Math 4 Honors

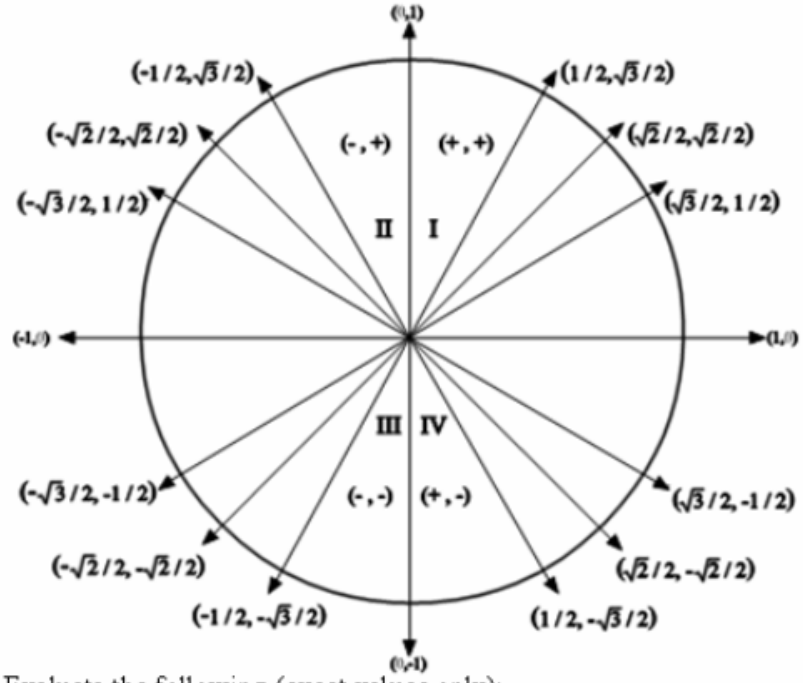
Unit 4 Pre-requisites: *The Unit Circle & Trig. Functions*

Name _____

Date _____

Equation for the **Unit Circle**: $x^2 + y^2 = 1$

What is the radius of the unit circle? 1 What are the coordinates of its center? (0, 0)



- Which coordinate is used to evaluate an angle's cosine?

  x

- Which coordinate is used to evaluate an angle's sine?

  y

- How are an angle's sine & cosine used to evaluate its tangent?

  $\tan\theta = \frac{y}{x}$

Evaluate the following (exact values only):

θ	0° = 0	30° = $\frac{\pi}{6}$	45° = $\frac{\pi}{4}$	60° = $\frac{\pi}{3}$	90° = $\frac{\pi}{2}$
sin θ	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
cos θ	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
tan θ	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∅

Evaluate the following (exact values only):

$\sin 225^\circ =$ $-\frac{\sqrt{2}}{2}$

$\cos\frac{5\pi}{6} =$ $-\frac{\sqrt{3}}{2}$

$\tan 270^\circ =$ ∅

$\sin 2\pi =$ 0

$\cos 300^\circ =$ $\frac{1}{2}$

$\tan\frac{5\pi}{3} =$ $-\sqrt{3}$

$\cos\frac{5\pi}{4} =$ $-\frac{\sqrt{2}}{2}$

$\tan\frac{5\pi}{6} =$ $-\frac{1}{\sqrt{3}}$

$\sin\frac{11\pi}{6} =$ $-\frac{1}{2}$

$\cos 240^\circ =$ $-\frac{1}{2}$

$\cos(-\pi) =$ -1

$\sin 720^\circ =$ 0

$\tan\left(\frac{-\pi}{4}\right) =$ -1

$\sin\left(\frac{-5\pi}{6}\right) =$ $-\frac{1}{2}$

$\tan(-270^\circ) =$ ∅

$\cos 390^\circ =$ $\frac{\sqrt{3}}{2}$

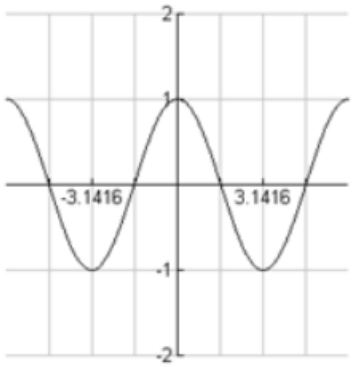
Graphical analysis of trigonometric functions.

Consider the three functions graphed below on the interval $[-2\pi, 2\pi]$. For each function identify the following.

Use exact values.

1. Name $y = \cos x$
2. Domain $(-\infty, \infty)$
3. Range $[-1, 1]$
4. Where the function is increasing and decreasing
5. Relative max/min values and where they occur
6. End behavior DNE
7. Zeros
8. y-intercept $(0, 1)$

Period: 2π
Even or Odd?



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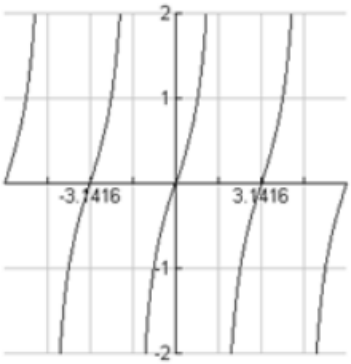
1. Name $y = \tan x$
2. Domain All reals except odd multiples of $\frac{\pi}{2}$
3. Range $(-\infty, \infty)$
4. Where the function is increasing and decreasing
5. Relative max/min values and where they occur
6. End behavior DNE
7. Zeros
8. y-intercept $(0, 0)$

Period: π
Even or Odd?



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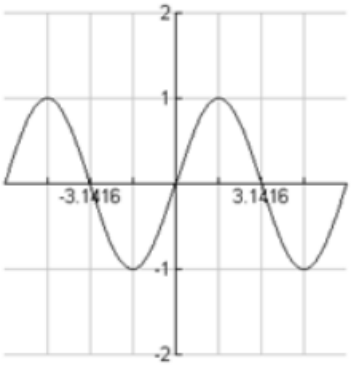
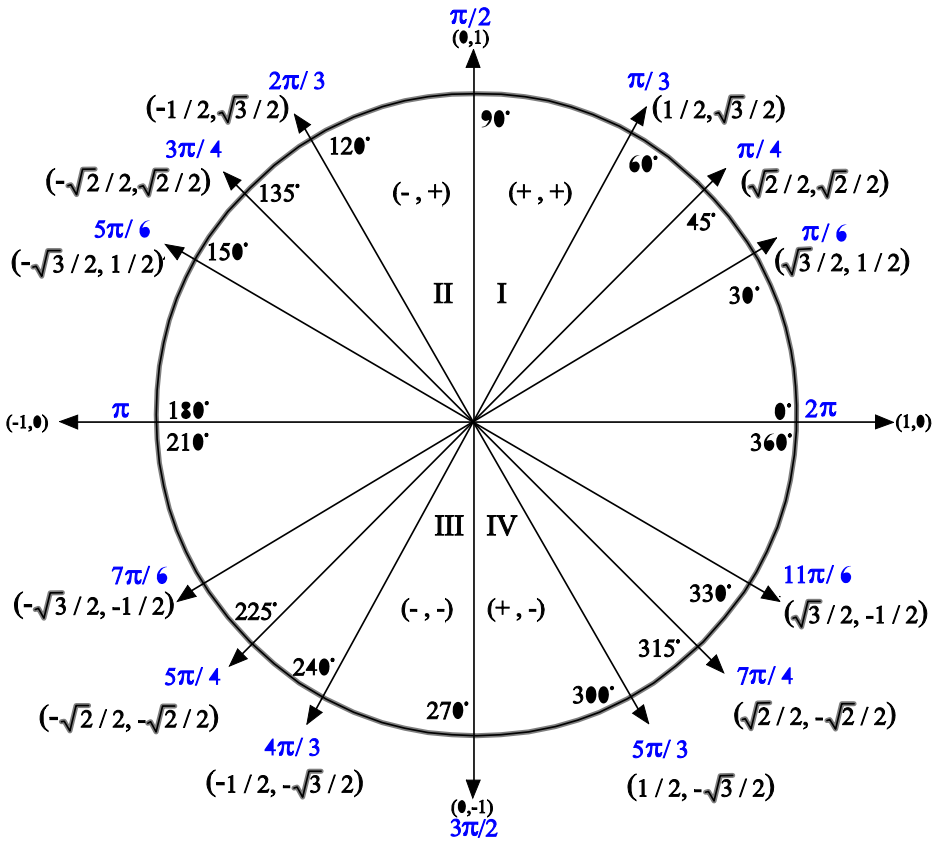
1. Name $y = \sin x$
2. Domain $(-\infty, \infty)$
3. Range $[-1, 1]$
4. Where the function is increasing and decreasing
5. Relative max/min values and where they occur
6. End behavior DNE
7. Zeros
8. y-intercept $(0, 0)$

Period: 2π
Even or Odd?




π/2
(0,1)
2π/ 3
(-1 / 2,√3 / 2)
π/ 3
(1 / 2,√3 / 2)
3π/ 4
(-√2 / 2,√2 / 2)
π/ 4
(√2 / 2,√2 / 2)
5π/ 6
(-√3 / 2, 1 / 2)
π/ 6
(√3 / 2, 1 / 2)
90°
120°
60°
135°
45°
150°
30°
(- , +)
(+ , +)
II
I
π
180°
0°
2π
(-1,0)
(1,0)
210°
360°
III
IV
7π/ 6
(-√3 / 2, -1 / 2)
11π/ 6
(√3 / 2, -1 / 2)
225°
330°
(- , -)
(+ , -)
315°
5π/ 4
(-√2 / 2, -√2 / 2)
240°
7π/ 4
(√2 / 2, -√2 / 2)
300°
270°
4π/ 3
(-1 / 2, -√3 / 2)
5π/ 3
(1 / 2, -√3 / 2)
(0,-1)
3π/2