

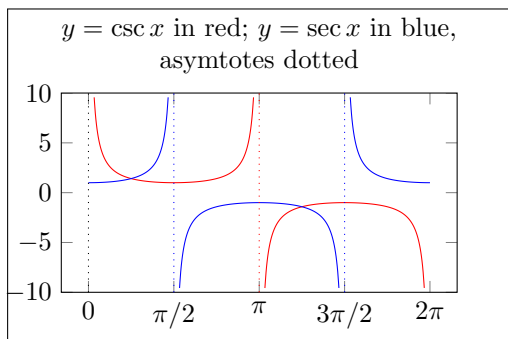
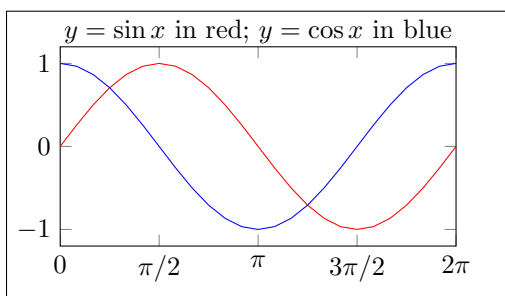
Square Roots $\sqrt{x^6} =  x^3 $ $\sqrt{x^8} = x^4$ $\sqrt{x^7} = x^3\sqrt{x}$	Absolute Value Inequalities $ x  < c \quad -c < x < c$ $ x  > c \quad x < -c \text{ or } c < x$	Distance Formula $A(x_1, y_2) \text{ and } B(x_2, y_2)$ $d(A, B) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$		Midpoint Formula $A(x_1, y_2) \text{ and } B(x_2, y_2)$ $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	
Equation of a Circle $(x-h)^2 + (y-k)^2 = r^2$	Point-Slope Form $y - y_1 = m(x - x_1)$	Standard Form $Ax + By + C = 0$	All Students Take Calculus I-All pos. II-sin III-tan IV-cos		Law of Cosines $a^2 = b^2 + c^2 - 2bc \cdot \cos A$
Joint Variation If $z$ is varies jointly as $x$ and $y$ , $z = kxy$	Perpendicular Lines $m_2 = -\frac{1}{m_1}$	Average Rate of Change $\text{ARoC} = \frac{y \text{ change}}{x \text{ change}} = \frac{f(x_2) - f(x_1)}{x_2 - x_1}$		Difference of Cubes $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$ $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$	
Standard Form of a Quadratic Function $f(x) = a(x - h)^2 + k$					
Vertical Shifts of Graphs Suppose $c > 0$ . Graph $y = f(x) + c$ by shifting $y = f(x)$ up $c$ . Graph $y = f(x) - c$ by shifting $y = f(x)$ down $c$ .			Horizontal Shifts of Graphs Suppose $c > 0$ . Graph $y = f(x - c)$ by shifting $y = f(x)$ right $c$ . Graph $y = f(x + c)$ by shifting $y = f(x)$ left $c$ .		
Reflecting Graphs Graph $y = -f(x)$ by reflecting $y = f(x)$ in the $x$ -axis. Graph $y = f(-x)$ by reflecting $y = f(x)$ in the $y$ -axis.			Vertical Stretching of Graphs To graph $y = cf(x)$ , graph $y = f(x)$ , then if $c > 1$ stretch vertically a by factor of $c$ if $0 < c < 1$ shrink vertically a by factor of $c$		
Horizontal Stretching of Graphs To graph $y = f(cx)$ , graph $y = f(x)$ , then if $c > 1$ shrink horizontally by a factor of $\frac{1}{c}$ if $0 < c < 1$ stretch horizontally by a factor of $\frac{1}{c}$			Inverse Variation If $y$ is inversly proportional to $x$ . $y = \frac{k}{x}$		
Even and Odd Functions if $f(-x) = f(x)$ $f(x)$ is even if $f(-x) = -f(x)$ $f(x)$ is odd			Heron's Formula $A = \sqrt{s(s-a)(s-b)(s-c)}$		
Min or Max of a Quadratic Function $f(x) = x(x - h)^2 + k \quad f(h) = k$ $f(x) = ax^2 + bx + c \quad f(-\frac{b}{2a})$		Change of Base $\log_b m = \frac{\log m}{\log b}$		Completing the Square With a quadratic in form $ax^2 + bx = c$ $(\frac{1}{2} \cdot b)^2 = c$	
Hidden quadratic 1 $x^{-3/2} + 2x^{-1/2} + x^{1/2}$ $x^{-3/2}(1 + 2x + x^2)$ $x^{-3/2}(1 + x)^2$		Hidden quadratic 2 $e^{2x} + 2e^x + 1$ $(e^x + 1)^2$			
Permutations $p(x, y) = \frac{x!}{(x - y)!}$		Choose Formula $C(x, y) = \binom{x}{y} = \frac{x!}{y!(x - y)!}$		Law of Sines $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$	
Degrees to Radians $\frac{A \cdot \pi}{180} = \theta$		Remainder Theorem If $P(x) \div (x - c)$ , the remainder = $P(c)$ .			
SOH-CAH-TOA $\sin = \frac{\text{opp}}{\text{hyp}} \quad \cos = \frac{\text{adj}}{\text{hyp}} \quad \tan = \frac{\text{opp}}{\text{adj}}$		Sector Area $A = \frac{1}{2}r^2\theta$		Direct Variation If $y$ is directly proportional to $x$ , $y = kx$	
Population Growth $n$ is population size, $r$ is relative growth rate, $t$ is time $n = n_0e^{rt}$		Area of $\Delta$ $A = ab \cdot \frac{1}{2} \sin C$			
Property of logs $(\log_a b)(\log_c d) = (\log_a d)(\log_c b)$					

<p style="text-align: center;"><b>Algebra of Functions</b></p> <p>Let <math>f</math> and <math>g</math> be functions with domains <math>A</math> and <math>B</math>.</p> <p><math>(f + g)(x) = f(x) + g(x)</math>    Domain <math>A \cap B</math></p> <p><math>(f - g)(x) = f(x) - g(x)</math>    Domain <math>A \cap B</math></p> <p><math>(fg)(x) = f(x)g(x)</math>    Domain <math>A \cap B</math></p> <p><math>\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}</math>    Domain <math>\{x \in A \cap B \mid g(x) \neq 0\}</math></p> <p><math>(f \circ g)(x) = f(g(x))</math>    Domain <math>\{x \in B \mid g(x) \in A\}</math></p>	<p style="text-align: center;"><b>Polynomial Synthetic Division</b></p> $(x^3 + x^2 - 1) \div (x + 2)$ <table style="margin-left: auto; margin-right: auto;"> <tr><td style="border-right: 1px solid black; padding: 5px 10px;">- 2</td><td style="padding: 5px 10px;">1</td><td style="padding: 5px 10px;">1</td><td style="padding: 5px 10px;">0</td><td style="padding: 5px 10px;">- 1</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px 10px;"></td><td style="padding: 5px 10px;"></td><td style="padding: 5px 10px;">- 2</td><td style="padding: 5px 10px;">2</td><td style="padding: 5px 10px;">- 4</td></tr> <tr><td style="border-right: 1px solid black; padding: 5px 10px;"></td><td style="padding: 5px 10px;">1</td><td style="padding: 5px 10px;">- 1</td><td style="padding: 5px 10px;">2</td><td style="padding: 5px 10px;">- 5</td></tr> </table>	- 2	1	1	0	- 1			- 2	2	- 4		1	- 1	2	- 5	<p style="text-align: center;"><b>Polynomial Long Division</b></p> $x^2 - x + 2$ <table style="margin-left: auto; margin-right: auto;"> <tr><td style="border-right: 1px solid black; padding: 5px 10px;"><math>x + 2</math></td><td style="padding: 5px 10px;"><math>x^3 + x^2 - 1</math></td></tr> <tr><td style="border-right: 1px solid black; padding: 5px 10px;"></td><td style="padding: 5px 10px;"><math>- x^3 - 2x^2</math></td></tr> <tr><td style="border-right: 1px solid black; padding: 5px 10px;"></td><td style="padding: 5px 10px;"><math>- x^2</math></td></tr> <tr><td style="border-right: 1px solid black; padding: 5px 10px;"></td><td style="padding: 5px 10px;"><math>x^2 + 2x</math></td></tr> <tr><td style="border-right: 1px solid black; padding: 5px 10px;"></td><td style="padding: 5px 10px;"><math>2x - 1</math></td></tr> </table>	$x + 2$	$x^3 + x^2 - 1$		$- x^3 - 2x^2$		$- x^2$		$x^2 + 2x$		$2x - 1$
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<p style="text-align: center;"><b>Rational Roots Theorem</b></p> <p><math>2x^3 + 2x^2 - 3x - 6</math></p> <p><math>\pm 1, \pm 2 \quad \pm 1, \pm 2, \pm 3, \pm 6</math></p> <p>Possible rational roots:</p> <p><math>\pm 1, \pm \frac{1}{2}, \pm 2, \pm 3, \pm \frac{3}{2}, \pm 6</math></p>	<p style="text-align: center;"><b>Decartes' Rule of Signs</b></p> <p>Count num. of sign changes</p> <p><math>P(x) = 3x^6 + 4x^5 + 3x^3 - x - 3</math></p> <p>1 positive real root</p> <p><math>P(-x) = 3x^6 - 4x^5 - 3x^3 + x - 3</math></p> <p>1 or 3 negative real roots</p>	<p style="text-align: center;"><b>Logarithm Formulas</b></p> <p><math>\log(m \cdot n) = \log m + \log n</math></p> <p><math>\log\left(\frac{m}{n}\right) = \log m - \log n</math></p> <p><math>\log(m^n) = n \cdot \log m</math></p> <p><math>\log_b b^x = x = b^{\log_b x}</math></p>	<p style="text-align: center;"><b>Other trig stuff</b></p> <p><math>\cot = \frac{1}{\tan}</math></p> <p><math>\csc = \frac{1}{\sin}</math></p> <p><math>\sec = \frac{1}{\cos}</math></p>
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<p style="text-align: center;"><b>Horizontal Asymptotes</b></p> <p><math>y = \frac{2x^2 - 4x + 5}{x^2 - 2x + 1}</math>    Original Equation</p> <p><math>= \frac{2x^2}{x^2}</math>    <math>x \rightarrow \infty</math>, other terms <math>\rightarrow</math> tiny</p> <p><math>= 2</math>    Cancel, horizontal asymptote</p>	<p style="text-align: center;"><b>Slant Asymptotes</b></p> <p><math>y = \frac{x^2 - 4x - 5}{x - 3}</math>    Original Equation</p> <p><math>= x - 1 - \frac{8}{x - 3}</math>    Divide</p> <p><math>= x - 1</math>    <math>x \rightarrow \infty</math>, other terms <math>\rightarrow</math> tiny</p>
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<p style="text-align: center;"><b>Vertical Asymptotes</b></p> <p><math>y = \frac{2x^2 - 4x + 5}{x^2 - 2x + 1}</math>    Original Equation</p> <p><math>= \frac{2x^2 - 4x + 5}{(2x - 1)(x + 2)}</math>    Factor demoniator</p> <p><math>x = \frac{1}{2}</math> or <math>x = -2</math>    Impossible</p>	<p style="text-align: center;"><b>End Behavior</b></p> <table style="width: 100%; text-align: center;"> <tr> <td><math>y = x^n</math></td> <td><math>y = -x^n</math></td> </tr> <tr> <td><math>n</math> is even</td> <td><math>n</math> is even</td> </tr> <tr> <td><math>y = x^n</math></td> <td><math>y = -x^n</math></td> </tr> <tr> <td><math>n</math> is odd</td> <td><math>n</math> is odd</td> </tr> </table>	$y = x^n$	$y = -x^n$	$n$ is even	$n$ is even	$y = x^n$	$y = -x^n$	$n$ is odd	$n$ is odd	<p style="text-align: center;"><b>Trig Identities</b></p> <p><math>\sin^2 + \cos^2 = 1</math></p> <p><math>\tan^2 + 1 = \sec^2</math></p> <p><math>1 + \cot^2 = \csc^2</math></p>
$y = x^n$	$y = -x^n$									
$n$ is even	$n$ is even									
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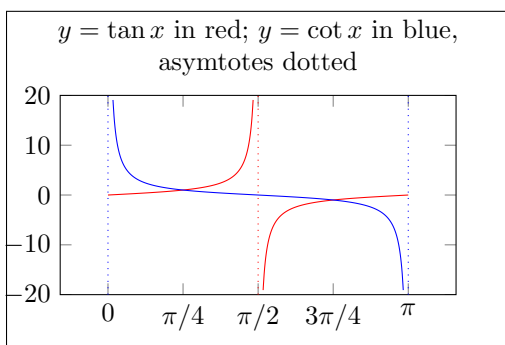


**sin/cos/csc/sec Graph Properties**

If in form:

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

amplitude  $|a|$ , period  $2\pi/k$ , phase shift  $b$



**tan/cot Graph Properties**

If in form:

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

amplitude  $|a|$ , period  $\pi/k$ , phase shift  $b$