Teacher Wong Subject Algebra 2 Dates 5/18-22/20 (Week 5) 7-12 Weekly Planner *Welcome to our Distance Learning Classroom!* **Student Time Expectation per day: 30 minutes**

Content Area & Materials	Learning Objectives	Tasks	Check-in Opportunities	Submission of Work for Grades
Digital (If you can work digitally, please do. It will help to keep us all safe 😊) Khan Academy (KA) Desmos	<u>Suggested Order / Pacing</u> • Graphing the sine function using amplitude, period, and vertical translation (Desmos) Monday and Tuesday • Unit Test (KhanAcademy) Wednesday • Reflection (Edmodo) Thursday	• Students are to complete the assigned **Purpose Games (submit photos of results to Edmodo Assignment)** and **Khan Academy Assignments.** • **All links will be provided via the course checklist page.**	Mrs. Wong is available during the office hours at the times indicated below. You can reach Mrs. Wong during these office hours via: • Zoom link provided in Edmodo • Email cwong@tusd.net	• Desmos assignments will be recorded in Desmos • KA assignments will be recorded with the highest scores attained • Submit the reflection assignment Edmodo
Hard Copy (Please only use this if you do not have technology available) • Notes + Examples • Assignments Do these assignments ONLY if you do not have digital access.	<u>Suggested Order / Pacing</u> • Graphing the sine function using amplitude, period, and vertical translation Monday and Tuesday • Reflection (Edmodo) Wednesday	• Students are to **read** the lesson and examples provided • On a separate sheet of paper for each assignment, **complete** ALL problems showing your work.	Mrs. Wong is available during the office hours at the times indicated below. You can reach Mrs. Wong during these office hours via: • Zoom link provided in Edmodo • Email cwong@tusd.net	• Group your work together for your math class IN ORDER, and with the following labels clearly displayed: Student Name: Teacher Name: Class Name/Subject: Period: Assignment Week # • Assignments will be scored on accuracy.
Scheduled, *if possible,* • Discussion	Zoom classes will be held on Tuesdays and Thursdays for 30 minutes, followed by 30 minutes of office hours. Discussions will revolve around discovery and application of concepts assigned for the week.			
Scaffolds & Supports	KA assignments can often be re-tried to improve learning. Videos are utilized to demonstrate not only key concepts, but also frequent points of errors, helping students avoid pitfalls.			

Teacher Office Hours	Monday **10AM-12PM**	Tuesday **2PM Alg. 2** (30 min) followed by Q&A	Wednesday **10AM-12PM**	Thursday **2PM Alg. 2** (30 min) followed by Q&A	Friday **10AM-12PM**

Graphing Sine and Cosine
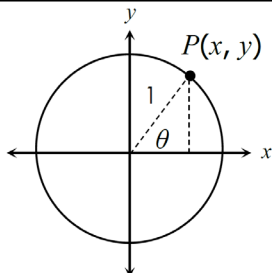
Because the value of r is 1 for each point $P(x, y)$ on the unit circle, the trig functions for θ are defined as:

$$\sin \theta = \frac{opp}{hyp} = \frac{y}{1} = y$$

$$\cos \theta = \frac{adj}{hyp} = \frac{x}{1} = x$$

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

Our parent functions begin with the UNIT Circle.

If you are working from the **UNIT circle**, then you can graph trig functions using the corresponding **coordinates**.
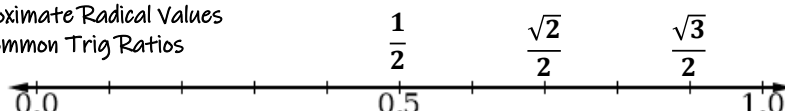
θ and sinθ → (θ, y)
θ and cosθ → (θ, x)
θ and tanθ → $\left(\theta, \frac{y}{x}\right)$

Table of Values going all the way around the Unit circle:

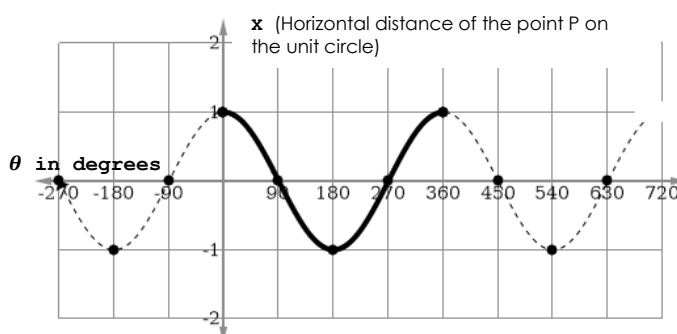|	Quadrant I					Quadrant II				Quadrant III				Quadrant IV			
θ degrees	0	30	45	60	**90**	120	135	150	**180**	210	225	240	**270**	300	315	330	**360**
θ radians	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$	$\frac{11\pi}{6}$	2π
X	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	-1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	0
y	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	-1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	1

Approximate Radical Values for common Trig Ratios

$\frac{1}{2}$ $\frac{\sqrt{2}}{2}$ $\frac{\sqrt{3}}{2}$

0.0 —— 0.5 —— 1.0

f(θ)=Sin θ → in Degrees → (θ, y)

θ°	y
0	0
90	1
180	0
270	-1
360	0

Y (height of the point P on the unit circle)

f(x)=Cos θ → in Degrees → (θ, x)

θ°	y
0	1
90	0
180	-1
270	0
360	1

x (Horizontal distance of the point P on the unit circle)
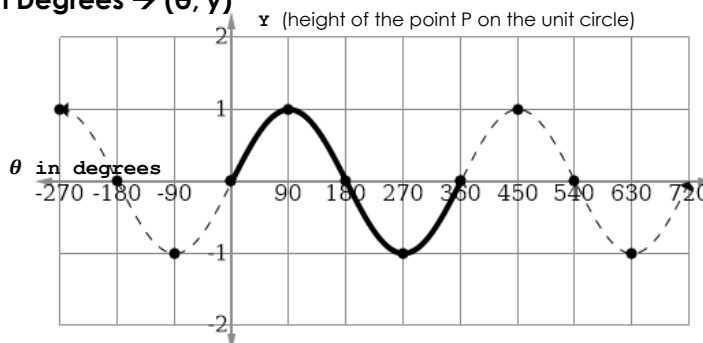
STEPS for GRAPHING Parent Trig Functions

1. Identify Function
   - ❏ Sin
   - ❏ Cos
   - ❏ Tan

2. Identify Axis and scale & if degrees OR radians
   - ❏ Sin → (θ, y)
   - ❏ Cos → (θ, x)
   - ❏ Tan → (θ, $\frac{y}{x}$)

3. Use "Friendly" Angles (0, 90, 180, 270, 360) to scale the horizontal axis.

3. Extend the horizontal axis forward and backward (rotations go forever forward and/or back)

3. Connect…NO sharp points, curves only.

## Steps for graphing a Sinusoidal Function of the form

$$g(x) = a\sin(b(x-h)) + k$$

OR

$$g(x) = a\cos(b(x-h)) + k$$

1. Identify if measurements are in degrees or radians.
2. Identify transformation parameters a, b, h, and k. make sure the b-value is factored out.
3. Start with parent function reference points
4. Apply Transformations
5. To scale horizontal axis, it is often easiest to make fractions with common denom.

Applying Amplitude and Period:

$$g(x) = 2\sin\left(\frac{1}{3}x\right) - 1$$

3	x	$\sin x$	2	1
0	0	0	0	-1
$\frac{3\pi}{2}$	$\frac{\pi}{2}$	1	2	1
3π	π	0	0	-1
$\frac{9\pi}{2}$	$\frac{3\pi}{2}$	-1	-2	-3
6π	2π	0	0	-1
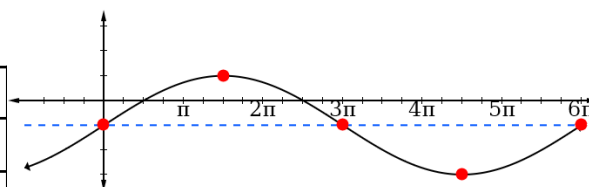
Key Features of Periodic Functions

Definitions:

- Periodic functions are functions that repeat exactly in regular intervals, called **cycles**.
- Trigonometric functions are periodic!
- **Period**: the length of a cycle. Periods can start at any point on the graph.
- **Amplitude:** Half the distance between the minimum and maximum values.
- **Phase Shift:** Horizontal shifts. Be careful here, the **b-value** MUST be factored out to find the phase shift represented by the **h-value**.
- **Midline:** The reference line to which a graph oscillates. The midline is represented by the **k-value**.
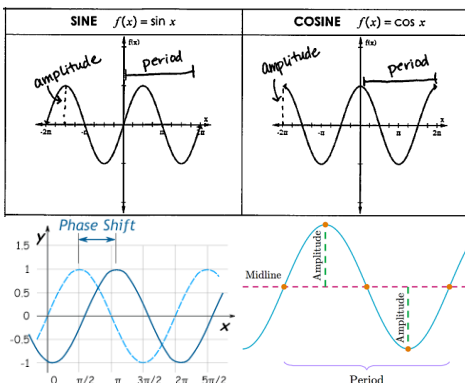
Finding the Key Features from Transformed Functions

$$g(x) = a \sin\big(b(x - h)\big) + k$$

Amplitude: $|a|$

Period: $\frac{2\pi}{b}$ OR $\frac{360°}{b}$

Phase Shift: h, but make sure the b value is factored out.

Midline: k

Extra Examples: Graphing Trig Functions with Transformations (in radians)

$$f(x) = 2 \sin\left(\frac{1}{3}(x + 30)\right) - 1$$

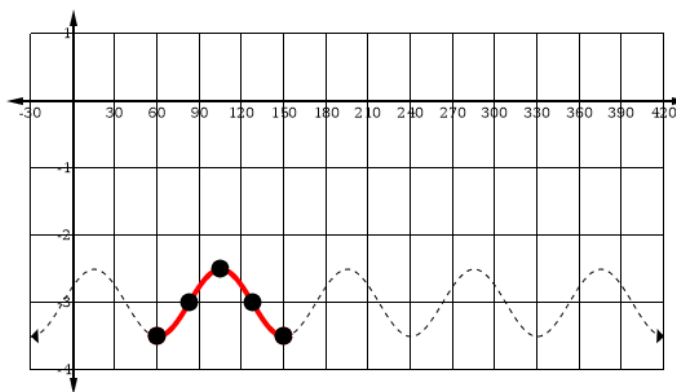| -30 [+]	3 [●]	x	$\sin x$ [●]	2	[+] -1
-30	0	0	0	0	-1
240	270	90	1	2	1
510	540	180	0	0	-1
780	810	270	-1	-2	-3
1050	1080	360	0	0	-1

Amplitude: **2**

Period: **1080°**

Phase Shift: **-30°**

Vertical Shift: **-1**

Midline: **y=-1**

$$f(x) = -\frac{1}{2} \cos\big(4(x - 60)\big) - 3$$

60 [+]	$\frac{1}{4}$ [●]	x	$\cos x$ [●]	$-\frac{1}{2}$ [+]	-3
60	0	0	1	$-\frac{1}{2}$	$-3\frac{1}{2}$
82.5	22.5	90	0	0	-3
105	45	180	-1	$\frac{1}{2}$	$-2\frac{1}{2}$
127.5	67.5	270	0	0	-3
150	90	360	1	$-\frac{1}{2}$	$-3\frac{1}{2}$

Amplitude: **½**

Period: **90°**

Phase Shift: **60°**

Vertical Shift: **-3**

Midline: **y=-3**

Do these assignments ONLY if you do not have digital access!

Complete all work on a separate sheet of paper. **Show all work.** Include the heading provided on each worksheet you turn in. **Use the Unit Circle, not a calculator!**
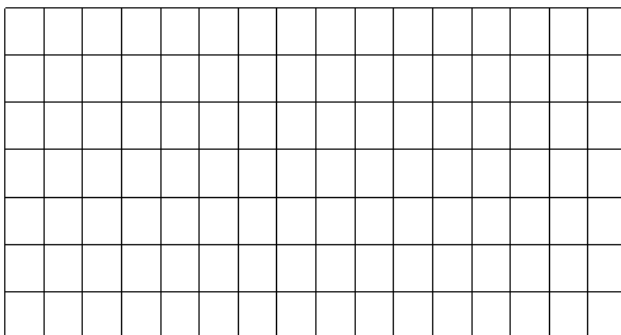
Monday - Thursday

Do all work by HAND

* Complete a table for the transformed function
• Scale your axis
• Graph the sinusoidal, continuing throughout the extent of the coordinate plane.

$f(x) = -\sin\left(\frac{1}{2}(x + 45)\right) - 2$

x	sin x
0	0
90	1
180	0
270	-1
360	0

Amplitude:

Period:

Phase Shift:

Vertical Shift:

Midline:

$f(x) = 2\sin\left(3(x - 30)\right) + 1$

x	sin x
0	0
90	1
180	0
270	-1
360	0
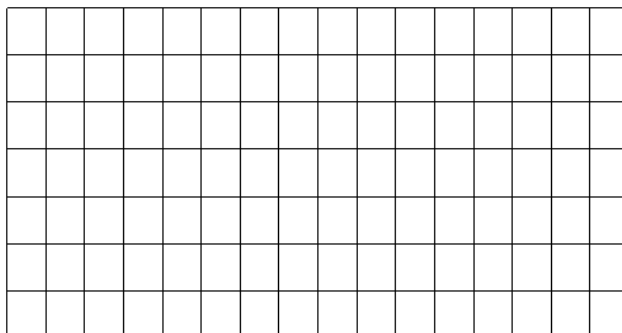
Amplitude:

Period:

Phase Shift:

Vertical Shift:

Midline:

$f(x) = \frac{1}{2}\sin\left(2(x - 60)\right) + 3$

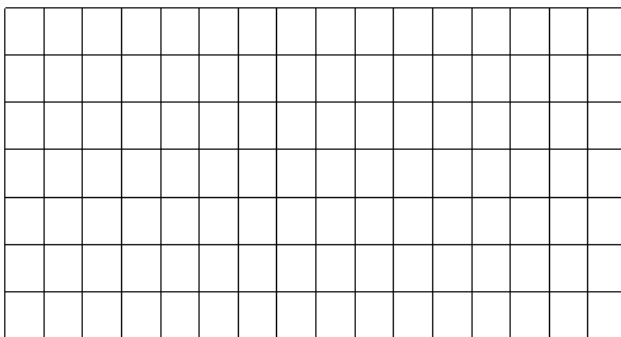| x	sin x
0	0
90	1
180	0
270	-1
360	0
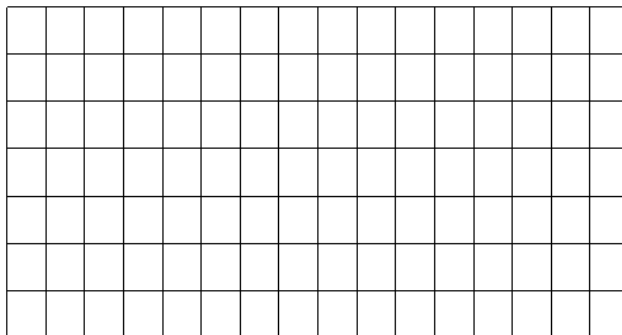
Amplitude:

Period:

Phase Shift:

Vertical Shift:

Midline:

$f(x) = -2\sin\left(\frac{2}{3}(x + 135)\right) - 1$

x	sin x
0	0
90	1
180	0
270	-1
360	0
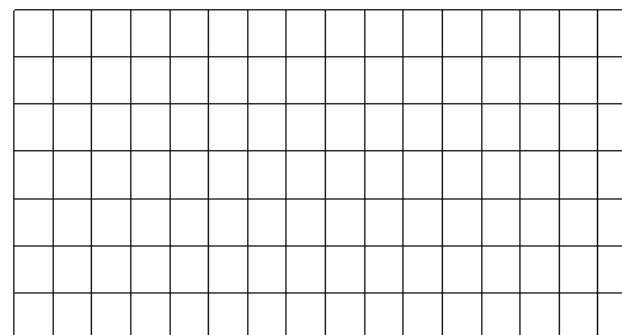
Amplitude:

Period:

Phase Shift:

Vertical Shift:

Midline:

Student Name:
Teacher: Wong
Subject: Algebra 2
Period:
Week #: 5

Do these assignments ONLY if you do not have digital access!

Complete all work on a separate sheet of paper. **Show all work.** Include the heading provided on each worksheet you turn in. **Use the Unit Circle, not a calculator!**

Monday - Thursday

Do all work by HAND

* Complete a table for the transformed function
* Scale your axis
* Graph the sinusoidal, continuing throughout the extent of the coordinate plane.

Problem 1

$$f(x) = -\frac{1}{2}\cos(3(x - 60)) + 2$$

x	$\cos x$
0	1
90	0
180	-1
270	0
360	1

Amplitude:

Period:

Phase Shift:

Vertical Shift:

Midline:

Problem 2

$$f(x) = 3\cos\left(\frac{2}{3}(x + 15)\right) - 3$$

x	$\cos x$
0	1
90	0
180	-1
270	0
360	1

Amplitude:

Period:

Phase Shift:

Vertical Shift:

Midline:

Problem 3
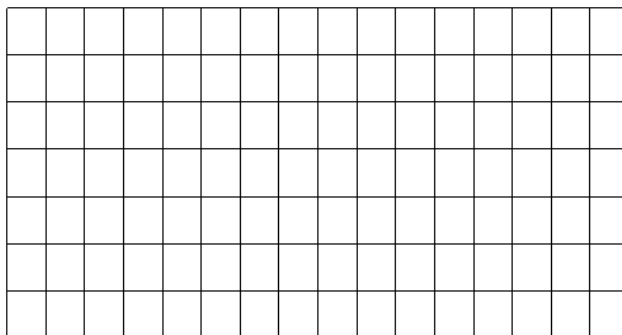
$$f(x) = 2\cos(2(x - 225)) + 4$$

x	$\cos x$
0	1
90	0
180	-1
270	0
360	1

Amplitude:

Period:

Phase Shift:

Vertical Shift:

Midline:

Problem 4
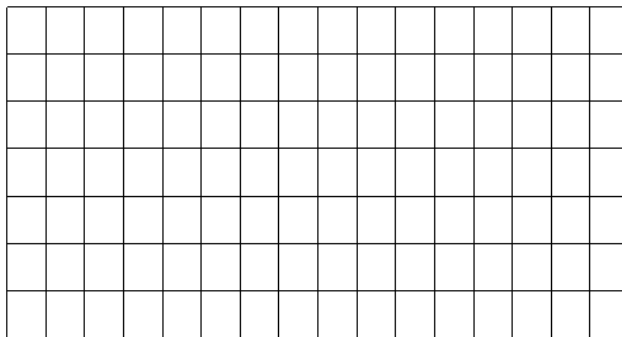
$$f(x) = -4\cos\left(\frac{1}{2}(x + 15)\right) - 1$$

x	$\cos x$
0	1
90	0
180	-1
270	0
360	1

Amplitude:

Period:

Phase Shift:

Vertical Shift:

Midline:

Reflection Assignment: Friday

What are you learning about yourself as a result of the corona virus-related shifts in your life? How have you come to learn these things?

What are you learning about other people (both those close to you and those not-so-close)?

How may you integrate this new learning and related perspectives gained into your life moving forward?