L3 – Transformations of Sine and Cosine Part 1 Equation → Graph

MCR3U

Jensen

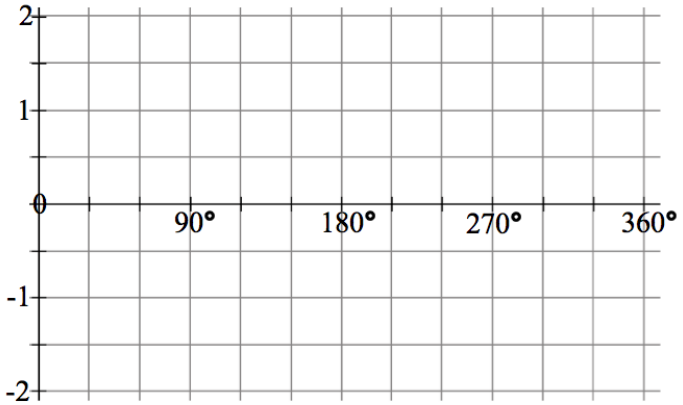
Section 1: Review of Sine and Cosine Functions

$$y = a\sin[k(x-d)] + c \quad \text{OR} \quad y = a\cos[k(x-d)] + c$$

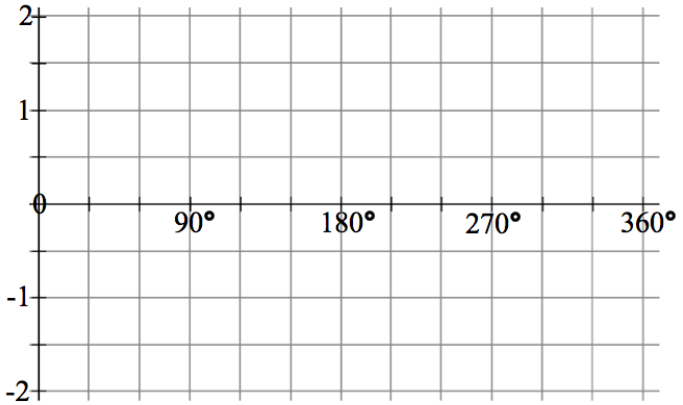
a	k	d	c
Vertical stretch or compression by a factor of a. Vertical reflection if $a < 0$ $\lvert a\rvert = amplitude$	Horizontal stretch or compression by a factor of $\frac{1}{k}$. Horizontal reflection if $k < 0$. $\frac{360}{\lvert k\rvert} = period$	Phase shift $d > 0; shift\ right$ $d < 0; shift\ left$	Vertical shift $c > 0; shift\ up$ $c < 0; shift\ down$

Graphs of parent functions $y = \sin x$ and $y = \cos x$ using key points:

x	y

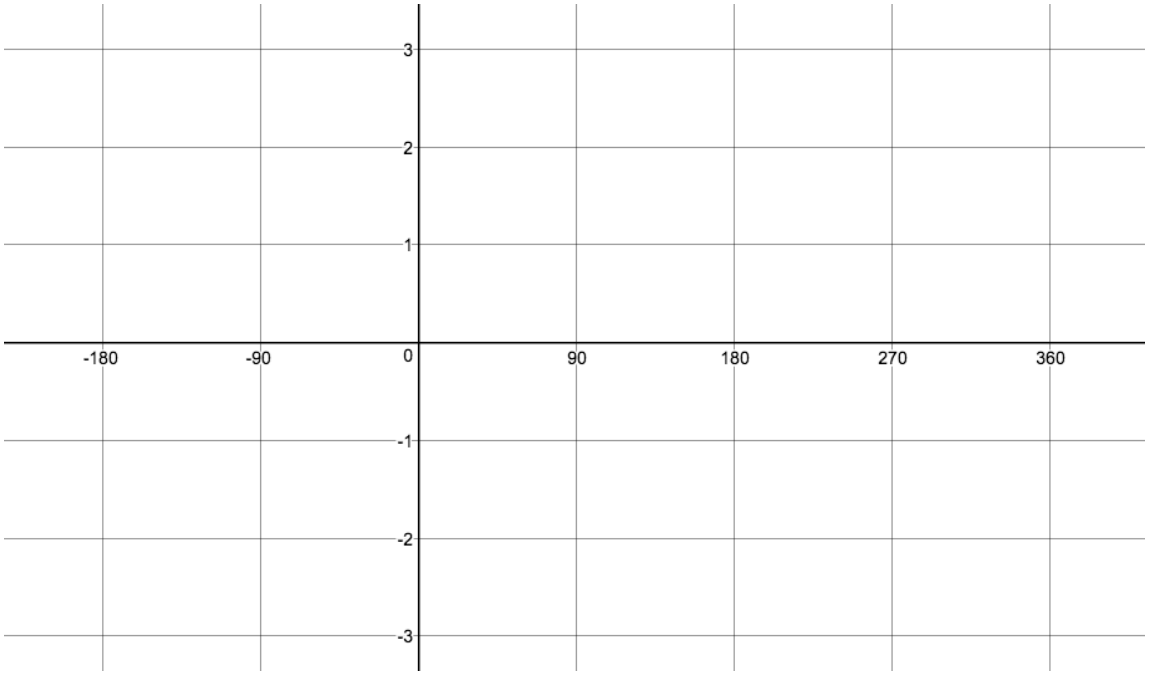


x	y



Section 2: Graphing Transformed Sinusoidal Functions

Example 1: Graph $y = 2\sin x + 1$ using transformations. Then state the amplitude, period, and number of cycles between $0°$ and $360°$.

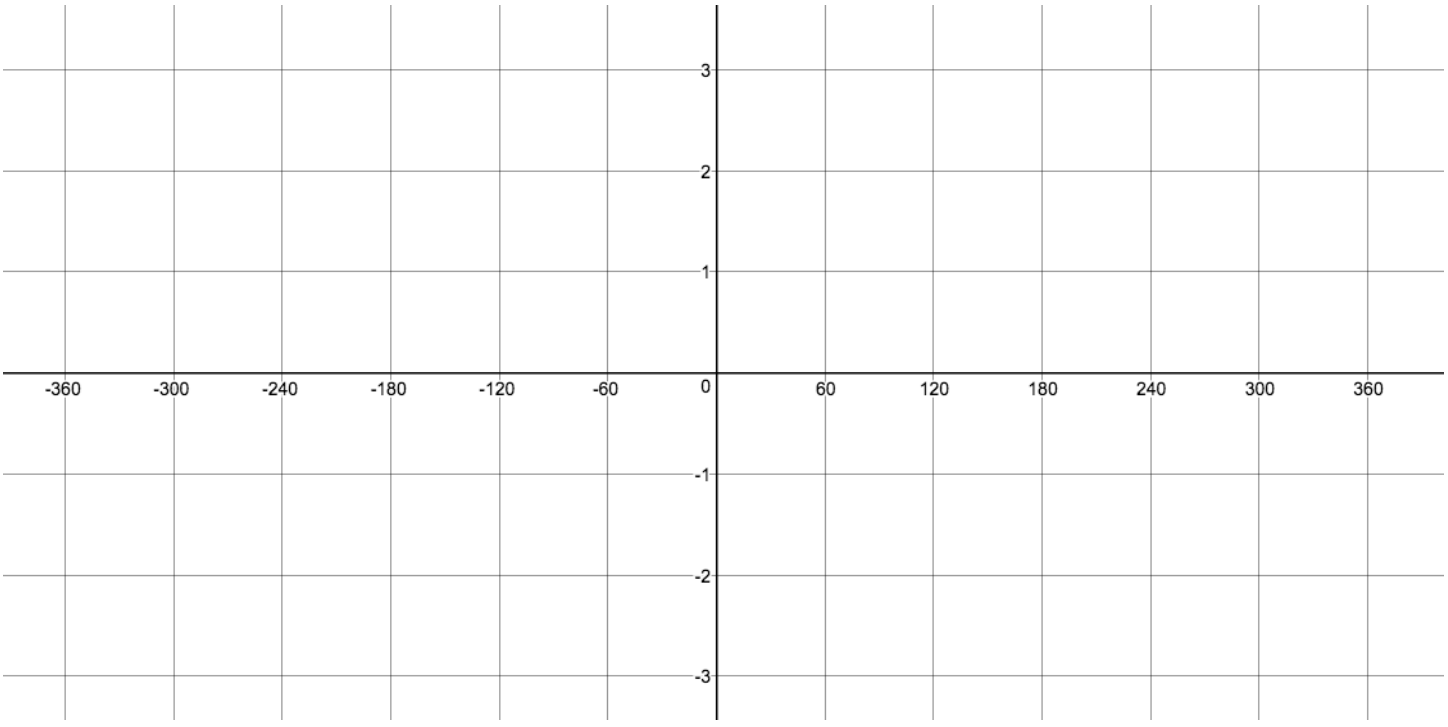


Amplitude:

Period:

Number of cycles between $0°$ and $360°$:

Example 2: Graph $y = -1.5\cos[3(x - 30°)] + 0.5$ using transformations. Then state the amplitude, period, and number of cycles between $0°$ and $360°$.

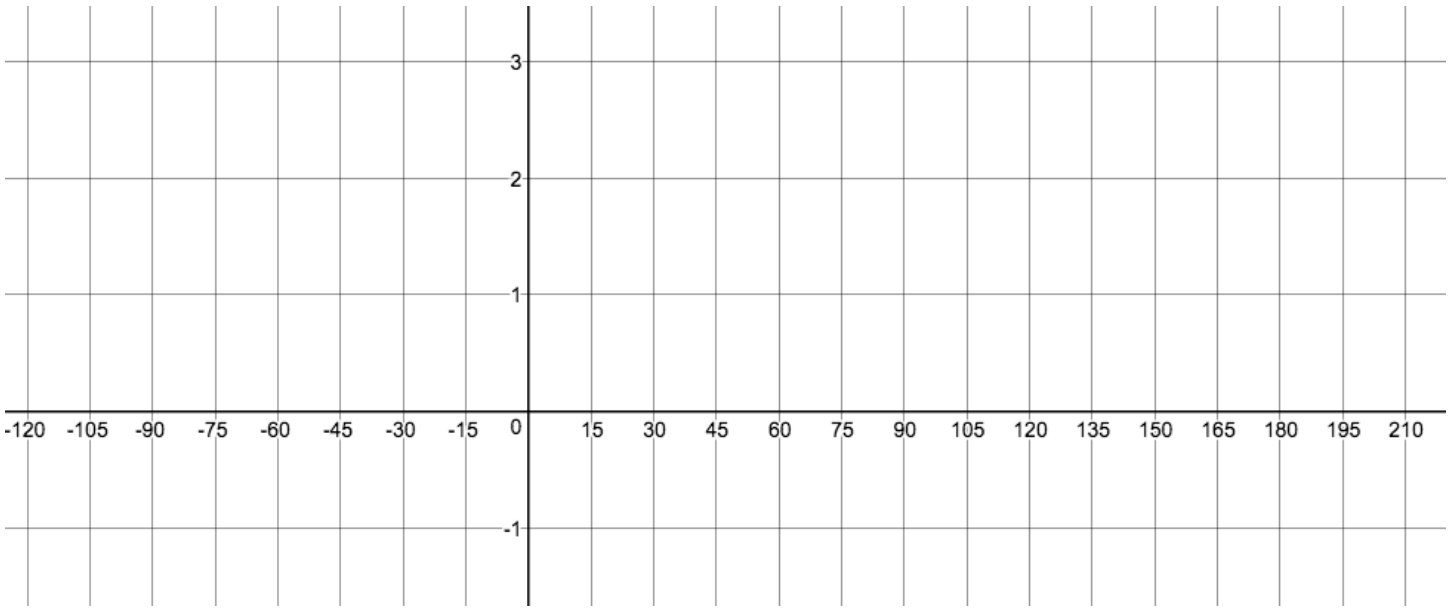


Amplitude:

Period:

Number of cycles between $0°$ and $360°$:

Example 3: Graph $y = \sin[-4(x - 60°)] + 2$ using transformations. Then state the amplitude, period, and number of cycles between $0°$ and $360°$.



Amplitude:

Period:

Number of cycles between $0°$ and $360°$: