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.
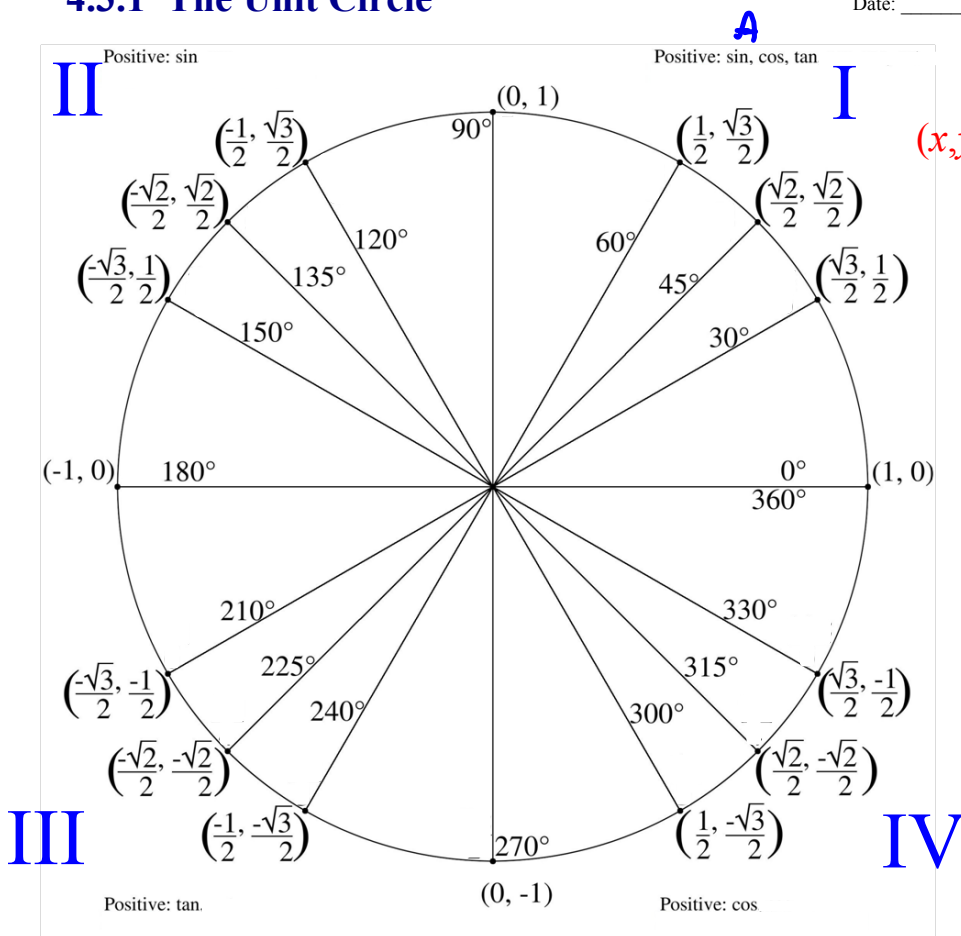b) determine "any" angle using the "CAST Rule" with the "raa" (related acute angle

Warm-up

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

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

4.3.1 The Unit Circle

Date: _____

II

Positive: sin

I

A

Positive: sin, cos, tan

$(x,y) = (\cos\theta, \sin\theta)$

$(0, 1)$

$90°$

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

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

$120°$ $60°$

$\left(\frac{-\sqrt{3}}{2}, \frac{1}{2}\right)$ $135°$ $45°$ $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

$150°$ $30°$

$(-1, 0)$ $180°$ $0°$ $(1, 0)$

$360°$

$210°$ $330°$

$225°$ $315°$

$\left(\frac{-\sqrt{3}}{2}, \frac{-1}{2}\right)$ $240°$ $300°$ $\left(\frac{\sqrt{3}}{2}, \frac{-1}{2}\right)$

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

III $\left(\frac{-1}{2}, \frac{-\sqrt{3}}{2}\right)$ $270°$ $\left(\frac{1}{2}, \frac{-\sqrt{3}}{2}\right)$ IV

$(0, -1)$

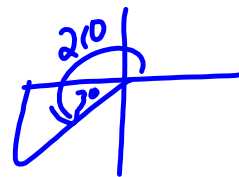Positive: tan.   Positive: cos

3

4.3.2 Investigating the Properties of Sinusoidal Functions   Date: _Apr. 8/16_

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

1. Complete the table.

Angle θ (°)	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 sinθ, and plot the ordered pairs (θ, sinθ) on the grid below. Join the points with a smooth continuous curve.
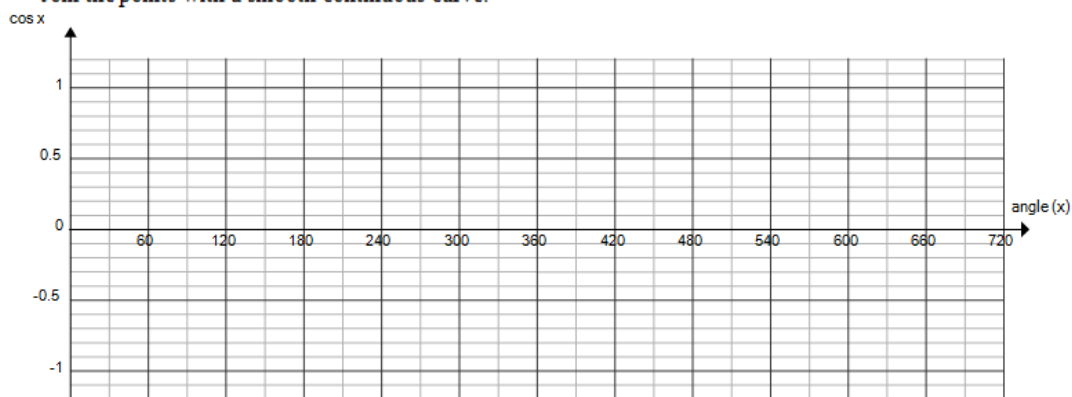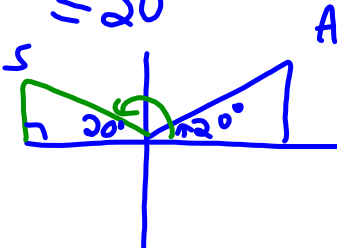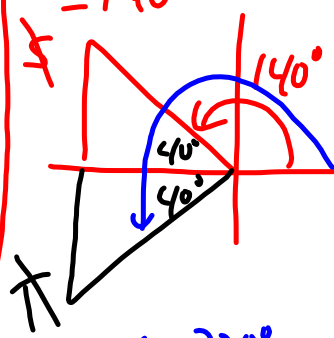

3. Properties of the function $y = \sin x$
   a) Length of the period: __360°__   b) Domain: __$\{x \in \mathbb{R}\}$__
   c) Maximum value of $\sin x$: __1__
   d) Minimum value of $\sin x$: __-1__   e) Range: __$\{y \in \mathbb{R} \mid -1 \leq y \leq 1\}$__

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

1. Complete the table.

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

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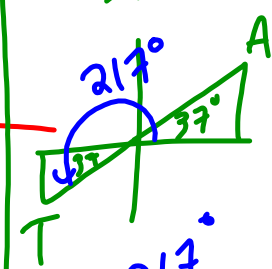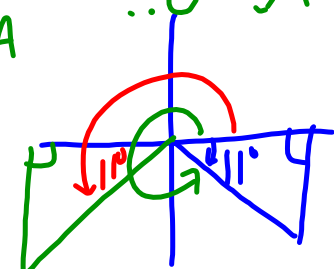   Join the points with a smooth continuous curve.

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 $0° \leq \theta \leq 360°$.

a) $\sin\theta = 0.3423$

$\theta = \sin^{-1}(0.3423)$

$\doteq 20.0$

$\doteq 20°$

$\therefore \theta = 160°$

b) $\cos\theta = -0.766$

$\theta = \cos^{-1}(-0.766)$

$\doteq 139.9$

$\doteq 140°$

$\therefore \theta = 220°$

c) $\tan\theta = 0.753$

$\theta = \tan^{-1}(0.753)$

$\doteq 36.9$

$\doteq 37°$

$\theta = 217°$

d) $\sin\theta = -0.1908$

$\theta = \sin^{-1}(-0.1908)$

$\doteq -10.99$

$\doteq -11°$

$\therefore \theta = 349°$

$\therefore \theta = 191°$

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