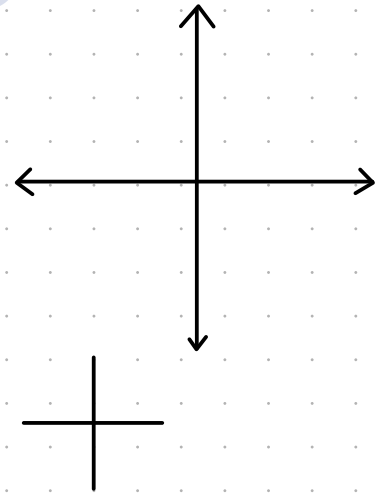
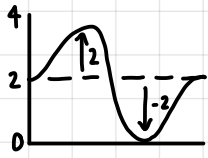


MATHS

maths



period : how long it takes to complete 1 full cycle / 1 full wavelength
amplitude: the difference between the highest and lowest points (average)



amplitude = 2

PERIOD FROM EQUATION

$$\text{period} = \frac{2\pi}{b}$$

EQUATION FROM GRAPH

$$b = \frac{2\pi}{\text{period}}$$

TRANSFORMATIONS OF SINE AND COSINE CURVES

INVESTIGATION

- What effect does changing the value of a in $y = a \sin x$ have on the graph of the function? I.e. draw and compare $y = \sin x$, $y = 2 \sin x$, $y = 3 \sin x$, $y = -2 \sin x$ etc. and try to write a general statement regarding the effect altering a has on the graph of $y = a \sin x$.
- Similarly investigate changing the value of b in $y = a \sin (bx)$, for $b > 0$. I.e. for some fixed value of a , say 1, compare graphs of $y = 1 \sin x$, $y = 1 \sin 2x$, $y = 1 \sin 3x$, $y = 1 \sin 4x$ etc. and try to write a general statement regarding the effect altering b has on the graph of $y = a \sin bx$.
- Similarly investigate changing the value of c in $y = a \sin [b(x - c)]$ and d in $y = a \sin [b(x - c)] + d$.
- Similarly investigate the cosine and tangent functions.

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

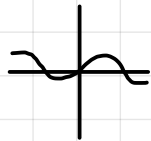
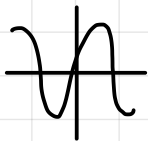
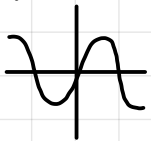
- a = changes the amplitude
 - b = changes the period
 - c = moves left and right (opposite sign)
 - d = moves up and down
- ↙ phase shift

CHANGING A

$$y = \sin(x)$$

$$y = 2 \sin(x)$$

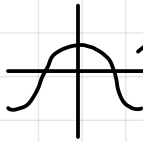
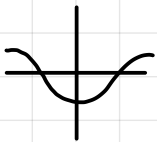
$$y = 0.5 \sin(x)$$



CHANGING B

if $b > 0$

if $b < 0$

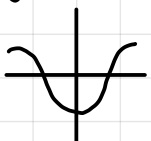
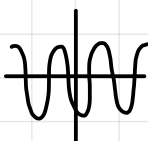
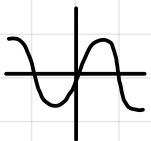


flipped over the x-axis

$$y = \sin(x)$$

$$y = \sin(2x)$$

$$y = \sin(0.5x)$$

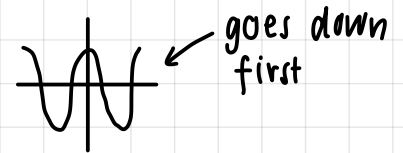


AMPLITUDE

in $y = 2 \sin(x)$
amplitude = 2



in $y = -2 \sin(x)$
amplitude = 2
(ignore the sign)



PERIOD

is given by: $\text{period} = \frac{2\pi}{b}$
to find b : $b = \frac{2\pi}{\text{period}}$

