$y = a\sin(b\theta) + c$

$y = a\cos(b\theta) + c$

GUIDED NOTES: Amplitude, Period, Frequency, and Vertical Shift

	Definition	How to find on a graph:	How to find in an equation:
amplitude	distance from the midline to a maximum or minimum midline - imaginary line graph oscillates about (bounces up and down around) *middle*	① Find midline (middle) ② Find a max/min ③ It's that distance!	$\lvert a \rvert$ * Always positive
period	how long (how many radians) until the graph repeats	① Start @ 0 ② Trace the graph until it repeats	$\frac{2\pi}{b}$
frequency	how much of the wave happens in one radian	*Not on the graph	$\frac{b}{2\pi}$
vertical shift	how far above or below the x-axis the graph was moved (where the midline is) * How far it's moved from 0!	It's the midline (middle)	c

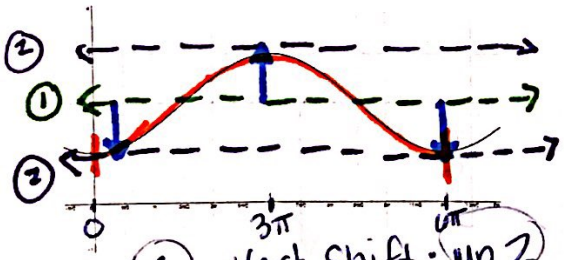
Reciprocals!

There is also a such thing as a phase shift. You will learn about it in your next math class.

① Find the middle of the graph
② Find the max/min
③ Identify the features

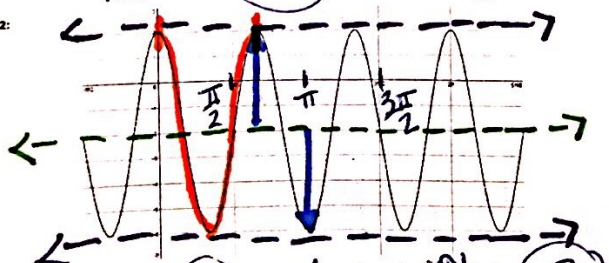
GUIDED NOTES: Graphs of Sine and Cosine

EX1:



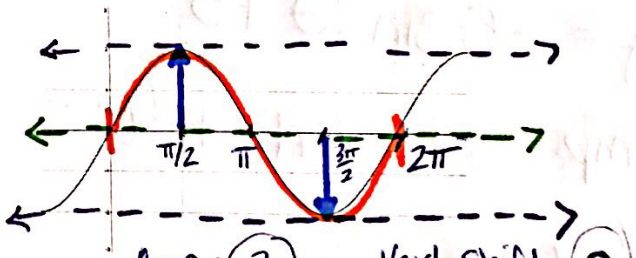
Amp: 1 Vert. Shift: up 2
Period: 6π Freq: $\frac{1}{6\pi}$

EX2:



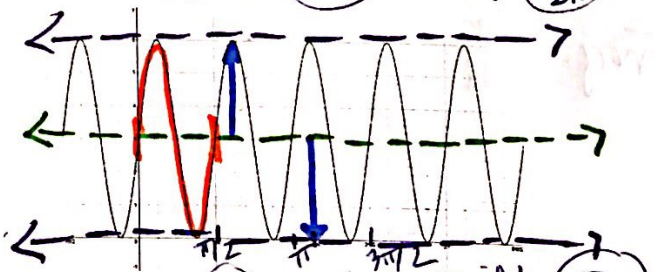
Amp: 4 Vert. Shift: −2
Period: $\frac{2\pi}{3}$ Freq: $\frac{3}{2\pi}$

EX3:



Amp: 2 Vert. Shift: 0
Period: 2π Freq: $\frac{1}{2\pi}$

EX4:



Amp: 3 Vert. Shift 3
Period: $\frac{\pi}{2}$ Freq: $\frac{2}{\pi}$

Equations

$y = a \cdot \sin(b\theta) + c$

① $y = \sin 2\theta + 4$

Amp: 1 Vert. Shift: 4

Period: $\frac{2\pi}{b} = \frac{2\pi}{2} \rightarrow \pi$

Freq: $\frac{1}{\pi}$

② $f(x) = -3\cos\theta - 7$ $y = a \cdot \cos(b\theta) + c$

Amp: 3 Vert. Shift: -7

Period: $\frac{2\pi}{b} = \frac{2\pi}{1} \rightarrow 2\pi$

Freq: $\frac{1}{2\pi}$

③ $y = -5\sin 2\theta + 3$

Amp: 5 Vert. Shift: 3

Period: $\frac{2\pi}{b} = \frac{2\pi}{2} = \pi$

Freq: $\frac{1}{\pi}$