4.4 & 4.5 Notes- Graphs of Trig Functions

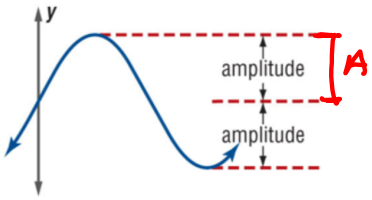
Transformations are in the form:

y = a.f(bx + c) + d

Ex: y = 2 sin(3x - 8) + 1 y = - cot (x + 2) - 6

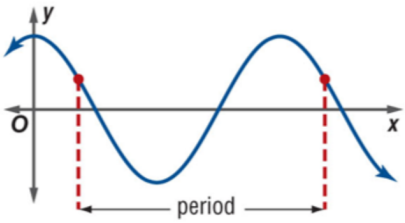
Amplitude: Half the distance from the maximum and minimum values.

A = .5|Max - Min|



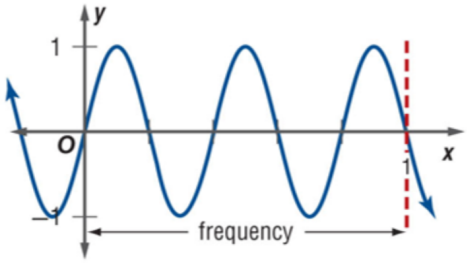
Period: Distance between any two repeating sets of points.

$P = \frac{2\pi}{B}$, for sin, cos, csc, and sec $P = \frac{\pi}{B}$, for tan and cot



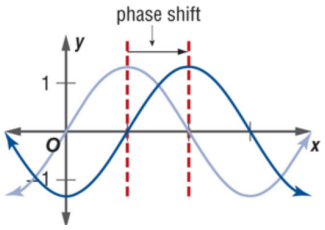
Frequency: Number of cycles the function completes in one unit interval.

$$\text{frequency} = \frac{1}{\text{period}} \text{ or } \frac{|b|}{2\pi}$$



Phase shift: Horizontal translation of a function.

$$\text{phase shift} = -\frac{c}{|b|}$$



Vertical translation: d

Midline: horizontal line through the middle of the function.

y = d

Ex: State the amplitude, period, frequency, phase shift, and vertical shift of each function. Then graph two periods.

$y = \underset{a}{.25}\cos(x) + 3$ $\qquad$ $y = 3\sin\left(x - \frac{\pi}{4}\right)$

$A = .25$

$P = \frac{2\pi}{B} = \frac{2\pi}{1} = 2\pi$

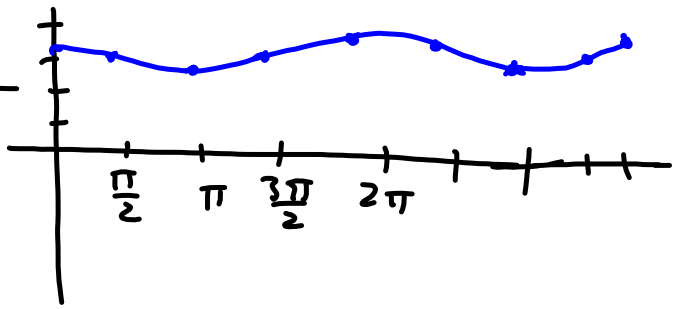
frequency: $\frac{1}{2\pi}$

phase shift: $-\frac{C}{|B|} = -\frac{0}{|1|} = 0$

vertical translation = 3

x	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
y	3.25	3	2.75	3	3.25

units: $\frac{P}{4} = \frac{2\pi}{4} = \frac{\pi}{2}$



$y = .25\cos(0) + 3$
$= .25(1) + 3$
$= 3.25$

$y = .25\cos(\pi) + 3$
$= .25(-1) + 3$
$= 2.75$

$y = .25\cos\left(\frac{\pi}{2}\right) + 3$
$= .25(0) + 3 = 3$

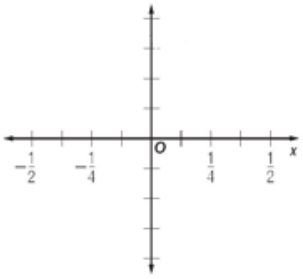
$y = .25\cos\left(\frac{3\pi}{2}\right) + 3$
$= .25(0) + 3$

HW: p. 264, 1-19 odd

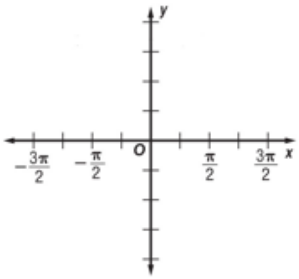
Exercises

Locate the vertical asymptotes and sketch the graph of each function.

1. $y = 3 \tan (4\pi x)$



2. $y = \csc (2x - 3\pi)$



Ex: #22 on page 264

Ex: #32 on page 265