

Before we begin, are there any questions from last day's work?^{4.2.4}

Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) sketch the sine and cosine functions.
- b) determine "any" angle
using the "CAST Rule" with the "raa" (related acute angle).

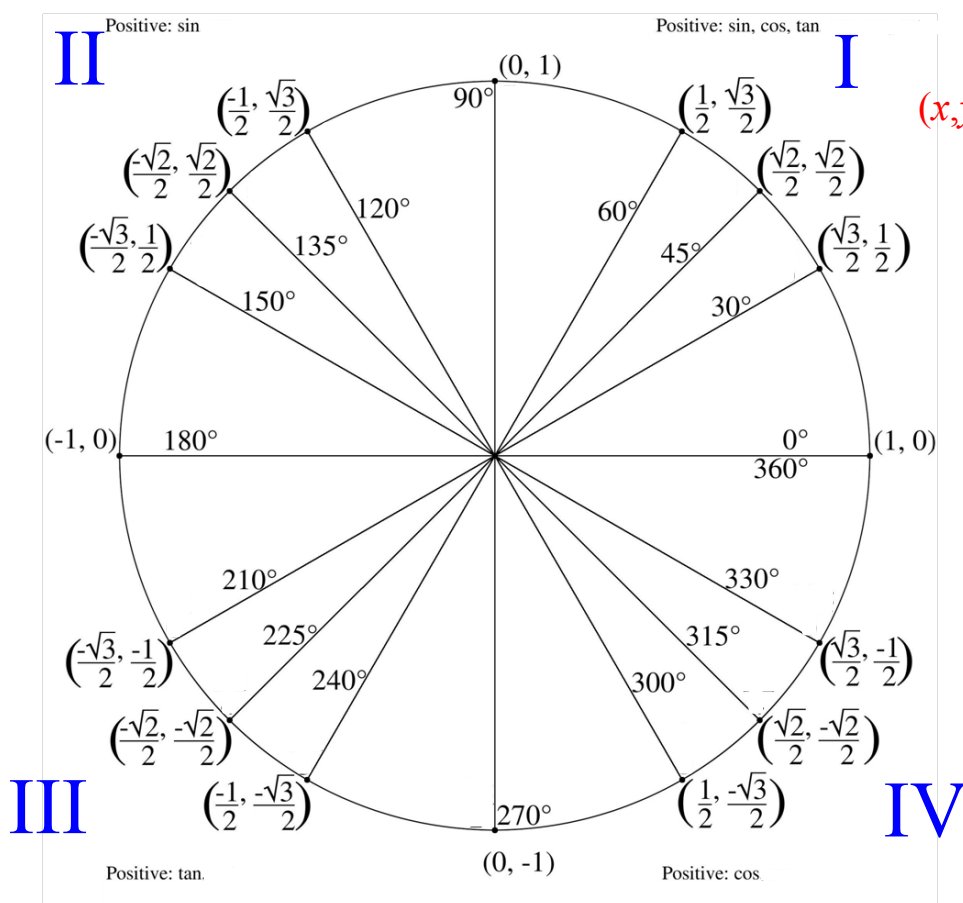
Warm-up

Complete the chart below:
(Did you Memorize it as instructed?)

θ	30°	45°	60°
$\sin \theta$	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$
$\cos \theta$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$
$\tan \theta$	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$

4.3.1 The Unit Circle

Date: _____



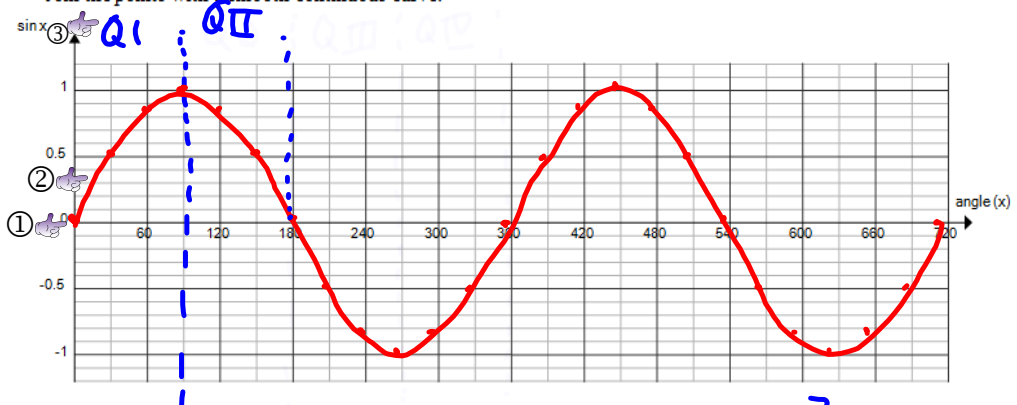
4.3.2 Investigating the Properties of Sinusoidal Functions Date: Apr. 6/18

A. Graphing $y = \sin \theta$ ($y = \sin x$)

1. Complete the table.

Angle θ ($^\circ$)	0	30	60	90	120	150	180	210	240	270	300	330	
Exact value of y ($\sin \theta$)	0	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	
Decimal value of y (2 decimal places)	0	0.5	0.86	1	0.86	0.5	0	-0.5	-0.86	-1	-0.86	-0.5	
	360	390	420	450	480	510	540	570	600	630	660	690	720
Exact value of y ($\sin \theta$)	0	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	0
Decimal value of y (2 decimal places)	0	0.5	0.86	1	0.86	0.5	0	-0.5	-0.86	-1	-0.86	-0.5	0

2. Use the decimal values of $\sin \theta$, and plot the ordered pairs $(\theta, \sin \theta)$ on the grid below. Join the points with a smooth continuous curve.



3. Properties of the function $y = \sin x$

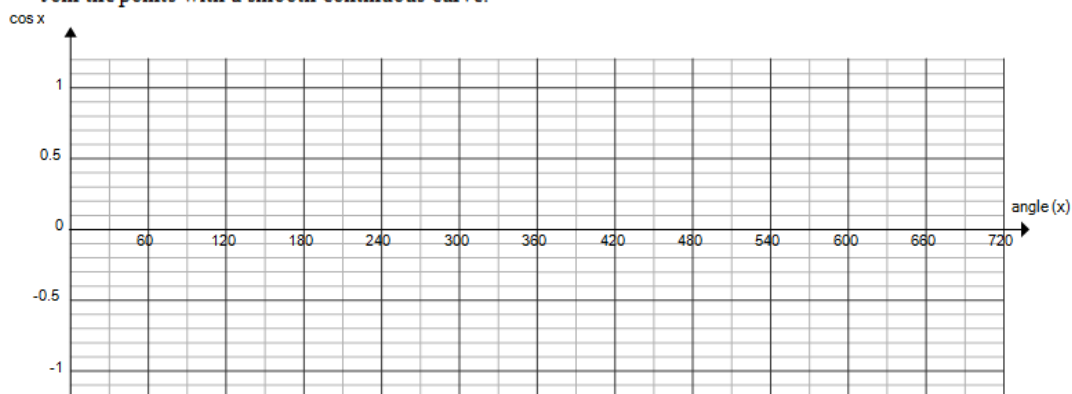
- ④ a) Length of the period: 360° b) Domain: $\{x \in \mathbb{R}\}$
 c) Maximum value of $\sin x$: 1
 d) Minimum value of $\sin x$: -1 e) Range: $\{y \in \mathbb{R} \mid -1 \leq y \leq 1\}$

B. Graphing $y = \cos \theta$ ($y = \cos x$)

1. Complete the table.

Angle θ ($^\circ$)	0	30	60	90	120	150	180	210	240	270	300	330	
Exact value of y ($\cos\theta$)													
Decimal value of y (2 decimal places)													
	360	390	420	450	480	510	540	570	600	630	660	690	720
Exact value of y ($\cos\theta$)													
Decimal value of y (2 decimal places)													

2. Use the decimal values of $\cos\theta$, and plot the ordered pairs $(\theta, \cos\theta)$ on the grid below. Join the points with a smooth continuous curve.



3. Properties of the function $y = \cos x$

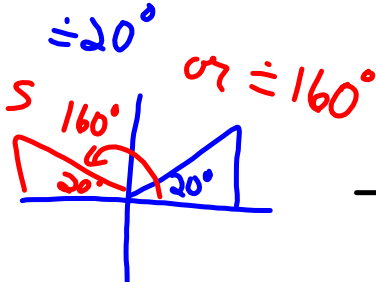
- a) Length of the period: _____
- b) Domain: _____
- c) Maximum value of $\cos x$: _____
- d) Minimum value of $\cos x$: _____
- e) Range: _____

4.3.3 Determining the Measure of an Angle from ANY Given Trigonometric Ratio

1. Use each trigonometric ratio to determine all of the values of θ , to the nearest degree, if $0^\circ \leq \theta < 360^\circ$.

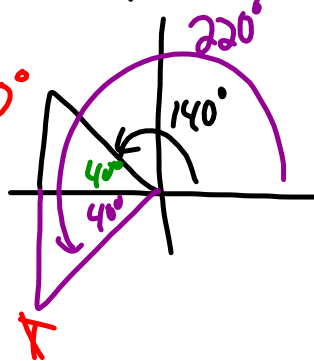
a) $\sin \theta = 0.3423$

$\theta = \sin^{-1}(0.3423)$
 ≈ 20.01
 $\approx 20^\circ$



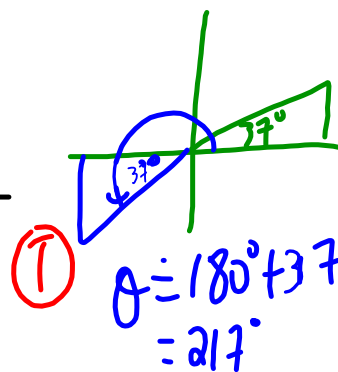
b) $\cos \theta = -0.766$

$\theta = \cos^{-1}(-0.766)$
 ≈ 139.9
 $\approx 140^\circ$ or $\approx 220^\circ$



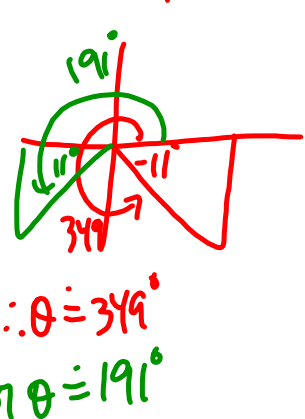
c) $\tan \theta = 0.753$

$\theta = \tan^{-1}(0.753)$
 ≈ 36.9
 $\approx 37^\circ$



d) $\sin \theta = -0.1908$

$\theta = \sin^{-1}(-0.1908)$
 $\approx -10.9^\circ$
 $\approx -11^\circ$



Today's Homework: 4.3.3 #1, 8, 9, 12, 13

(already complete on next slide)

sin θ



- ☞ over 2
- ☞ square root sign
- ☞ fingers away from 0

sin θ
0

$$\frac{\sqrt{0}}{2}$$

0

30

$$\frac{\sqrt{1}}{2}$$

$\frac{1}{2}$

45

$$\frac{\sqrt{2}}{2}$$

60

$$\frac{\sqrt{3}}{2}$$

90

$$\frac{\sqrt{4}}{2}$$

1