

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 $\text{ARoC} = \frac{\text{y change}}{\text{x change}} = \frac{f(x_2) - f(x_1)}{x_2 - x_1}$		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 $(\log_a b)(\log_c d) = (\log_a d)(\log_c b)$					

Algebra of Functions		Polynomial Synthetic Division		Polynomial Long Division	
Let $f$ and $g$ be functions with domains $A$ and $B$ .		$(x^3 + x^2 - 1) \div (x + 2)$		$x^2 - x + 2$	
$(f + g)(x) = f(x) + g(x)$	Domain $A \cap B$	$-2 \begin{array}{rrrr} 1 & 1 & 0 & -1 \\ & -2 & 2 & -4 \\ \hline 1 & -1 & 2 & -5 \end{array}$		$x + 2 \overline{) \begin{array}{rrr} x^3 & + x^2 & - 1 \\ -x^3 & - 2x^2 & \\ \hline & -x^2 & \\ & x^2 & + 2x \\ \hline & & 2x & - 1 \end{array}}$	
$(f - g)(x) = f(x) - g(x)$	Domain $A \cap B$				
$(fg)(x) = f(x)g(x)$	Domain $A \cap B$				
$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$	Domain $\{x \in A \cap B \mid g(x) \neq 0\}$				
$(f \circ g)(x) = f(g(x))$	Domain $\{x \in B \mid g(x) \in A\}$				

Rational Roots Theorem		Decartes' Rule of Signs		Logarithm Formulas	
$2x^3 + 2x^2 - 3x - 6$		Count num. of sign changes		$\log(m \cdot n) = \log m + \log n$	
$\pm 1, \pm 2 \qquad \pm 1, \pm 2, \pm 3, \pm 6$		$P(x) = 3x^6 + 4x^5 + 3x^3 - x - 3$		$\log\left(\frac{m}{n}\right) = \log m - \log n$	
Possible rational roots:		1 positive real root		$\log(m^n) = n \cdot \log m$	
$\pm 1, \pm \frac{1}{2}, \pm 2, \pm 3, \pm \frac{3}{2}, \pm 6$		$P(-x) = 3x^6 - 4x^5 - 3x^3 + x - 3$		$\log_b b^x = x = b^{\log_b x}$	
		1 or 3 negative real roots			

Horizontal Asymptotes		Slant Asymptotes	
$y = \frac{2x^2 - 4x + 5}{x^2 - 2x + 1}$	Original Equation	$y = \frac{x^2 - 4x - 5}{x - 3}$	Original Equation
$= \frac{2x^2}{x^2}$	$x \rightarrow \infty$ , other terms $\rightarrow$ tiny	$= x - 1 - \frac{8}{x - 3}$	Divide
$= 2$	Cancel, horizontal asymptote	$= x - 1$	$x \rightarrow \infty$ , other terms $\rightarrow$ tiny

Vertical Asymptotes		End Behavior		Trig Identities	
$y = \frac{2x^2 - 4x + 5}{x^2 - 2x + 1}$	Original Equation	$y = x^n$ $y = -x^n$		$\sin^2 + \cos^2 = 1$	
$= \frac{2x^2 - 4x + 5}{(2x - 1)(x + 2)}$	Factor demoniator	$n$ is even $n$ is even		$\tan^2 + 1 = \sec^2$	
$x = \frac{1}{2}$ or $x = -2$	Impossible	$n$ is odd $n$ is odd		$1 + \cot^2 = \csc^2$	