

Precalc Lesson 4

1.12.16

Amplitude, Period, and translations of sine and cosine graphs

Section 6.4, 6.5

Warmup

Graph  $y = \sin\theta$  for  $\pi < \theta < 3\pi$

**Amplitude:** Half of the difference between the maximum and minimum values of a sine or cosine function.

$$y = A\cos\theta$$

$$y = A\sin\theta$$

$|A|$ =amplitude.

I Try:

Find the amplitude of  $y = 20\cos\theta$

Identify $ A $	$A=$
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We Try:

Find the amplitude of  $y = -10\sin\theta$

*Find the amplitude of  $y = \cos\theta$*

**Period:** The length of the interval of the function.

The period for  $y = \sin k\theta$  and  $y = \cos k\theta$  is  $\frac{2\pi}{k}$ , where  $k > 0$ .

I Try:

Find the period of  $y = \cos 2\theta$ .

Identify k	
Period = $\frac{2\pi}{k}$	

We Try:

Find the period of  $y = \cos \pi\theta$ .

Identify k	
Period = $\frac{2\pi}{k}$	

You Try solo:

Find the period of  $y = \cos \frac{7\pi}{6}\theta$ .

Identify k	
Period = $\frac{2\pi}{k}$	

You Try SOLO

Find the amplitude and period of  $y = -3\sin\frac{\pi}{6}\theta$ .

Vertical translation  
 $y = \sin(k\theta - c) + h$   
 $y = \sin(k\theta - c) + h$   
*vertical shift up for + h.*

*vertical shift down for  $-h$*

I do:  
Graph  $y = \sin\theta + 3$

Identify $h$	$h =$
Graph the parent function	
Graph the function.	

We do:  
Graph  $y = 2\cos 4\theta + 3$

Identify $h$	$h =$
Graph the parent function	
Graph the function.	

We do:  
Graph  $y = -3\sin\theta - 2$

Identify $h$	$h =$
Graph the parent function	
Graph the function.	

**Phase Shift: The horizontal translation of sine and cosine graphs**

$$y = \sin(k\theta - c) \text{ and } y = \cos(k\theta - c), k > 0.$$

Phase shift is  $\frac{c}{k}$ .

*-c shifts right*  
*+c shift left.*

I do:

Find the phase shift of  $y = \cos(\theta - \pi)$

Graph the function.

Identify k and c	$k =$ $c =$
Phase shift = $\frac{c}{k}$	
Graph the parent function	

We do.

Find the phase shift of  $y = 5 \cos(2\theta - \pi) + 3$

Graph the function.

Identify k and c	$k =$
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	$c =$
Phase shift = $\frac{c}{k}$	
Graph the parent function	
Graph the function.	

We do.

Find the phase shift of  $y = -2 \cos(3\theta + \pi) - 4$

Graph the function.

Identify k and c	$k =$ $c =$
Phase shift = $\frac{c}{k}$	
Graph the parent function	
Graph the function.	

Exit Slip

Identify the

Amplitude, Phase Shift, Vertical Translation, and Period.

Graph the function.



$$y = 3\sin(\theta - \pi) + 2$$