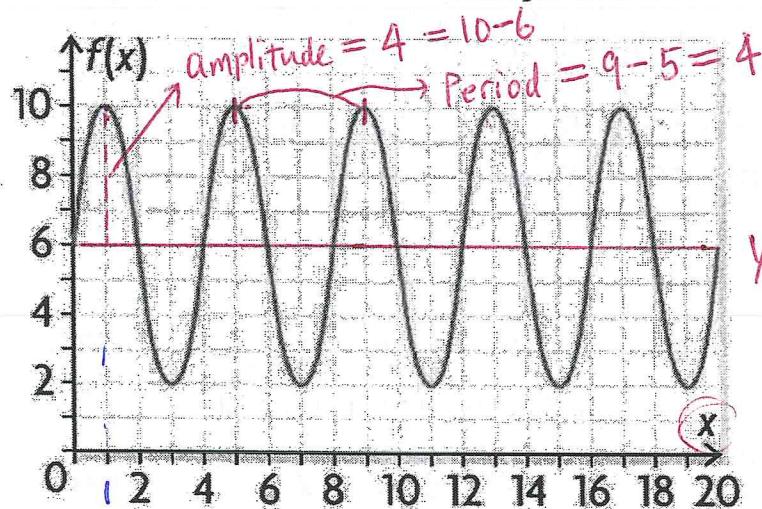


PERIODIC FUNCTIONS

For the following periodic function, highlight one cycle.

Draw the axis of the curve.

State the period and calculate the amplitude.



$$\frac{\text{Max} + \text{Min}}{2} = \frac{10 + 2}{2} =$$

$y = 6$ (axis of curve)

From the graph, what is $f(1)$? $f(5)$? $f(9)$? $f(13)$?

When $x=1 \rightarrow y=? \Rightarrow f(1)=10 \quad f(5)=10. \quad f(9)=10$

What is $f(45)$?

$f(45) = 10$ because of period = 4

For a periodic function, $f(x) = f(x \pm p)$ where p is the period.

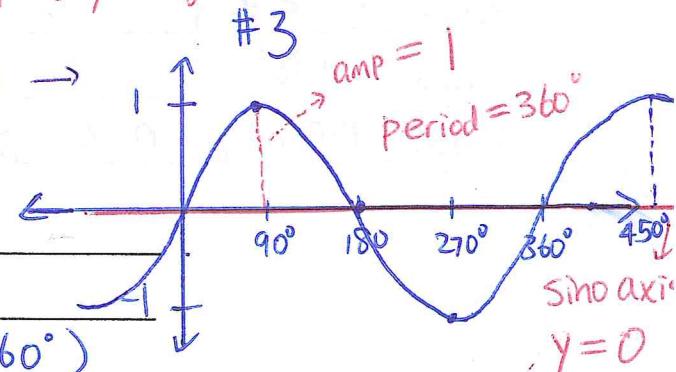
$$f(x) = f(x + np) \quad n = \text{any integer}$$

$$y = \sin \theta$$

Sketch a graph with the main points:

$$y = \sin \theta \rightarrow \\ (\text{parent})$$

HW P290 #1, #2



$$\text{Domain: } \{\theta \in \mathbb{R}\}$$

$$\text{Range: } \{y \in \mathbb{R}, -1 \leq y \leq 1\}$$

$$\text{Period: } 360^\circ \quad (450^\circ - 90^\circ = 360^\circ)$$

$$\text{Amplitude: } 1$$

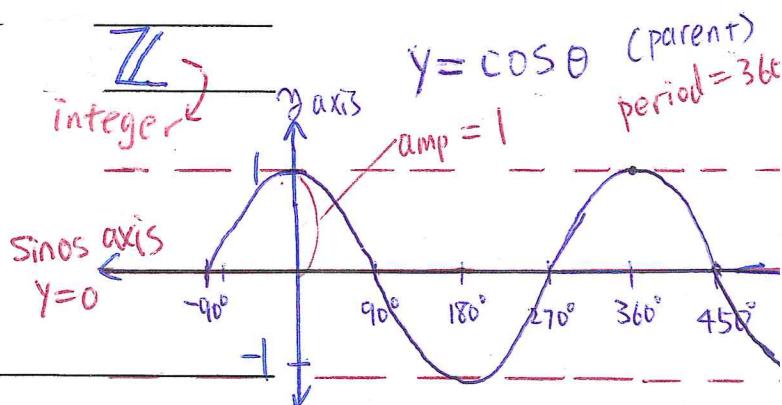
$$\text{Roots: } 180^\circ n, \quad n \in \mathbb{Z}$$

↳ or x-intercepts or zeros

$$y = \cos \theta$$

Sketch a graph with the main points:

$$\text{Domain: } \{\theta \in \mathbb{R}\}$$



PERIODIC FUNCTIONS

$$y = \cos \theta$$

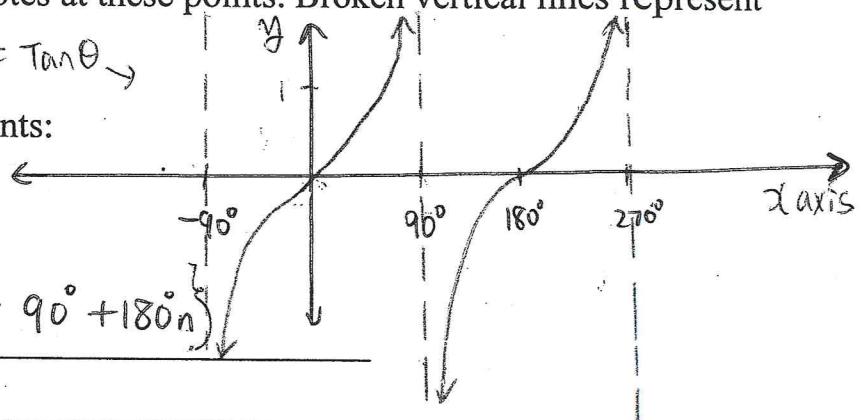
Range: $\{y \in \mathbb{R}, -1 \leq y \leq 1\}$ Period: 360° Amplitude: 1Roots: $90^\circ + 180^\circ n$ (e.g. $90^\circ, 270^\circ, 450^\circ$ etc...)What translation would map the graph of $y = \sin \theta$ onto $y = \cos \theta$?Shift $\sin \theta$ 90° to the left

$$y = \tan \theta$$

There are certain values of θ for which $y = \tan \theta$ is undefined. Thegraph of $f(90^\circ) \rightarrow \text{undefined}$ (y value does not exist.) $y = \tan \theta$ is said to have asymptotes at these points. Broken vertical lines represent the asymptotes.

$$y = \tan \theta$$

Sketch a graph with the main points:

Domain: $\{\theta \in \mathbb{R}, \theta \neq 90^\circ + 180^\circ n\}$ Range: $\{y \in \mathbb{R}\}$ Period: 180° Roots: $180^\circ n, n \in \mathbb{Z}$

||
integer

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

HW 290. #3, #4, #7

May 14 MCR3U Park

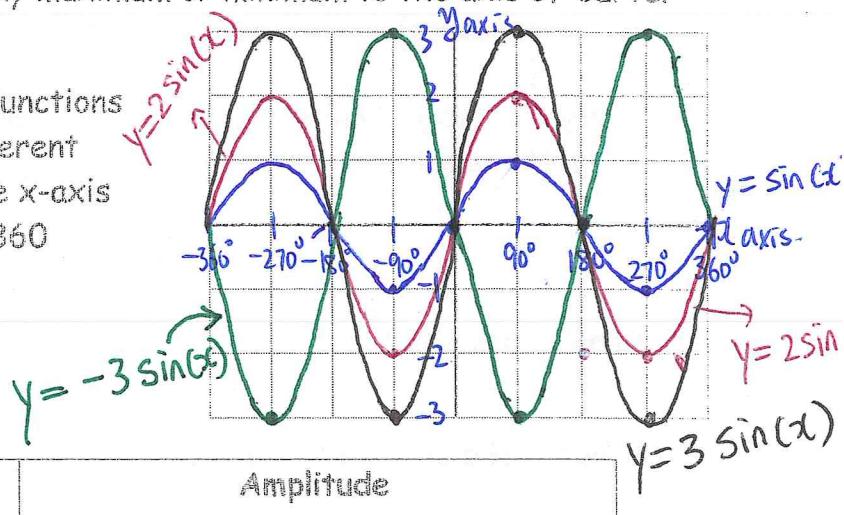
Transforming the Graph of $\sin x$

Part 1 - Amplitude

The amplitude is the distance from any maximum or minimum to the axis of curve.

1. Neatly sketch the graphs of the functions listed below on the grid using different colours and label them clearly. The x-axis should have a scale from -360 to 360

2. Complete the following table.



Function	Amplitude
$y = \sin(x)$	1
$y = 2\sin(x)$	2
$y = 3\sin(x)$	3

3. How can you determine the amplitude from the equation?

$y = a \sin(x)$ The number (a value) in front of
 $y = a \cos(x)$ the function indicates amplitude.

4. Graph $y = -3 \sin(x)$. Sketch the graph on the grid and clearly label it.

- Describe the change to the graph when $y = 3\sin(x)$ was changed to $y = -3 \sin(x)$.

reflect it on x axis.

- Compare the amplitudes of $y = 3\sin(x)$ and $y = -3 \sin(x)$. Same

because amplitude is always absolute value: $| -3 | = 3$

*Trig Identities Worksheet May 14

#13. $\tan^2 \theta - \sin^2 \theta = \sin^2 \theta \tan^2 \theta$

LS

$$\left(\frac{\sin \theta}{\cos \theta}\right)^2 - \sin^2 \theta$$

$$\frac{\sin^2 \theta}{\cos^2 \theta} - \frac{\sin^2 \theta}{\cos^2 \theta}$$

$$\frac{\sin^2 \theta - \cos^2 \theta \sin^2 \theta}{\cos^2 \theta}$$

$$\frac{\sin^2 \theta (1 - \cos^2 \theta)}{\cos^2 \theta}$$

$$\frac{\sin^2 \theta \cdot \sin^2 \theta}{\cos^2 \theta}$$

$$\star \tan^2 \theta \cdot \sin^2 \theta$$

RS

$$\sin^2 \theta \cdot \left(\frac{\sin \theta}{\cos \theta}\right)^2$$

$$\sin^2 \theta \cdot \frac{\sin^2 \theta}{\cos^2 \theta}$$

$$(1 - \cos^2 \theta) \cdot \frac{\sin^2 \theta}{\cos^2 \theta}$$

$$(1 + \cos \theta)(1 - \cos \theta) \cdot \frac{\sin^2 \theta}{\cos^2 \theta}$$

$$\therefore LS = RS$$

$$A = \frac{A \times B}{T \times B} = \frac{AB}{B}$$

$$\#17 \quad \frac{\tan \theta \sin \theta}{\tan \theta + \sin \theta} = \frac{\tan \theta - \sin \theta}{\tan \theta \sin \theta}$$

LS	RS
$= \frac{\left(\frac{\sin \theta}{\cos \theta}\right) \sin \theta}{\left(\frac{\sin \theta}{\cos \theta}\right) + \sin \theta}$	
$= \frac{\frac{\sin^2 \theta}{\cos \theta}}{\frac{\sin \theta + (\sin \theta \cdot \cos \theta)}{\cos \theta}}$	
$= \frac{\frac{\sin^2 \theta}{\cos \theta}}{\frac{\sin \theta (1 + \cos \theta)}{\cos \theta}}$	
$= \frac{\cancel{\sin \theta}}{\cancel{\cos \theta}} \times \frac{\cancel{\cos \theta}}{\cancel{\sin \theta} (1 + \cos \theta)}$	
$= \frac{\sin \theta}{1 + \cos \theta}$	
	$= \frac{\frac{\sin \theta}{\cos \theta} - \sin \theta}{\frac{\sin \theta}{\cos \theta} \cdot \sin \theta}$
	$= \frac{\frac{\sin \theta - \cos \theta \sin \theta}{\cos \theta}}{\frac{\sin^2 \theta}{\cos \theta}}$
	$= \frac{\sin \theta - \cos \theta \sin \theta}{\cos \theta} \times \frac{\cos \theta}{\sin^2 \theta}$
	$= \frac{(1 - \cos \theta) \sin \theta}{\sin^2 \theta}$
	$= \frac{\sin \theta (1 - \cos \theta)}{1 - \cos^2 \theta}$
	$= \frac{\sin \theta (1 - \cos \theta)}{(1 + \cos \theta)(1 - \cos \theta)}$
	$= \frac{\sin \theta}{1 + \cos \theta}$

$$\therefore LS = RS$$