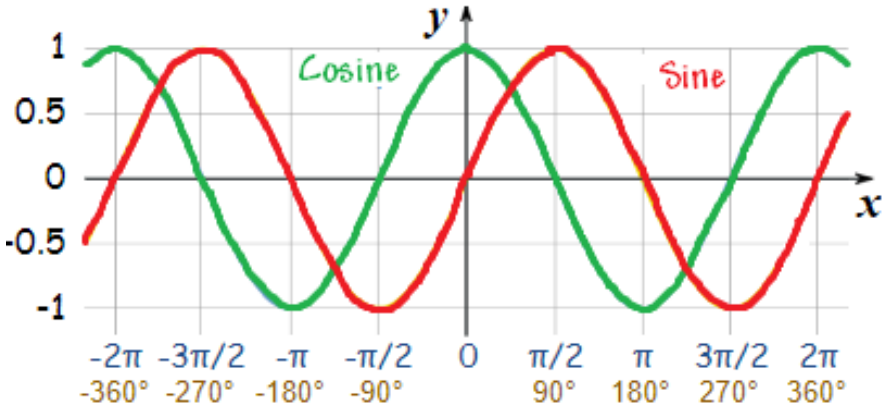
Graphing Cosine and its BFF

Sine and Cosine look a lot alike however we can see that at the origin (0,0) Sine is 0 and Cosine is 1



Go ahead and graph Cosine in your calculator

Click Here

Trigonometry Animated Gif's

Again we have the Period, Amplitude, Phase Shift and Vertical Shifts

We can have all of these items in one equation so instead of graphing

$$f(x) = \cos x$$

We have this:

$$f(x) = A\cos(Bx - C) + D$$

That's a lot of letters, but don't worry you can figure this out.

Check it Out:

Play with the graph found at the link below and list what the letters do

https://www.desmos.com/calculator/ufx9eqp4f9

A: How high the peaks are and How low the valleys are
* Plus if A < 0 the graph flips

B: The # of waves in one period
B is larger = more waves
B is smaller = less waves

C: Horizontal shift

D: Vertical shift

Each of the values A, B, C and D all help to find things about the graph

$$f(x) = A\cos(Bx - C) + D$$

Amplitude:

How high the graph goes (If A is negative it flips the graph also)

Overall Period:

How long it takes to do a complete wave

Phase Shift:

Moving the graph left or right

Vertical Shift:

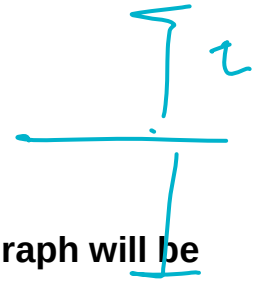
Moving the graph up or down

Check it Out:

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

$A = -2$ $B = 4$ $C = 2\pi$ $D = 3$

$$\text{Amplitude} = |A| = |-2| = 2$$



Height of wave will be 2, because $A = -2$ **the graph will be flipped over the x-axis**

$$\text{Overall Period} = \frac{\text{period}}{B} = \frac{2\pi}{4} = \frac{\pi}{2}$$

One complete wave will happen in length π/2

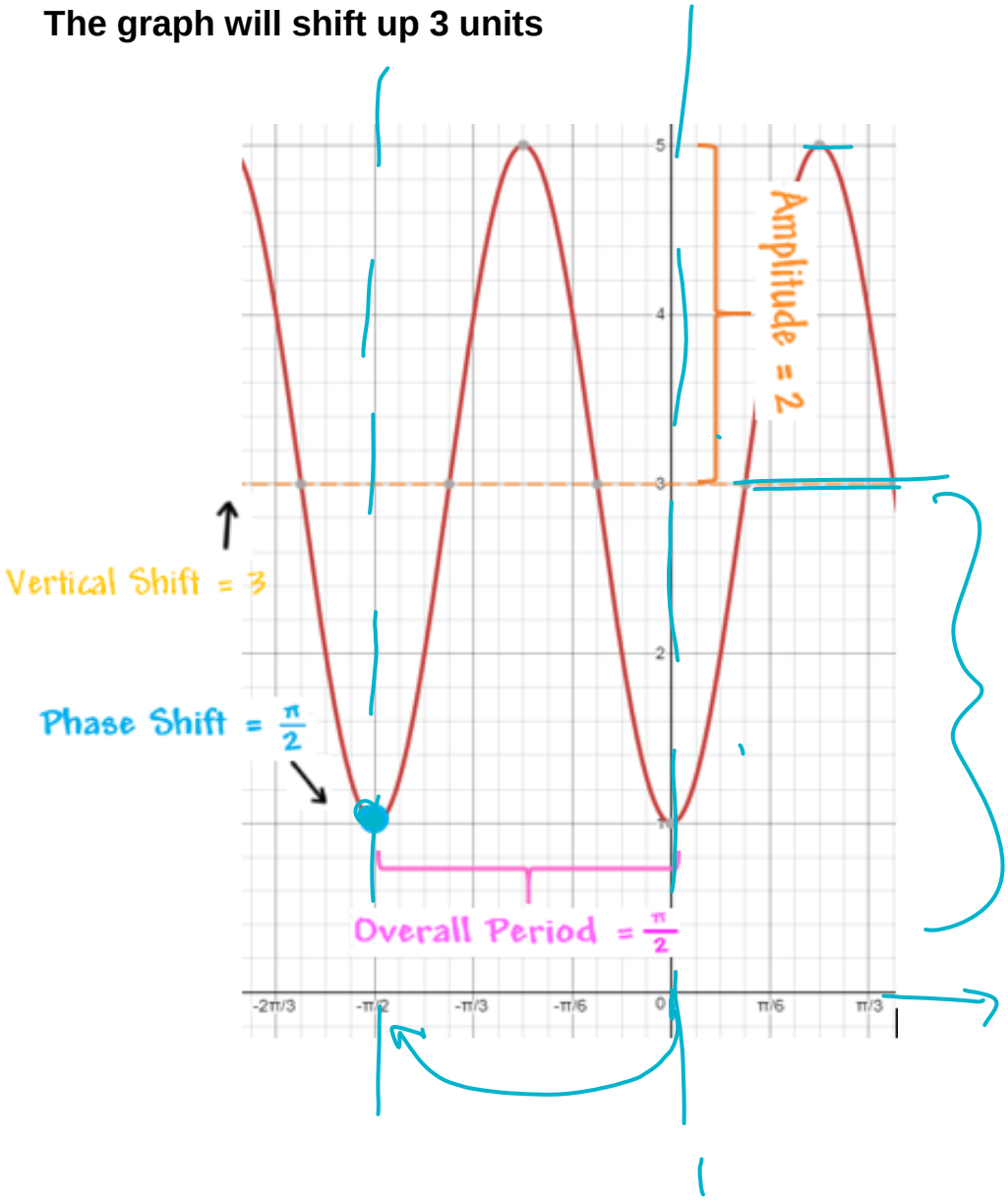
* cosine has period of 2π

Phase Shift = $\frac{C}{B} = \frac{2\pi}{4} = \frac{\pi}{2}$

The graph will begin the wave at x = π/2

Vertical Shift = D = 3

The graph will shift up 3 units



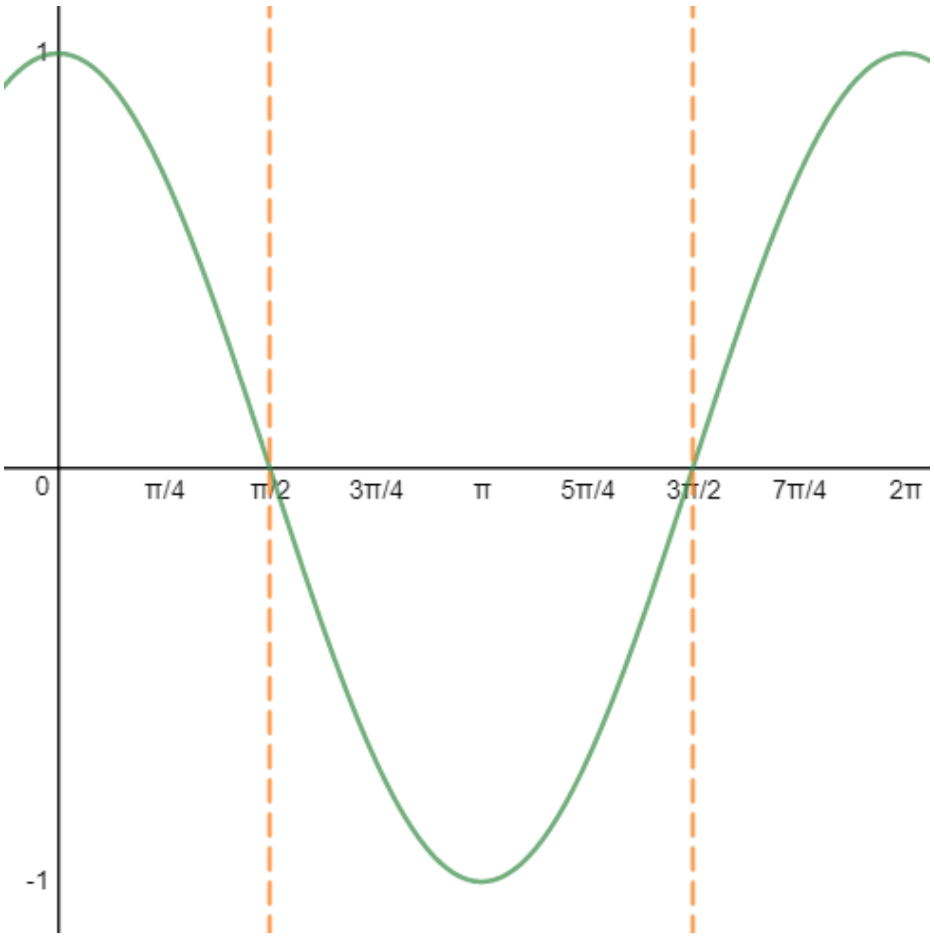
up 3 units

So what about Cosine's best friend… Secant what does it look like?

We know $\sec\theta = \frac{1}{x}$

What happens when x=0???

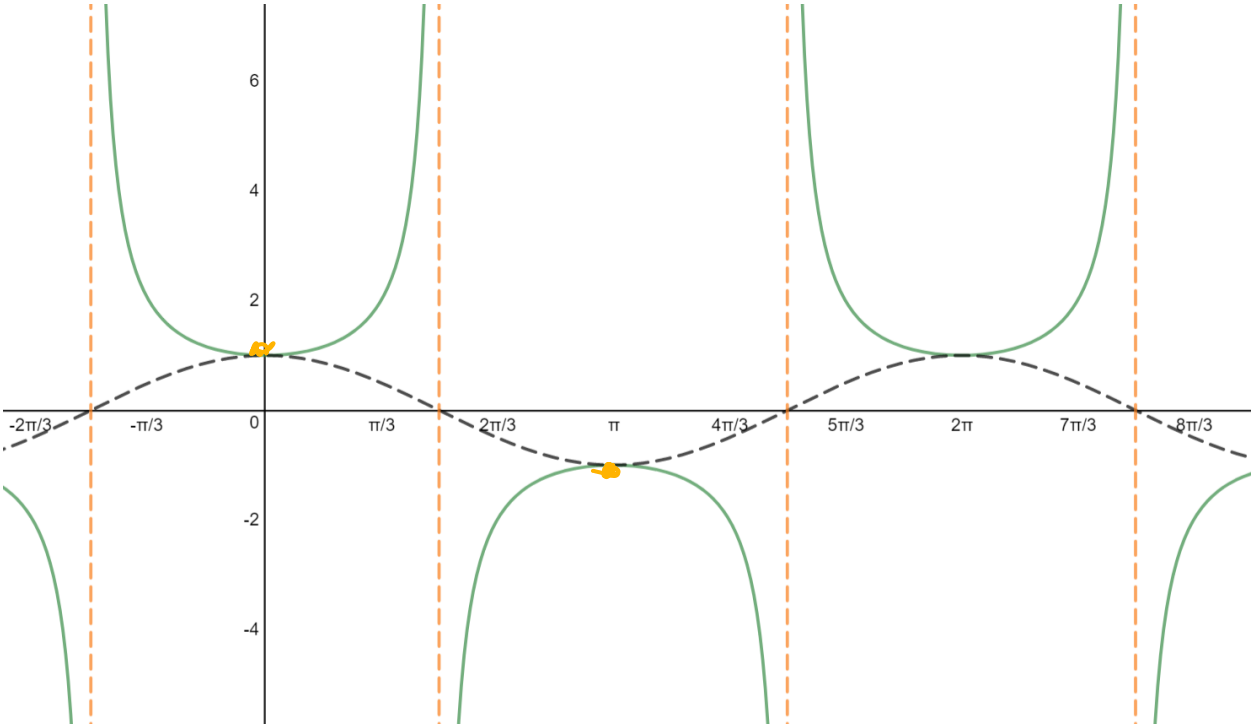
Secant is UNDEFINED



Everywhere $\cos\theta = 0$ **then** $\sec\theta =$ undefined

The yellow dashed lines are where secant is undefined which means it DOES NOT EXIST

Ok so let's take what we have left and flip each piece



Ok that's weird but yup it's definitely flipped.