

# TRIGONOMETRIC TRANSFORMATIONS

Reference Guide for Sine and Cosine Functions

$$y = a \sin(b(x - h)) + k$$

VARIABLE	TRANSFORMATION TYPE	GRAPHICAL EFFECT / DESCRIPTION
$ a $	Amplitude	Vertical stretch or compression. The distance from the midline to peak.
$-a$	Reflection	If negative, the graph reflects across the x-axis (midline).
$b$	Period Factor	Used to find Period: $P = 2\pi /  b $ . Horizontal stretch/compression.
$h$	Phase Shift	Horizontal shift. $(x - h)$ moves Right; $(x + h)$ moves Left.
$k$	Vertical Shift	Moves the graph Up (+) or Down (-). Defines the <b>Midline</b> ( $y = k$ ).

FEATURE	CALCULATION / FORMULA
<b>Domain</b>	All Real Numbers: $(-\infty, \infty)$
<b>Range</b>	$[k -  a , k +  a ]$
<b>Critical Point Interval</b>	Divide Period by 4 (Period / 4)

Student Name: \_\_\_\_\_ Date: \_\_\_\_\_