Accel Precalc Handout: Exploring Sinusoidal Graphs Name:_____
Unit #6: Graphs and Inverses of Trig Functions
Lesson 7: Sinusoidal Graphs

EQ:

Recall:

Linear Combination in Algebra --- a linear combination of ____ and ___ would result in an expression of the form ____ + _____

Linear Combination in Trigonometry --- combination of _____ and _____ is the sum in the form _____ + _____

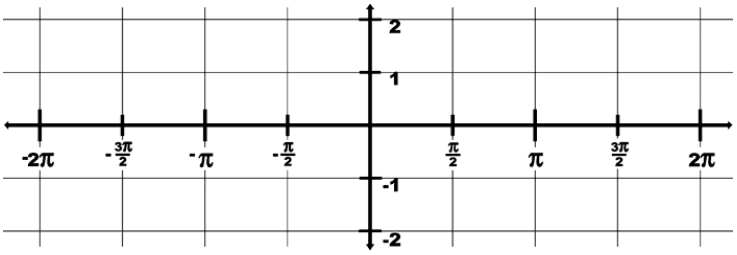
Sinusoidal Curve --- a waveform with _____ that can be graphically expressed as the _____ _____

y = _____

A = _____ B = _____ t = _____

h = _____ D = _____

Recall: Sketch sine parent function:



- Recall: Terms for Transformations

Part I: Determine if a given linear combination is sinusoidal.

❖ Place calculator in Radian mode. Set Window: X values $[-2\pi, 2\pi]_{\pi/4}$ Y values $[-8,8]_1$ Graph each function. Sketch the graph beside the equation. Which appear to be sinusoidal?

1. $y = 3\sin x + 2\cos x$

2. $y = 2\sin x - 3\cos x$

3. $y = 2\sin 3x + 4\cos 2x$

4. $y = 3\sin 5x - 5\cos 5x$

5. $y = 4\sin x - 2\cos x$

6. $y = 2\sin 3x + 3\cos 2x$

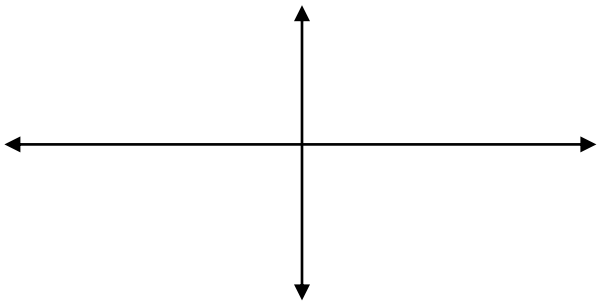
- Which, if any appear to be sinusoidal?

- What do the sinusoidal equations have in common?

Part II: How do you write the equation of a sinusoid in the form $y = A\sin[B(x - C)] + D$?

Ex 1. $y = 2\sin x + 5\cos x$

Step 1: Graph $y = 2\sin x + 5\cos x$ using your graphing calculator. Sketch.



Step 2: Find amplitude using max and min functions on calculator.

max = _____ min = _____ A = _____

Step 3: Identify 2 zeros that **complete a cycle**. $zero_1$ = _____ $zero_2$ = _____

Calculate the period of the graph using your zeros NP = _____ - _____ = _____

Determine B. $B = 2\pi / NP$ ___ = 2π/ ___ B = ____

Step 4: Use phase shift (use closest zero) to determine C. C = _____

*** PAY ATTENTION : Does the graph _____ or _____ at this zero? That will determine if you need _____ or _____ .

Step 5: Find average of max and min to determine horizontal axis of symmetry, D.

D = _____

∴ State function in the form f(x) = Asin[B(x – C)] + D.

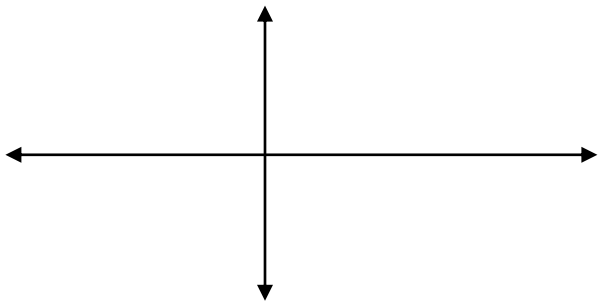
f(x) = _____

- Place your function in **Y2**. Change your viewing window to Domain $[-\pi, \pi]_{\pi/4}$. Go over to the far left and change the line to **THICK** so you'll see a difference in the graphs. Graph your sinusoidal equation over the original to see if they are equal.

Complete these examples on your own.
Sketch each sinusoid on the graph provided. Mark max, min, and zeros on the graph.
Show your work for determining each missing value A, B, C, and D in the equation
y = Asin[B(x – C)] + D.

Ex 2. y = 4sinx + 3cosx

y = _____

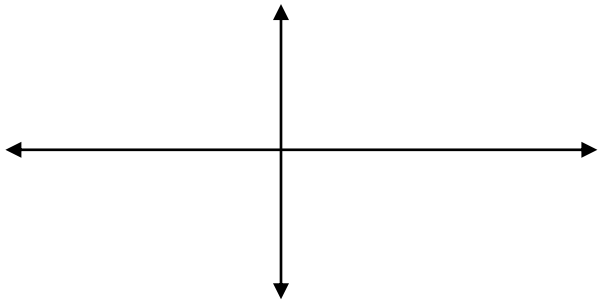


A = B =

C = D =

Ex 3. y = 2sin3x – 4cos3x

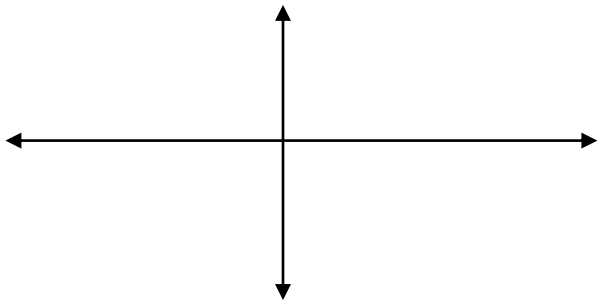
y = _____



A = B =

C = D =

Ex 4. $y = 3\sin(2x - 1) + 4\cos(2x + 3)$ $y =$ _____



A = B =

C = D =

- **Assignment: Practice Worksheet #1 Exploring Sinusoidal Graphs**