

5.3 Transformations of Trig Functions Lesson

This document was composed and formatted by Annie Bernatchez.

The course material originated from www.jensenmath.ca

Part 1: Transformation Properties

For a transformed sine or cosine function of the form $y = a \sin[k(x - d)] + c$ or $y = a \cos[k(x - d)] + c$, each parameter affects the graph in the following way:

a	k	d	c

Example 1: For the function $y = 3 \sin \left[\frac{1}{2} \left(\theta + \frac{\pi}{3} \right) \right] - 1$, determine the amplitude, period, phase shift, vertical shift, maximum, and minimum.

Amplitude:	Period:
Phase shift:	Vertical shift:
Max:	Min:

Part 2: Given the Equation, Graph the Function

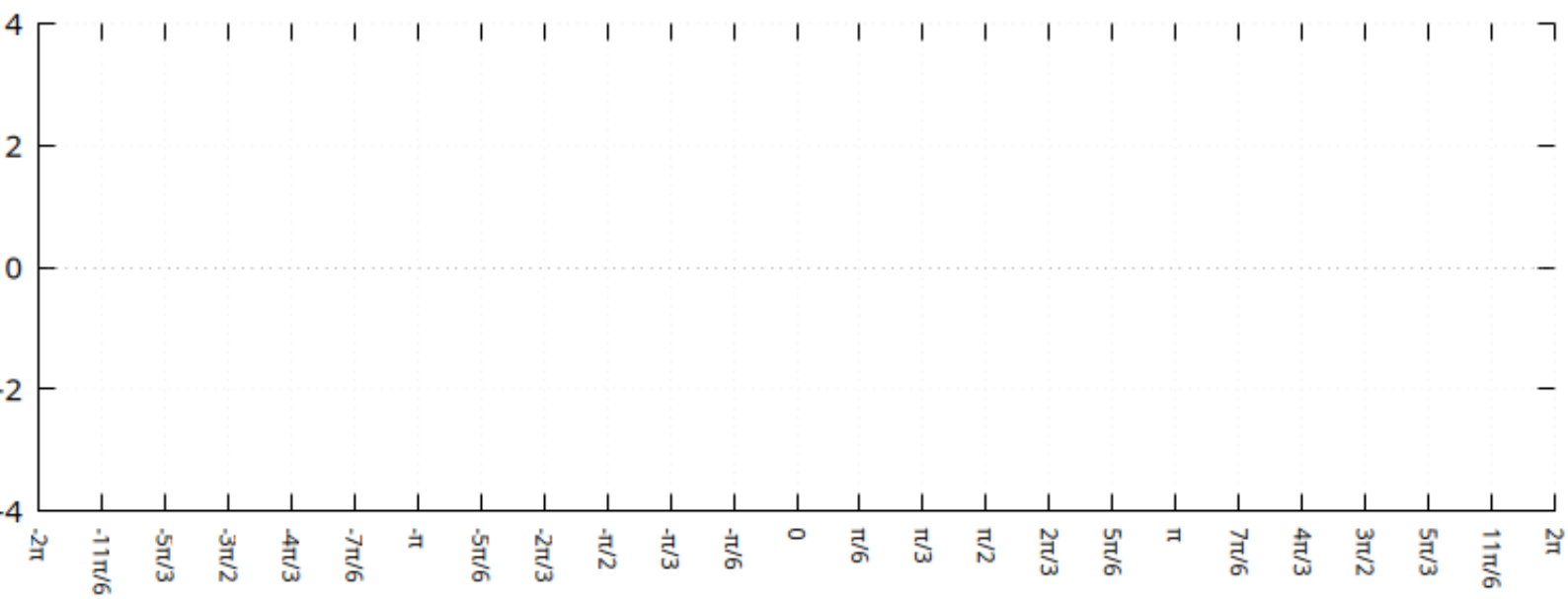
To graph a transformed sine or cosine function, apply the transformations to key points of the parent function $y = \sin x$ or $y = \cos x$.

Example 2: Graph $y = 2 \sin[2(x - \frac{\pi}{3})] + 1$ using transformations.

x	$y = \sin x$
0	
$\frac{\pi}{2}$	
π	
$\frac{3\pi}{2}$	
2π	

$\frac{x}{2} + \frac{\pi}{3}$	$2y + 1$

Amplitude: Period:

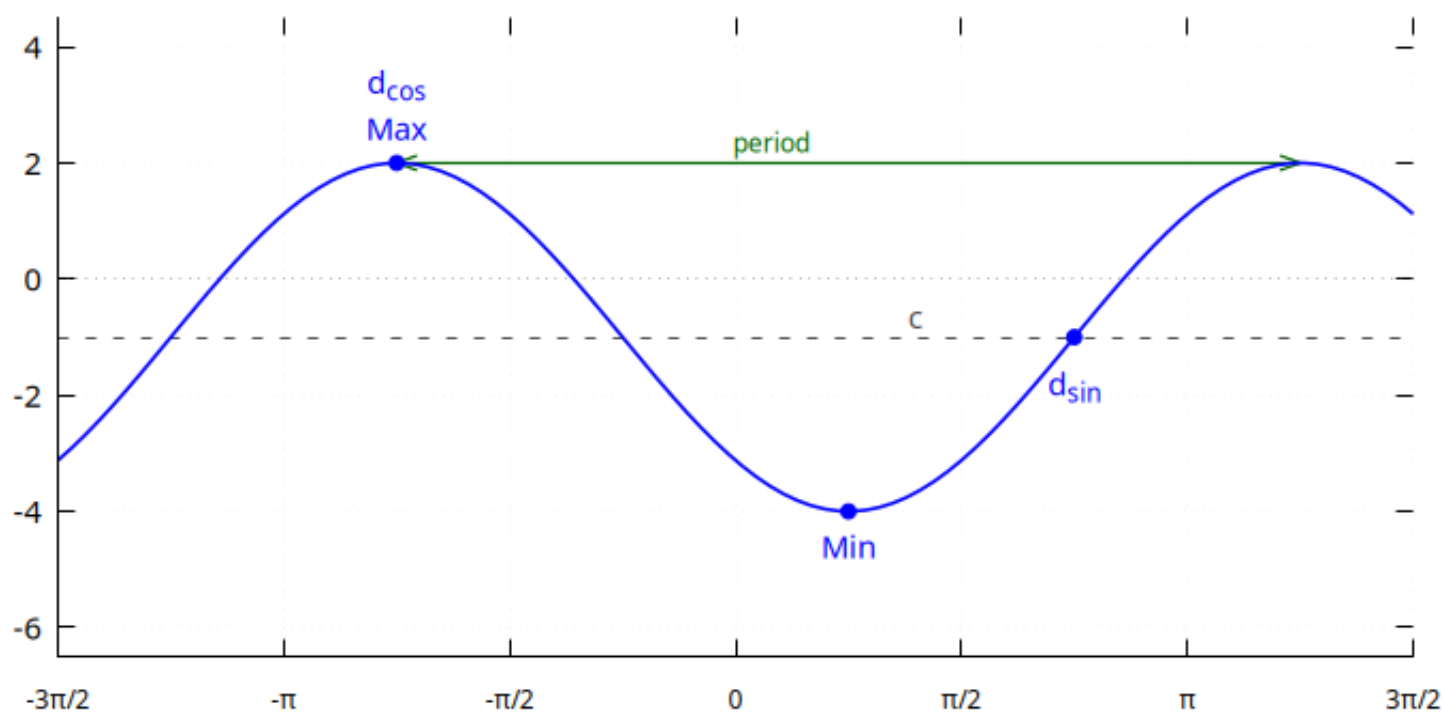


Part 3: Given the Graph, Write the Equation

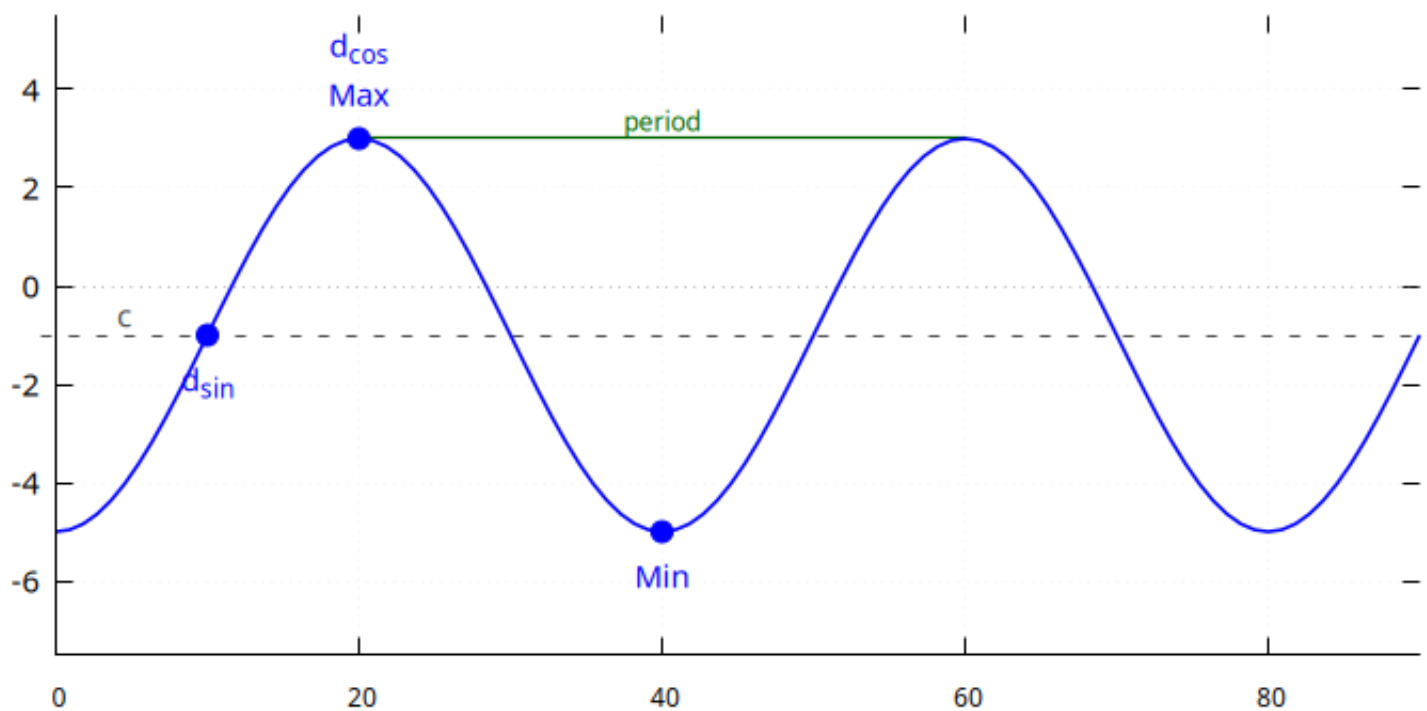
To find the equation of a transformed sine or cosine function from its graph, use the following relationships:

<i>a</i>	<i>k</i>	<i>d</i>	<i>c</i>

Example 3: Determine a sine equation and a cosine equation for the function shown in the graph.



Example 4: Determine a sine equation and a cosine equation for the function shown in the graph.



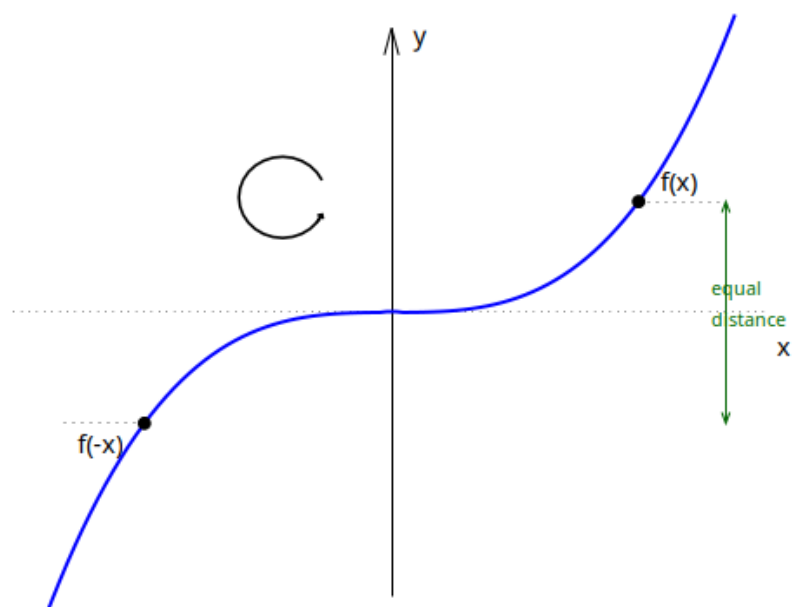
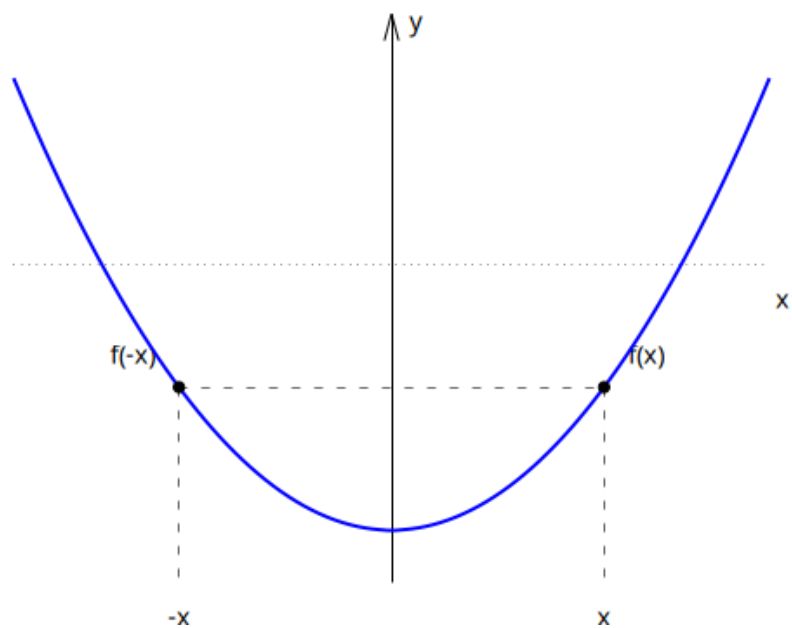
Example 5:

a) Create a sine function with amplitude 7, period π , phase shift $\frac{\pi}{4}$ to the right, and vertical displacement 3 down.

b) Convert this function to an equivalent cosine equation.

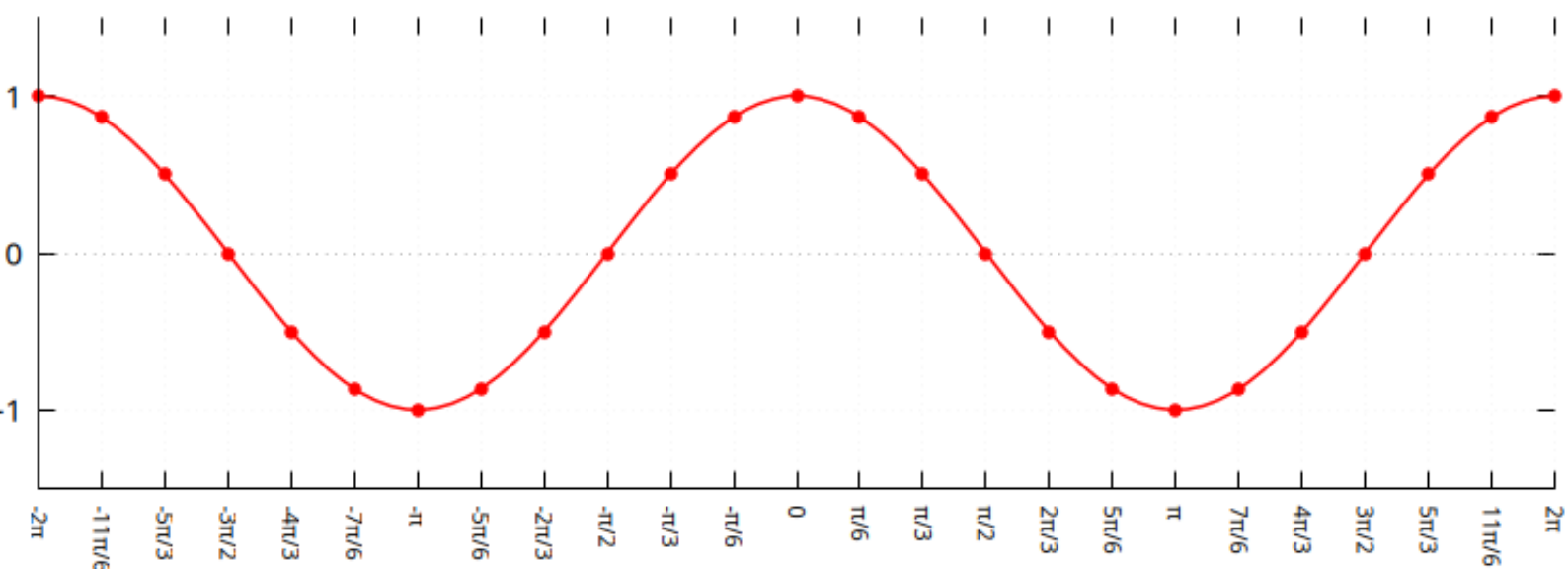
Part 4: Even and Odd Functions

Even Functions	Odd Functions
_____	_____
Rule: _____	Rule: _____

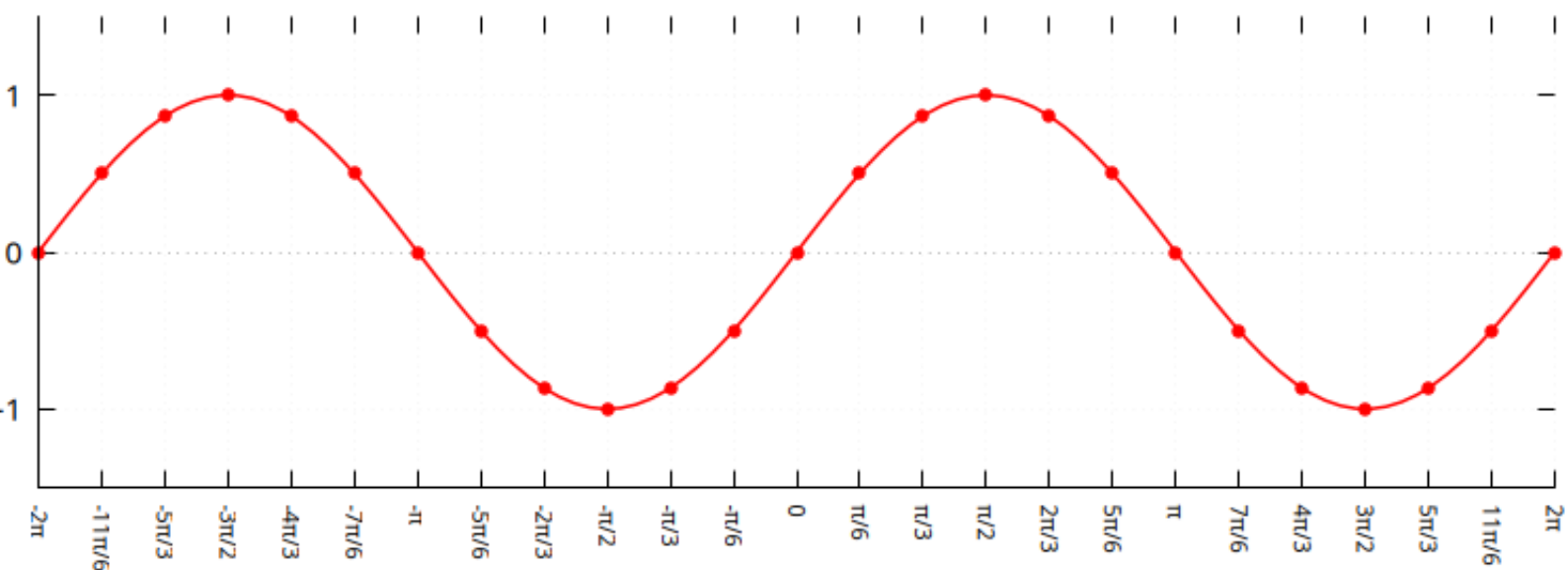


5.3 Transformations of Trig Functions Lesson

Example: $y = \cos(x)$ is an even function.



Example: $y = \sin(x)$ is an odd function.



$y = \tan(x)$ is also an odd function.

