

Sinusoidal Functions Applications Note

Example 1

Determine the equation of the sinusoidal function that passes through the following points:

θ	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π
y	-2	1	4	1	-2

Example 2

Determine a sinusoidal equation for the following graph:

Example 3

Determine the equation of a cosine function that is equal to : $y = -2\sin(3\theta - \pi) + 1$

Example 4

A ferris wheel has a radius of 8 m and makes 1 revolution every 18 seconds. The bottom of the ferris wheel is 2m above the ground.

- Draw a graph to show how the rider's height above the ground varies with time for 3 revolutions, starting when the person gets on the ferris wheel at its lowest point.
- Determine a sine equation and a cosine equation to match the graph.
- How high is the ferris wheel after 1 minute?

Example 5

An object suspended from a spring is oscillating up and down. The distance from the high point to the low point is 30 cm and the object takes 4 seconds to complete 5 cycles. For the first few cycles, the distance (in cm) from the rest position with respect to time (in seconds) is modelled by a sinusoidal function.

- Draw a graph to show the position of the object relative to the rest position for the first two cycles.
- Determine a sine equation and a cosine equation to match the graph.
- Where is the object relative to the rest position after 3 seconds?