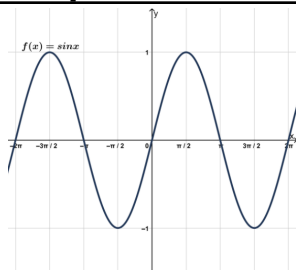
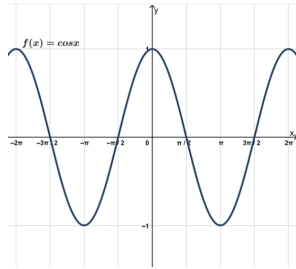
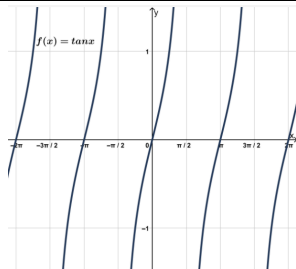
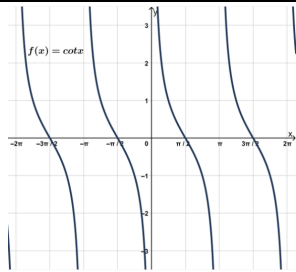
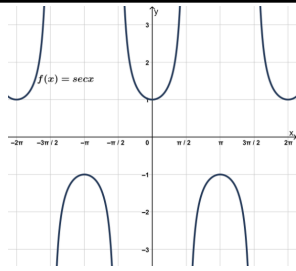
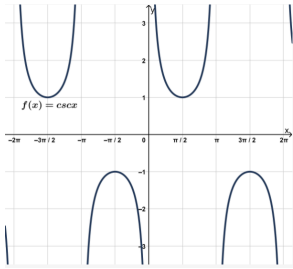


## Summary of Trigonometric Functions

Function	Properties	Graph
<p>Sine</p> $f(x) = \sin x$	<p>Domain: All Real numbers</p> <p>Range: <math>[-1, 1]</math></p> <p>x-Intercepts: <math>x = \pi n</math>, where <math>n</math> is an integer</p> <p>y-Intercept: <math>y = 0</math></p> <p>Asymptotes: None</p> <p>Symmetry: Symmetric about the origin, making it an odd function</p> <p>Periodic: Increases and decreases with oscillating behavior in periods of <math>2\pi</math></p> <p>Absolute maximum: 1</p> <p>Absolute minimum: <math>-1</math></p>	
<p>Cosine</p> $f(x) = \cos x$	<p>Domain: All Real numbers</p> <p>Range: <math>[-1, 1]</math></p> <p>x-Intercepts: <math>x = \frac{\pi}{2} + \pi n</math>, where <math>n</math> is an integer</p> <p>y-Intercept: <math>y = 1</math></p> <p>Asymptotes: None</p> <p>Symmetry: Symmetric about the y-axis, making it an even function</p> <p>Periodic: Increases and decreases with oscillating behavior in periods of <math>2\pi</math></p> <p>Absolute maximum: 1</p> <p>Absolute minimum: <math>-1</math></p>	
<p>Tangent</p> $f(x) = \tan x$	<p>Domain: All Real numbers such that <math>x \neq \frac{\pi}{2} + \pi n</math>, such that <math>n</math> is an integer</p> <p>Range: <math>(-\infty, \infty)</math></p> <p>x-Intercepts: <math>x = \pi n</math>, such that <math>n</math> is an integer</p>	

	<p>y-Intercept: <math>y = 0</math>  Asymptotes: Vertical asymptotes at <math>x = \frac{\pi}{2} \pm \pi n</math>, such that <math>n</math> is an integer  Symmetry: Symmetric about the origin, making it an odd function  Period: <math>\pi</math>  Extrema: None  Increasing/Decreasing: Increasing on entire domain</p>	
<p>Cotangent Function  <math>f(x) = \cot x</math></p>	<p>Domain: All Real numbers such that <math>x \neq \pi n</math>, such that <math>n</math> is an integer  Range: <math>(-\infty, \infty)</math>  x-Intercepts: <math>x = \frac{\pi}{2} + \pi n</math>, such that <math>n</math> is an integer  y-Intercept: None  Asymptotes: Vertical asymptotes at <math>x = \pi n</math>, such that <math>n</math> is an integer  Symmetry: Symmetric about the origin, making it an odd function  Period: <math>\pi</math></p>	
<p>Secant Function  <math>f(x) = \sec x</math></p>	<p>Domain: All Real numbers such that <math>x \neq \frac{\pi}{2} \pm \pi n</math>, such that <math>n</math> is an integer  Range: <math>(-\infty, -1] \cup [1, \infty)</math>  x-Intercept: None  y-Intercept: <math>y = 1</math></p>	

	<p>Asymptotes: Vertical asymptotes at <math>x = \frac{\pi}{2} \pm \pi n</math>, such that <math>n</math> is an integer</p> <p>Symmetry: Symmetric about the y-axis, making it an even function</p> <p>Period: <math>2\pi</math></p>	
<p>Cosecant Function</p> <p><math>f(x) = \csc x</math></p>	<p>Domain: All Real numbers such that <math>x \neq \pi n</math>, such that <math>n</math> is an integer</p> <p>Range: <math>(-\infty, -1] \cup [1, \infty)</math></p> <p>x-Intercept: None</p> <p>y-Intercept: None</p> <p>Asymptotes: Vertical asymptotes at <math>x = \pi n</math>, such that <math>n</math> is an integer</p> <p>Symmetry: Symmetric about the origin, making it an odd function</p> <p>Period: <math>2\pi</math></p>	

<p><b>Transformation of Sine and Cosine Functions</b></p> <p>Use the standard form of the equation <math>y = a\sin(bx - c) + d</math> or <math>y = a\cos(bx - c) + d</math>.</p> <p>amplitude = <math> a </math></p> <p>period = <math>\frac{2\pi}{ b }</math></p> <p>phase shift = <math>\frac{c}{b}</math></p>	<p><b>Transformation of Tangent Function</b></p> <p>Use the standard form of the equation <math>y = a\tan(bx - c) + d</math>.</p> <p>vertical stretch/shrink = <math>a</math></p> <p>period = <math>\frac{\pi}{ b }</math></p>
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vertical shift = $d$	$\text{phase shift} = \frac{c}{b}$ vertical shift = $d$
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