

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 Δ $A = ab \cdot \frac{1}{2} \sin C$					
Property of logs $(\log_a b)(\log_c d) = (\log_a d)(\log_c b)$					

<p style="text-align: center;">Algebra of Functions</p> <p>Let f and g be functions with domains A and B.</p> <p>$(f + g)(x) = f(x) + g(x)$ Domain $A \cap B$</p> <p>$(f - g)(x) = f(x) - g(x)$ Domain $A \cap B$</p> <p>$(fg)(x) = f(x)g(x)$ Domain $A \cap B$</p> <p>$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$ Domain $\{x \in A \cap B \mid g(x) \neq 0\}$</p> <p>$(f \circ g)(x) = f(g(x))$ Domain $\{x \in B \mid g(x) \in A\}$</p>	<p style="text-align: center;">Polynomial Synthetic Division</p> <p>$(x^3 + x^2 - 1) \div (x + 2)$</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 0 10px;">- 2</td> <td style="border-left: 1px solid black; padding: 0 10px;">1</td> <td style="padding: 0 10px;">1</td> <td style="padding: 0 10px;">0</td> <td style="padding: 0 10px;">- 1</td> </tr> <tr> <td></td> <td style="border-left: 1px solid black;"></td> <td style="padding: 0 10px;">- 2</td> <td style="padding: 0 10px;">2</td> <td style="padding: 0 10px;">- 4</td> </tr> <tr> <td></td> <td style="border-left: 1px solid black; border-top: 1px solid black;"></td> <td style="border-top: 1px solid black; padding: 0 10px;">1</td> <td style="border-top: 1px solid black; padding: 0 10px;">- 1</td> <td style="border-top: 1px solid black; padding: 0 10px;">2 - 5</td> </tr> </table>	- 2	1	1	0	- 1			- 2	2	- 4			1	- 1	2 - 5	<p style="text-align: center;">Polynomial Long Division</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: right;">x^2</td> <td style="text-align: right;">$- x + 2$</td> <td></td> </tr> <tr> <td style="padding-right: 10px;">$x + 2$)</td> <td style="text-align: right;">x^3</td> <td style="text-align: right;">$+ x^2$</td> <td style="text-align: right;">$- 1$</td> </tr> <tr> <td></td> <td style="text-align: right;">$- x^3$</td> <td style="text-align: right;">$- 2x^2$</td> <td></td> </tr> <tr> <td></td> <td style="border-top: 1px solid black;"></td> <td style="text-align: right;">$- x^2$</td> <td></td> </tr> <tr> <td></td> <td></td> <td style="text-align: right;">$x^2 + 2x$</td> <td></td> </tr> <tr> <td></td> <td></td> <td style="border-top: 1px solid black;"></td> <td style="text-align: right;">$2x - 1$</td> </tr> </table>		x^2	$- x + 2$		$x + 2$)	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;">Rational Roots Theorem</p> <p>$2x^3 + 2x^2 - 3x - 6$</p> <p>$\pm 1, \pm 2$ $\pm 1, \pm 2, \pm 3, \pm 6$</p> <p>Possible rational roots:</p> <p>$\pm 1, \pm \frac{1}{2}, \pm 2, \pm 3, \pm \frac{3}{2}, \pm 6$</p>	<p style="text-align: center;">Decartes' Rule of Signs</p> <p>Count num. of sign changes</p> <p>$P(x) = 3x^6 + 4x^5 + 3x^3 - x - 3$</p> <p>1 positive real root</p> <p>$P(-x) = 3x^6 - 4x^5 - 3x^3 + x - 3$</p> <p>1 or 3 negative real roots</p>	<p style="text-align: center;">Logarithm Formulas</p> <p>$\log(m \cdot n) = \log m + \log n$</p> <p>$\log\left(\frac{m}{n}\right) = \log m - \log n$</p> <p>$\log(m^n) = n \cdot \log m$</p> <p>$\log_b b^x = x = b^{\log_b x}$</p>	<p style="text-align: center;">Other trig stuff</p> <p>$\cot = \frac{1}{\tan}$</p> <p>$\csc = \frac{1}{\sin}$</p> <p>$\sec = \frac{1}{\cos}$</p>
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<p style="text-align: center;">Horizontal Asymptotes</p> <p>$y = \frac{2x^2 - 4x + 5}{x^2 - 2x + 1}$ Original Equation</p> <p>$= \frac{2x^2}{x^2}$ $x \rightarrow \infty$, other terms \rightarrow tiny</p> <p>$= 2$ Cancel, horizontal asymptote</p>	<p style="text-align: center;">Slant Asymptotes</p> <p>$y = \frac{x^2 - 4x - 5}{x - 3}$ Original Equation</p> <p>$= x - 1 - \frac{8}{x - 3}$ Divide</p> <p>$= x - 1$ $x \rightarrow \infty$, other terms \rightarrow tiny</p>
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<p style="text-align: center;">Vertical Asymptotes</p> <p>$y = \frac{2x^2 - 4x + 5}{x^2 - 2x + 1}$ Original Equation</p> <p>$= \frac{2x^2 - 4x + 5}{(2x - 1)(x + 2)}$ Factor demoniator</p> <p>$x = \frac{1}{2}$ or $x = -2$ Impossible</p>	<p style="text-align: center;">End Behavior</p> <table style="width: 100%; text-align: center;"> <tr> <td style="width: 50%;"> $y = x^n$ n is even $y = x^n$ n is odd </td> <td style="width: 50%;"> $y = -x^n$ n is even $y = -x^n$ n is odd </td> </tr> </table>	$y = x^n$ n is even $y = x^n$ n is odd	$y = -x^n$ n is even $y = -x^n$ n is odd	<p style="text-align: center;">Trig Identities</p> <p>$\sin^2 + \cos^2 = 1$</p> <p>$\tan^2 + 1 = \sec^2$</p> <p>$1 + \cot^2 = \csc^2$</p>
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