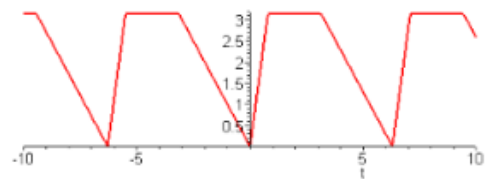
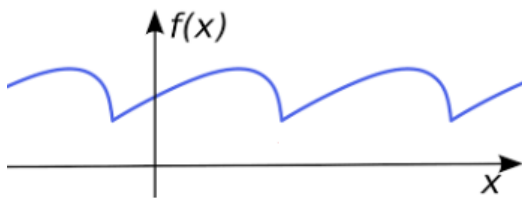
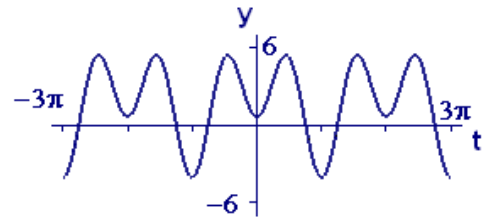
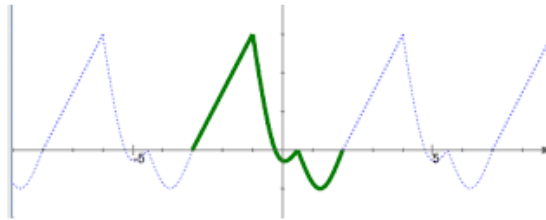


Notes - Sinusoidal Functions

Many relationships display periodic behavior. Periodic functions take on the same set of values over and over again as the independent variable changes.

Examples of Graphs of Periodic Functions

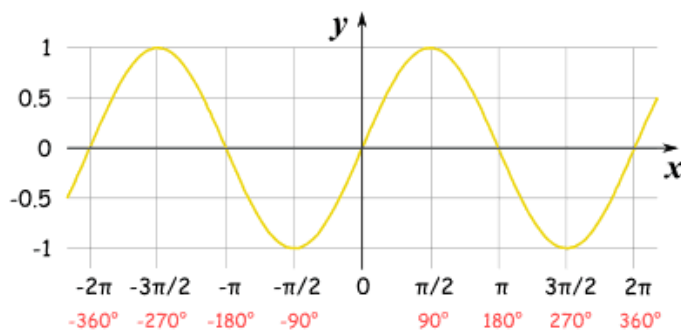


Sinusoidal Functions

Sinusoidal functions produce graphs that look like waves. The motion of swinging pendulums and oscillating springs are “real life” examples of sinusoidal relationships.

The sine function and the cosine function are sinusoidal functions.

The Sine Function



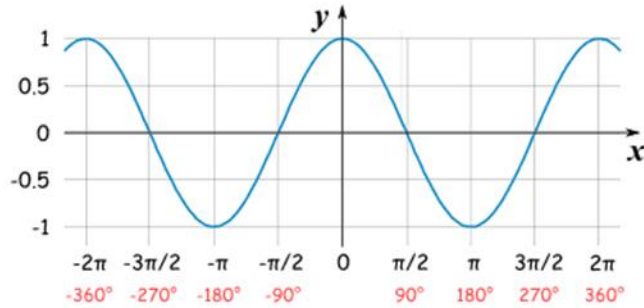
Key Points

x	y
0°	0
90°	1
180°	0
270°	-1
360°	0

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

Domain: $(-\infty, \infty)$ Range: $[-1, 1]$

The Cosine Function



Domain: $(-\infty, \infty)$ **Range:** $[-1, 1]$

Key Points

x	y
0°	1
90°	0
180°	-1
270°	0
360°	1

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

Important Vocabulary

1. **Period** – the horizontal length of one repeating pattern of the function; the number of degrees/radians required to draw one complete wave.

The period of both the sine and cosine functions is 360° (or 2π radians).

2. **Local Maximum** – the maximum value of the function.

3. **Local Minimum** – the minimum value of the function.

4. **Sinusoidal Axis** – the horizontal line halfway between the local maximum and local minimum

Equation of the Sinusoidal Axis:

$$y = \frac{\text{local maximum} + \text{local minimum}}{2}$$

5. **Amplitude** – half the vertical distance from the function's maximum value to its minimum value.

Equation:

$$a = \frac{\text{local maximum} - \text{local minimum}}{2}$$