

# Precalculus A

## 4.4 Graphing the Sine and Cosine Functions

### Day 5

Hw: Finish Practice Worksheet

D. Paulson

### Standard Equation w/ Transformations

$$y = \pm a \sin(b(x-h)) + k \quad y = \pm a \cos(b(x-h)) + k$$

± : (+) normal    (-) reflection over x-axis

a : vertical dilation - amplitude of the graph

b : horizontal dilation - frequency - adjusts the period

h : horizontal translation - phase shift right/left

k : vertical translation - vertical shift up/down

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### Graphing with all Transformations

$$y = 2\cos 2\left(x + \frac{\pi}{4}\right) + 3$$

② a=2  
 b=2  
 period =  $\frac{2\pi}{2} = \pi$   
 $\frac{\pi}{4}$  = step  
 ③ phase shift =  $-\frac{\pi}{4}$   
 ① vertical shift (k) = 3

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### Graphing with all Transformations

$$y = 3\sin 2\left(x - \frac{\pi}{2}\right) - 2$$

② a=3  
 b=2  
 period =  $\frac{2\pi}{2} = \pi$   
 ③ step =  $\frac{\pi}{4}$   
 phase shift (h) =  $\frac{\pi}{2}$   
 ① vertical shift (k) = -2

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