

## Transformations of Trigonometric Functions

General Equation for sine, cosine, and ~~tangent~~.

$$y = a \sin(b(x-c)) + d$$

$$y = a \cos(b(x-c)) + d$$

Transformations for each letter:

If  $a$  is negative: reflect over  $x$ -axis

$a$  = vertical stretch,  
change amplitude

If  $b$  is negative: doesn't happen in trig

$b$  = hor. stretch,  
change period

Formula for period of sine & cosine:  $\frac{2\pi}{b}$

Frequency of sine & cosine:  $\frac{b}{2\pi}$

~~Formula for period of tangent:~~

$c$  = translate  $\longleftrightarrow$ ,  
phase shift

$d$  = translate  $\updownarrow$ ,  
vertical shift

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General Equation for sine, cosine, and tangent.

Transformations for each letter:

If  $a$  is negative:

$a$  =

If  $b$  is negative:

$b$  =

Formula for period of sine & cosine:

Frequency of sine & cosine:

~~Formula for period of tangent:~~

$c$  =

$d$  =

