

7.4: Frequency and Phase Shifts

“I WILL...

...identify phase shifts and frequency”

I. Transformation of Graph Equation

- A. Equation: $y = A \text{ trig function } B(x - c) + d$
- B. A is the vertical stretch/compression or Amplitude for Sine and Cosine
- C. B is the period
- D. C is the horizontal shift or phase shift
- E. D is the vertical shift
- F. Frequency is defined as the number of cycles per second

II. Steps

- A. Identify A to D
- B. Identify the Period by using the equation, $\frac{\pi}{B}$ for Tangent and Cotangent and $\frac{2\pi}{B}$ for the others
- C. Identify the Anchor Points (spacing) by $\frac{\text{Period}}{4}$
- D. Identify “ C ”, the trig function, and the table for each trig function
- E. Put “ C ” as the vertical shift and follow the table
 1. For Sine and Tangent, use the horizontal shift when the first $y = 0$
 2. For Cosine and Secant, use the horizontal shift when the first $y = 1$
 3. For Cosecant and Cotangent, use the horizontal shift when the first $y =$
Undefined

III. Trig Tables

- A. Sin x : 0, 1, 0, -1 , 0
- B. Cos x : 1, 0, -1 , 0, 1
- C. Tan x : Und, -1 , 0, 1, Und
- D. Csc x : Und, 1, Und, -1 , Und
- E. Sec x : Und, 1, Und, -1 , Und
- F. Cot x : Und, 1, 0, -1 , Und

<p>Ex 1: Graph $y = 4\sin\frac{1}{2}x + 1$ in one period and identify amplitude, period, vertical shift, and phase shift</p>	<p>Ex 2: Graph $y = -2\cos3\left(x + \frac{\pi}{3}\right)$ in one period and identify amplitude, period, vertical shift, and phase shift</p>
<p>Ex 3: Graph $y = -2\tan\left(x + \frac{\pi}{2}\right) - 1$ in one period and identify amplitude, period, vertical shift, and phase shift</p>	<p>Your Turn: Graph $y = -1 + 2\sin(4x - \pi)$ in one period and identify amplitude, period, vertical shift, and phase shift</p>
<p>Ex 4: Graph $y = 3\csc\frac{\pi}{2}(x + 1) - 2$ in one period and identify amplitude, period, vertical shift, and phase shift</p>	<p>Your Turn: Graph $y = \sec 2(x + \pi)$ in one period and identify amplitude, period, vertical shift, and phase shift</p>