin x = 0 & \sin x + 2 = 0 & \sin x - 2 = 0 \\
 \hline
 x = 0 \text{ or } x = \pi & \sin x = -2 & \sin x = 2
 \end{array}$$

The only solutions in the interval $0 \leq x < 2\pi$ are $x = 0$ and $x = \pi$.

The general solution is $x = 2n\pi$ or $x = \pi + 2n\pi$ where n is any integer.

▶ The correct answer is D. (A) (B) (C) (D)

s never
 greater
 re no
 x = -2

TOYO Solving Trigonometric Functions

Solve the following for $0 \leq x < 2\pi$.

A) $2\sin^3 x = \sin x$

$$\underline{2\sin^3 x - \sin x = 0}$$

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

$$\begin{array}{l} \sin x = 0 \\ 0^\circ, \cancel{360^\circ}, 180^\circ \end{array} \quad \begin{array}{l} 2\sin^2 x - 1 = 0 \\ 2\sin^2 x = 1 \\ \sin^2 x = \frac{1}{2} \end{array}$$

Solve the following for $0 \leq x < 2\pi$

B) $\sin^2 x + 5\sin x + 4 = 0$

$$\begin{array}{l} \sqrt{\sin^2 x} = \sqrt{\frac{1}{2}} \\ \sin x = \pm \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \quad \begin{array}{l} 315^\circ \\ 225^\circ \end{array} \\ \sin x = \frac{\sqrt{2}}{2} \quad \begin{array}{l} 45^\circ \\ 135^\circ \end{array} \end{array}$$

GUIDED PRACTICE for Examples 4, 5, and 6

Find the general solution of the equation.

4. $\sin^3 x - \sin x = 0$

5. $1 - \cos x = \sqrt{3} \sin x$

Solve the equation in the interval $0 \leq x \leq \pi$.

6. $2 \sin x = \csc x$

7. $\tan^2 x - \sin x \tan^2 x = 0$

Homework



*Page 935 # 3-21 odd,
24-28, 30, 31, 34



Review

1) $\sin x \cos^2 x - 2 \sin x \cos x + \sin x = 0$

HW: Solving ws

Word Problem WS- due on test day