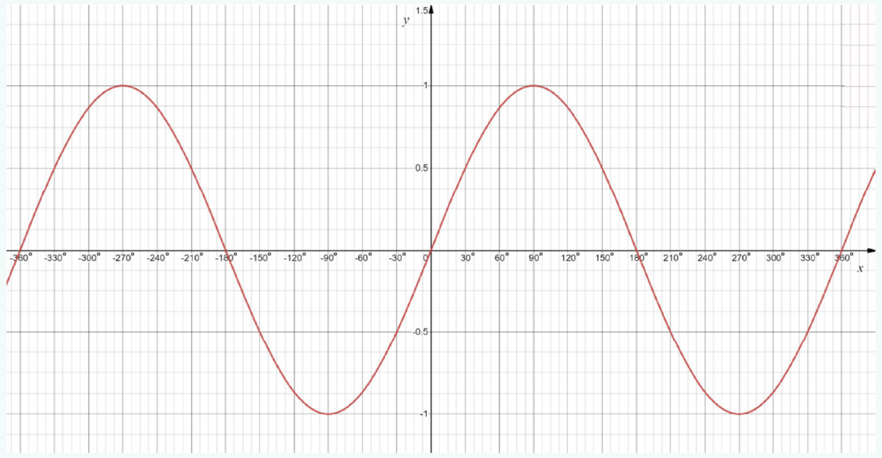
Check that you can:
- *solve equations to find the unknown variable*
- *use the trigonometric and inverse function buttons on your calculator.*

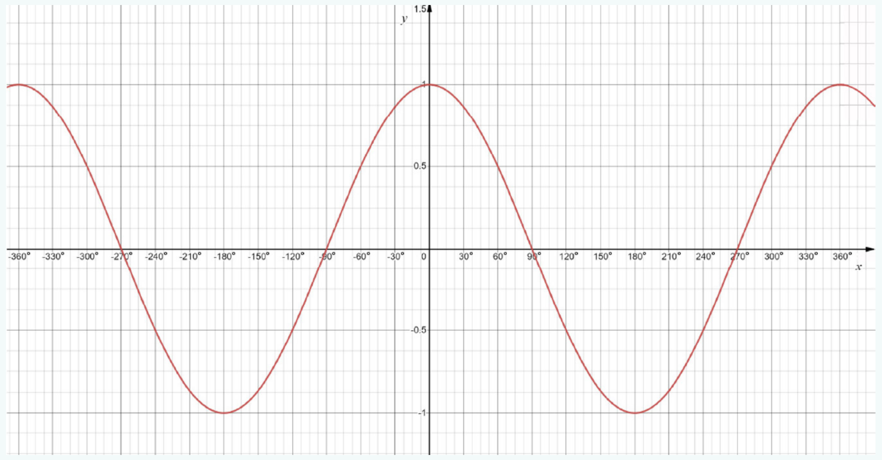
Graph | Key features

Here is the graph of $y = \sin x$ for the values $-360° \leq x \leq 360°$.



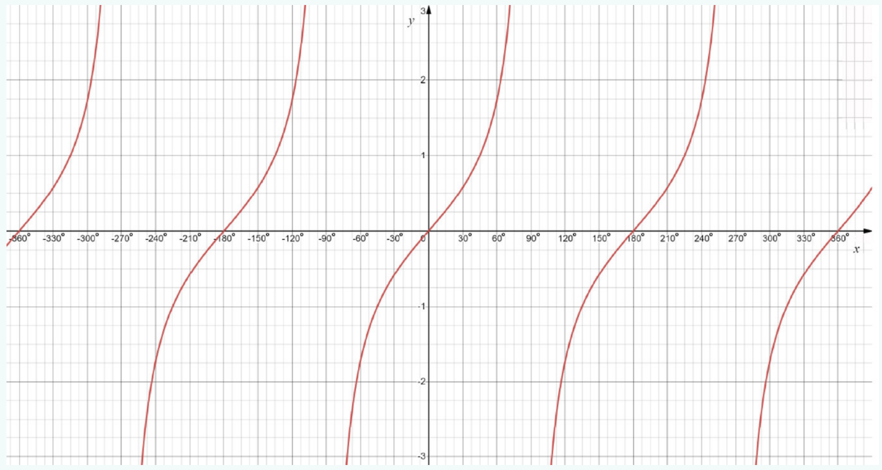
- The graph makes one complete 'wave' in 360°. This means that the graph repeats itself every 360°. This is referred to as the **period** of the graph.
- It **goes** through the origin (0, 0).
- The **maximum value is 1 and minimum is –1** so we can say that $-1 \leq \sin x \leq 1$.

Here is the graph of $y = \cos x$ for the values $-360° \leq x \leq 360°$.



- The graph makes one complete 'wave' in 360°. This means that the graph repeats itself every 360°. Therefore, the **period** of the graph is again **360°**.
- It **does not** go through the origin (0,0).
- It **crosses the *y* axis** at (0,1).
- The **maximum value is 1 and minimum is –1**, so we can say that $-1 \leq \cos x \leq 1$.
- The **shape is the same** as $y = \sin x$ but it has been transformed (moved left 90°).
- The curve is **symmetrical** about the y-axis.

Here is the graph of $y = \tan x$ for the values $-360° \leq x \leq 360°$.



- The graph makes one complete 'wave' in 180°. This means that the graph repeats itself every 180°. Therefore, the **period** of the graph is **180°**.
- It **goes** through the origin (0,0).
- The **shape is not similar** to either the sin graph or the cos graph.
- There are some values that are undefined, i.e. values of $\tan x$ that will appear as an error on any calculator. **There will be a break in the graph at these values, at $x = \pm 90°, \pm 270°$, ...** The imaginary vertical lines at these values of x are called **asymptotes** – they are imaginary lines that the graph of $y = \tan x$ gets close to, but does not touch.
- There is no maximum or minimum value, so $-\infty \leq \tan x \leq \infty$.

Transformations of trigonometric graphs

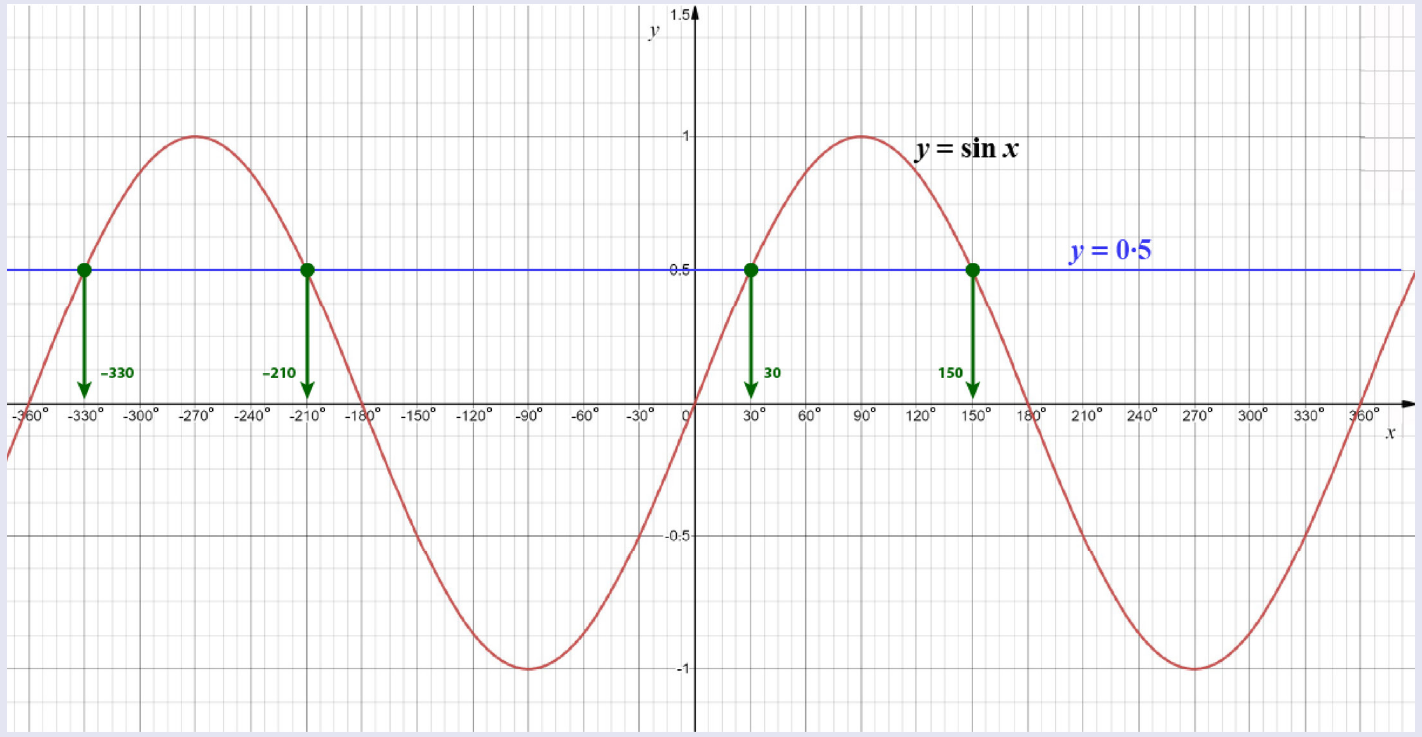
When transforming graphs, remember the following rules:
$y = f(x)$ denotes the original function.
$y = f(x) + h$ moves the graph upwards by h units.
$y = f(x) - h$ moves the graph downwards by h units.
$y = f(x + h)$ moves the graph to the left by h units.
$y = f(x - h)$ moves the graph to the right by h units.
$y = f(ax)$ denotes a horizontal stretch from the y-axis by a scale factor of $\frac{1}{a}$, the reciprocal of a.
$y = af(x)$ denotes a vertical stretch from the x-axis by a scale factor of a.
These rules can be applied to trigonometric graphs.

REMEMBER!
When finding solutions to any equation, you can substitute back in to check your work.

Solving equations using trigonometric graphs

Example

Use the graph of $y = \sin x$ for the values $-360° \leq x \leq 360°$ to solve the equation $\sin x = 0 \cdot 5$.



Answer

$\sin x = 0 \cdot 5$, where the curve and the blue line intersect. Solutions for this part of the graph are shown on the graph (by the green arrows) they are: –330°, –210°, 30°, 150°.

We are not always able to identify all values accurately by looking at the graphs.
We can find one solution using a calculator and then use the symmetry of the graph to find any other solutions.