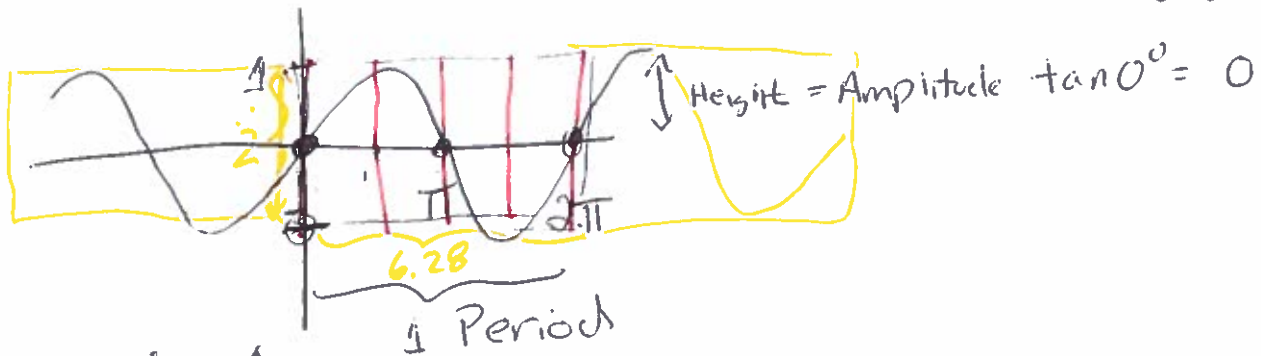
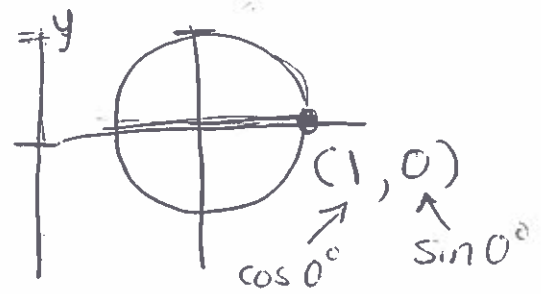


TRIG FUNCTIONS

$$y = \sin(x)$$



Amplitude = 1
Period = 2π

Zeros: $0, \pi, 2\pi, \dots, n\pi$ n is an integer.

WHERE MAX/MIN $x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \dots, \frac{(2n+1)\pi}{2}$

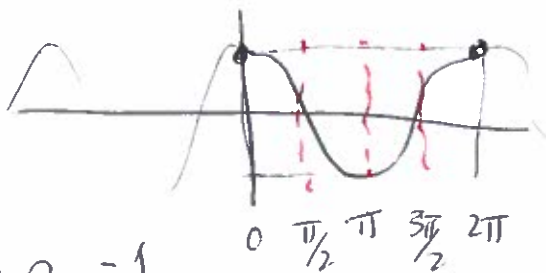
$y = 1, -1, 1, -1$

Domain: $(-\infty, \infty)$ or \mathbb{R}

Range: $[-1, 1]$

NO END Behavior

$$y = \cos(x)$$



Amp. = 1
Period = 2π

Zeros: $(2n+1)\pi/2$

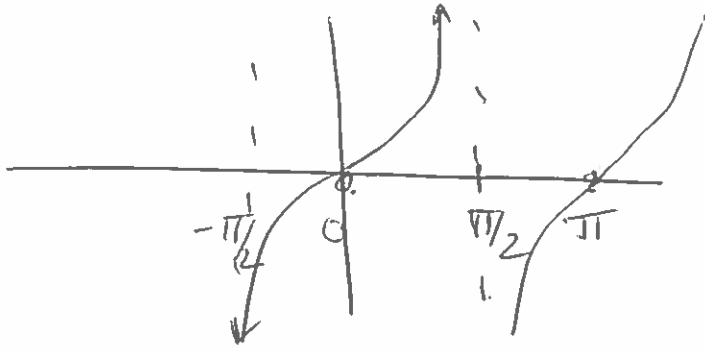
MAX/MINS: $n\pi$

Domain: $(-\infty, \infty)$

Range: $[-1, 1]$

NO END Behavior.

$$y = \tan(x)$$



No Amplitude

Period = π

VA: $\pi/2, 3\pi/2, (2n+1)\pi/2$

Zero: $n\pi$

No max mins

Domain: $x \neq (2n+1)\pi/2$

Range: $(-\infty, \infty)$

No END Behavior

$$y = \sec(x) = \frac{1}{\cos(x)}$$

Period: 2π



Range
 $(-\infty, -1] \cup [1, \infty)$

$$y = \csc(x) = \frac{1}{\sin(x)}$$

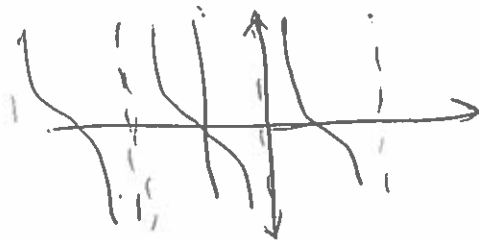
Period 2π



↓

$$y = \cot(x) = \frac{1}{\tan(x)}$$

Period: π



Range \mathbb{R}

Transformations of Trig

$$y = A \sin(x)$$

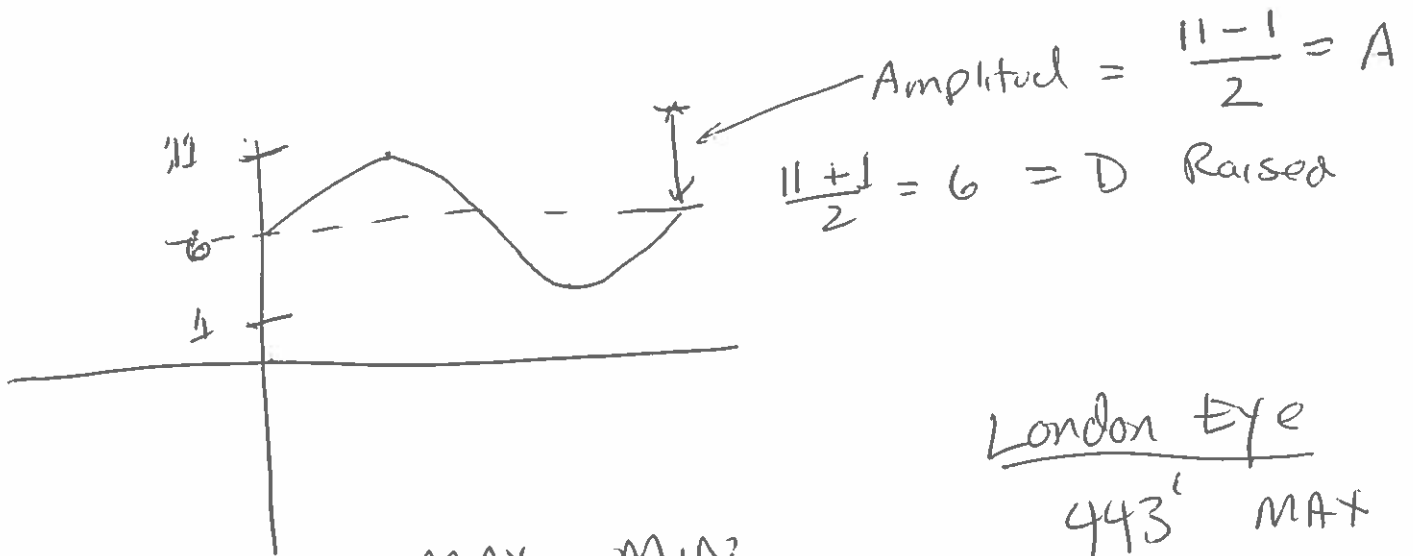
$A > 1$ stretching
 $0 < A < 1$ shrinking
 $A < 0$ reflecting

Amplitude: $|A|$

$$y = \sin(x) + D$$

$D > 0$ Raised
 $D < 0$ Lowered

Raise/Lower: D



$$\text{Amplitude} = \frac{\text{MAX} - \text{MIN}}{2}$$

$$\text{Raised} = \frac{\text{MAX} + \text{MIN}}{2}$$

London Eye

443' MAX

3' off ground

$$\text{Amplitude} = \frac{443 - 3}{2}$$

$$= 220$$

$$\text{Raised} = \frac{443 + 3}{2} = 223$$



NEW

$$y = f(Bx)$$

$B > 1$ Push ←

$0 < B < 1$ Pull out →

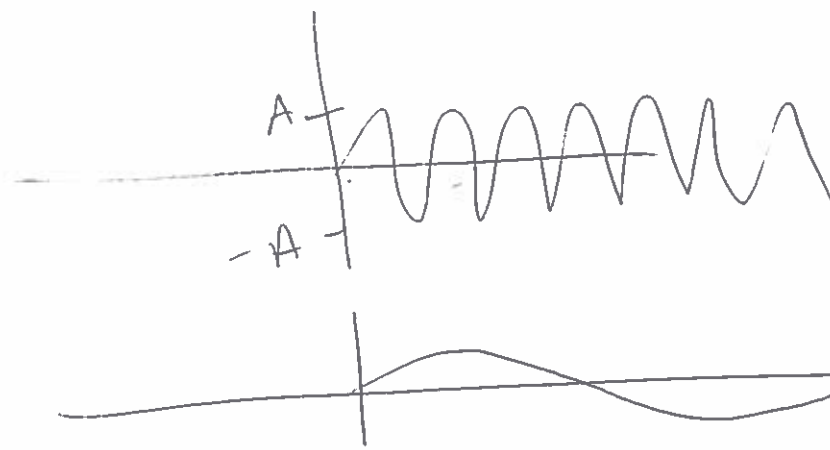
$B < 0$ Reflect about y-axis

$$y = x^2$$

$$y = (2x)^2 = f(2x) = 4x^2$$

Period = $\frac{2\pi}{|B|}$ for $\sin(x)$ $\cos(x)$
 $\sec(x)$ $\csc(x)$

Period = $\frac{\pi}{|B|}$ for $\tan(x)$ $\cot(x)$



Busy High Frequency

Lazy Low Frequency

London Eye

$$y = 220 \sin(.209x) + 223$$



Period = 30 mins

$$\frac{2\pi}{B} = 30$$

$$B = \frac{2\pi}{30} = .209$$

Transformations to Left or Right

$$y = \sin(x + c) \quad \begin{array}{l} c > 0 \text{ Left} \\ c < 0 \text{ Right} \end{array}$$

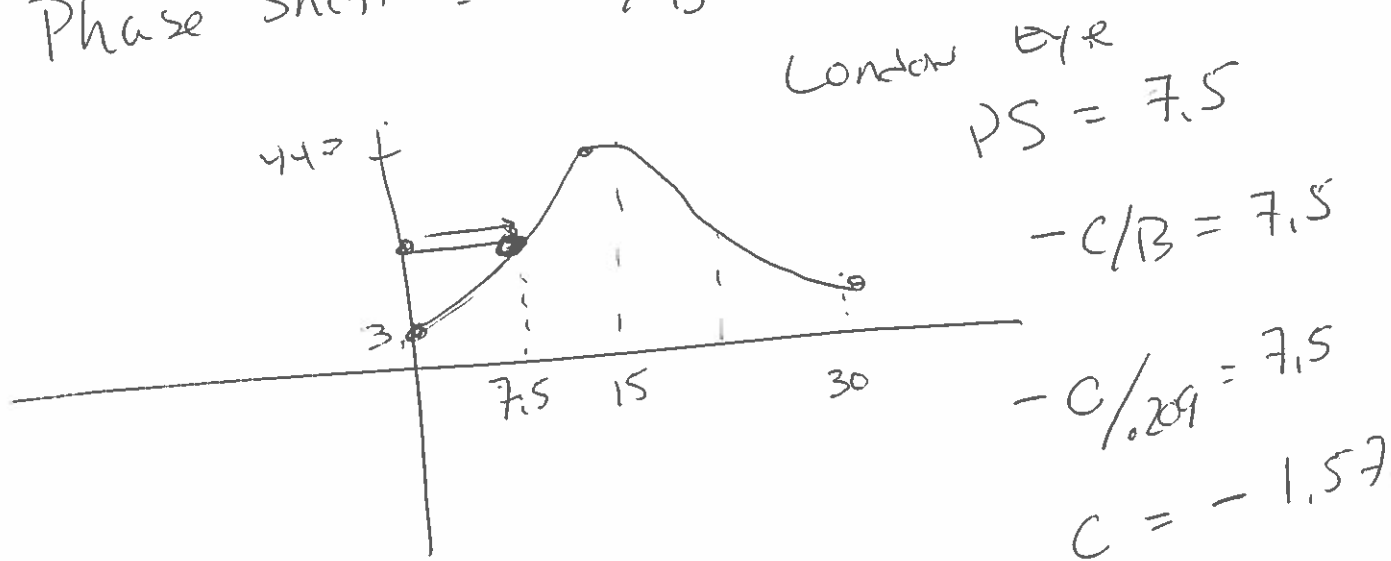
$\stackrel{=}{=} 0$
 $x = -c$

Phase Shift = $-c$

$$y = \sin(Bx + c)$$

$\stackrel{=}{=} 0$

Phase Shift = $-c/B$



$$y = 220 \sin(.209x \mp 1.57) + 223$$

GROUP NAME:	Student Names (First and Last)
Logo:	Speaker/Presenter: <u>Justin + Dalen</u>
Date: <u>10/31/13</u>	Writer/Prep: <u>Elise</u>
Topics:	QC/Leader: <u>Tabbi</u>

Instructions:

DATA:

\$	Acts of Violence
7,000	150
10,000	53
17,000	35
20,000	80
27,000	120

Sin Regressions

$$y = a * \sin(bx + c) + d$$

$$a = 56.03...$$

$$b = 0.29...$$

$$c = 0.61...$$

$$d = 73.08$$

$$y = 56.03... * \sin(0.29...x + 0.61...) + 73.08$$

$$a = 56.03$$

$$\frac{2\pi}{b} = 21.68$$

$$\frac{-c}{b} = -2.11$$



GROUP NAME: Biz Wizards

Student Names (First and Last)



Speaker/Presenter: Jason Hayes

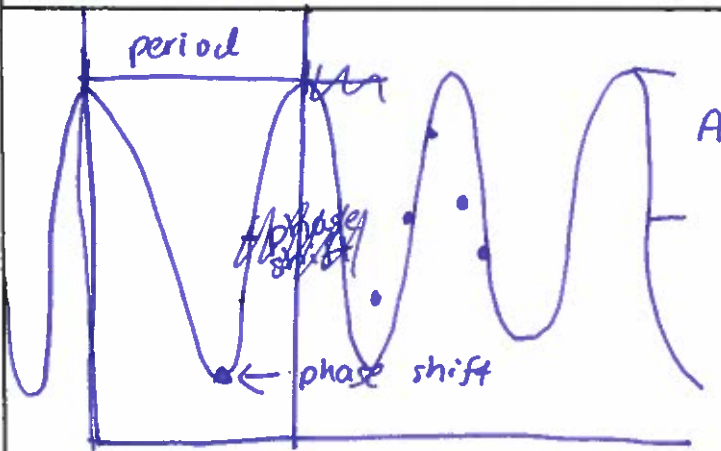
Date: Halloween!

Writer/Prep: Rachel Ralston

Topics: sine regression

QC/Leader: Giulliana Fonseca

Instructions: Find A , $\frac{2\pi}{B}$, and $\frac{-C}{B}$.




x	y
2009	.58
2010	62
2011	65
2012	63
2013	60

$A = 7.58 \dots \leftarrow$ amplitude

Microsoft's Revenue
in Billions
of Dollars

$\frac{2\pi}{B} = 5.80 \dots \leftarrow$ period

$\frac{-C}{B} = -1.50 \dots \leftarrow$ phase shift

<p>GROUP NAME: <u>MEABS</u></p> <p>Logo: </p>	<p>Student Names (First and Last)</p> <p>Speaker/Presenter: <u>Ahmed</u></p> <p>Writer/Prep: <u>Jenn/Kero</u></p> <p>QC/Leader: <u>Daniella S.</u></p>
<p>Date: <u>10/31/13</u></p> <p>Topics:</p>	

Instructions: Sin Reg

x ₁	x ₂
2	2.4
3	2.1
4	2.2
5	3.3
6	3.1
7	2.8

SIN REGRESSION

$y = a \sin(b(x - c)) + d$
 $2.4 = a \sin(b(2 - c)) + d$
 $2.1 = a \sin(b(3 - c)) + d$
 $2.2 = a \sin(b(4 - c)) + d$
 $3.3 = a \sin(b(5 - c)) + d$
 $3.1 = a \sin(b(6 - c)) + d$
 $2.8 = a \sin(b(7 - c)) + d$

$a = 1.748$

$$\frac{a\pi}{b} = \frac{2.7}{.684} = 3.910..$$

$$\frac{c}{L} = \frac{-1.243}{.684} = -1.817..$$

