

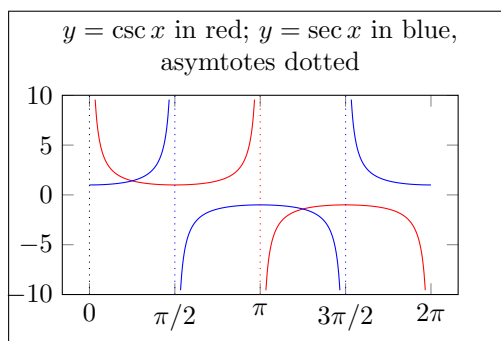
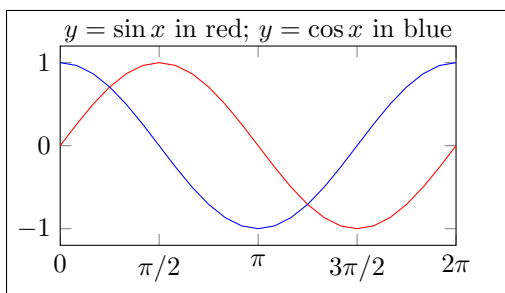
<b>Square Roots</b> $\sqrt{x^6} =  x^3 $ $\sqrt{x^8} = x^4$ $\sqrt{x^7} = x^3\sqrt{x}$	<b>Absolute Value Inequalities</b> $ x  < c \quad -c < x < c$ $ x  > c \quad x < -c \text{ or } c < x$	<b>Distance Formula</b> $A(x_1, y_2) \text{ and } B(x_2, y_2)$ $d(A, B) = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$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

<p>Algebra of Functions</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>Polynomial Synthetic Division</p> $(x^3 + x^2 - 1) \div (x + 2)$ $\begin{array}{r rrrr} -2 & 1 & 1 & 0 & -1 \\ & & -2 & 2 & -4 \\ \hline & 1 & -1 & 2 & -5 \end{array}$ <p>Result is <math>x^2 - x + 2 - \frac{5}{x+2}</math></p>	<p>Polynomial Long Division</p> $\begin{array}{r} x^2 - x + 2 \\ x+2 \overline{) x^3 + x^2 - 1} \\ \underline{-x^3 - 2x^2} \phantom{-1} \\ -x^2 \phantom{-1} \\ \underline{x^2 + 2x} \phantom{-1} \\ 2x - 1 \end{array}$
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<p>Rational Roots Theorem</p> $2x^3 + 2x^2 - 3x - 6$ <p><math>\pm 1, \pm 2 \quad \pm 1, \pm 2, \pm 3, \pm 6</math></p> <p>Possible rational roots:</p> $\pm 1, \pm \frac{1}{2}, \pm 2, \pm 3, \pm \frac{3}{2}, \pm 6$	<p>Decartes' Rule of Signs</p> <p>Count num. of sign changes</p> $P(x) = 3x^6 + 4x^5 + 3x^3 - x - 3$ <p>1 positive real root</p> $P(-x) = 3x^6 - 4x^5 - 3x^3 + x - 3$ <p>1 or 3 negative real roots</p>	<p>Logarithm Formulas</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>Other trig stuff</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>Horizontal Asymptotes</p> <p>When degree of numerator is more than one greater than degree of denominator</p> $y = \frac{2x^2 - 4x + 5}{x^2 - 2x + 1}$ Original Equation $= \frac{2x^2}{x^2}$ $x \rightarrow \infty$ , other terms $\rightarrow$ tiny $= 2$ Cancel, horizontal asymptote <p>If degree of denominator is greater, 0</p>	<p>Slant Asymptotes</p> <p>When degree of numerator is one greater than degree of denominator</p> $y = \frac{x^2 - 4x - 5}{x - 3}$ Original Equation $= x - 1 - \frac{8}{x - 3}$ Divide $= x - 1$ $x \rightarrow \infty$ , other terms $\rightarrow$ tiny
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<p>Vertical Asymptotes</p> $y = \frac{2x^2 - 4x + 5}{x^2 - 2x + 1}$ Original Equation $= \frac{2x^2 - 4x + 5}{(2x - 1)(x + 2)}$ Factor demoniator $x = \frac{1}{2}$ or $x = -2$ Impossible	<p>End Behavior</p> <p><math>y = x^n</math> <math>n</math> is even</p> <p><math>y = x^n</math> <math>n</math> is odd</p> <p><math>y = -x^n</math> <math>n</math> is even</p> <p><math>y = -x^n</math> <math>n</math> is odd</p>	<p>Trig Identities</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>
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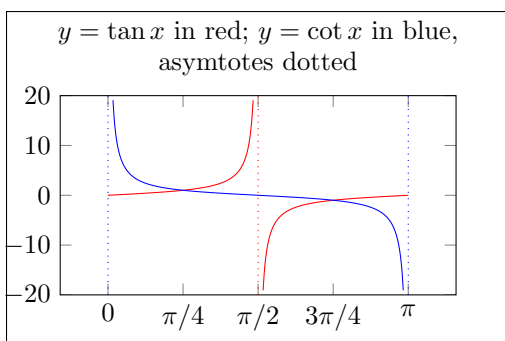


sin/cos/csc/sec Graph Properties

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  $b$