Square Roots			Midnei	nt Formula
$\sqrt{r^6} = r^3 Ab$	solute Value Inequalities	Distance Formula	$ A(x_1, y_2) $	and $B(x_2, y_2)$
$ \sqrt{8} x^4 $	< c -c < x < c	$A(x_1, y_2)$ and $B(x_2, y_2)$		
$\left \begin{array}{c} \sqrt{x^8} = x^4 \\ \sqrt{x^7} = x^3 \sqrt{x} \end{array} \right \left \begin{array}{c} x < c < x < c \\ x > c & x < -c \text{ or } c < x \end{array} \right \left \begin{array}{c} 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} \end{array} \right \left \begin{array}{c} \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) \\ \end{array} \right $				
Equation of a Circle $(x-h)^2+(y-k)^2=r$	Point-Slope Form $y-y_1 = m(x-x_1)$ Standard $Ax+By+$		s Take Calculus sin III–tan IV–cos	Law of Cosines $a^2 = b^2 + c^2 - 2bc \cdot \cos A$
1 7	rpendicular Lines $a_2 = -\frac{1}{m_1}$ Average Rate ARoC = $\frac{y \text{ change}}{x \text{ change}}$	e of Change $= \frac{f(x_2) - f(x_1)}{x_2 - x_1} \begin{bmatrix} a^3 + a^3 - $	Difference of Cubes $b^{3} = (a+b)(a^{2}-ab+a^{2})$ $b^{3} = (a-b)(a^{2}+ab+a^{2})$	Standard Form of a Quadratic Function $f(x) = a(x-h)^2 + k$
Vertical Shifts of Graphs Horizonal Shifts of Graphs Definition Arc				
Suppose $c > 0$. Suppose $c > 0$.				
Graph $y = f(x) + c$ by shifting $y = f(x)$ up c. Graph $y = f(x - c)$ by shifting $y = f(x)$ right c. If $x = y$, $y = y = c$				
Graph $y = f(x) - c$ by shifting $y = f(x)$ down c . Graph $y = f(x + c)$ by shifting $y = f(x)$ left c . $\log_a y = x$				
Reflecting Graphs To graph $y = cf(x)$, graph $y = f(x)$, then Vertical Stretching of Graphs Variation				
Graph $y = -f(x)$ by reflecting $y = f(x)$ in the x-axis. $ $ if $c > 1$ strech vertically a by factor of $c = 1$. If y is inversible $f(x) = 1$ is the factor of $f(x) = 1$.				
Graph $y = f(-x)$ by reflecting $y = f(x)$ in the y-axis. if $0 < c < 1$ shrink vertically a by factor of c $y = \frac{k}{x}$				
Horizontal Stretching of Graphs				
To graph $y = f(x)$, graph $y = f(x)$, then if $f(-x) = f(x)$ is even Heron's Formula				
if $c>1$ shrink horizontally by a factor of $\frac{1}{c}$ if $f(-x)=-f(x)$ $f(x)$ is odd $A=\sqrt{s(s-a)(s-b)(s-c)}$				
if $0 < c < 1$ stretch horizontally by a factor of $\frac{1}{c}$				
Min or Max of a	a Quadratic Change of		Hidden quadratic 1	Hidden
$f(m) = m(m-h)^2 + h + f(h) = h$ Some With a quadratic in $-3/2(1+2+2)$ $2\pi + 2\pi + 1$				quadratic 2
$ f(x) = x(x-h)^2 + k f(h) = k \\ f(x) = ax^2 + bx + c f(-\frac{b}{2a}) $ $ \log_b m = \frac{\log m}{\log b} $ $ \log_b m = \frac{\log m}{\log b} $ $ \frac{\text{With a quadratic in form } ax^2 + bx = c}{(\frac{1}{2} \cdot b)^2 = c} $ $ \frac{x^{-3/2}(1 + 2x + x^2)}{x^{-3/2}(1 + x)^2} $ $ \frac{e^{2x} + 2e^x + 1}{(e^x + 1)^2} $				
Permutations	Choose Formula	Law of Sines	Degrees to Radia	
$p(x,y) = \frac{x!}{(x-y)!}$	$C(x,y) = {x \choose y} = \frac{x!}{y!(x-y)!}$	$\frac{\sin A}{dt} = \frac{\sin B}{dt} = \frac{\sin C}{dt}$	$\frac{A \cdot \pi}{1} = \theta$	If $P(x) \div (x-c)$, the
(x-y)!	$C(x,y) = \left(y\right) = \frac{1}{y!(x-y)!}$	a b c	180	remainder = $P(c)$.

Direct

Variation
If y is directly proportional to x, y = kx

1

Sector Area $A = \frac{1}{2}r^2\theta$

 $\frac{\mathrm{opp}}{\mathrm{adj}}$

tan =

 $\frac{\text{SOH-CAH-TOA}}{\frac{\text{opp}}{\text{hyp}}} \quad \cos = \frac{\text{adj}}{\text{hyp}} \quad \text{ta}$

Property of logs $(\log_a b)(\log_c d) = (\log_a d)(\log_c b)$

 $\sin =$

Population Growth n is population size, r is relative growth rate, t is time $n = n_0 e^{rt}$

Algebra of Functions

Let f and g be functions with domains A and B.

$$(f+g)(x) = f(x) + g(x)$$

 $(f-g)(x) = f(x) - g(x)$

Domain $A \cap B$

$$(f-g)(x) = f(x) - g(x)$$

Domain $A \cap B$

$$(f-g)(x) = f(x) - g(x)$$
$$(fg)(x) = f(x)g(x)$$

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 $\{x \in B \mid g(x) \in A\}$

Polynomial Synthetic Division

$$\begin{array}{c|cccc}
(x^3 + x^2 - 1) \div (x + 2) \\
-2 & 1 & 1 & 0 & -1 \\
& & -2 & 2 & -4
\end{array}$$

Polynomial Long Division
$$x^2 - x + 2$$

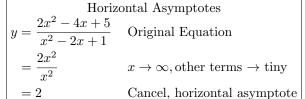
$$\begin{array}{r}
x^{2} - x + 2 \\
x + 2) \overline{\smash{\big)}\ x^{3} + x^{2} - 1} \\
\underline{-x^{3} - 2x^{2}} \\
\underline{-x^{2}} \\
\underline{x^{2} + 2x} \\
\underline{-x^{2} + 2x}
\end{array}$$

Rational Roots Theorem
$$2x^3 + 2x^2 - 3x - 6$$

 $\pm 1, \pm 2$ $\pm 1, \pm 2, \pm 3, \pm 6$
Possible rational roots: $\pm 1, \pm \frac{1}{2}, \pm 2, \pm 3, \pm \frac{3}{2}, \pm 6$

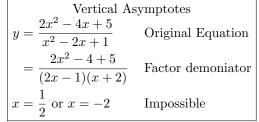
Decartes' Rule of Signs
Count num. of sign changes
$$P(x) = 3x^6 + 4x^5 + 3x^3 - x - 3$$
1 positive real root
$$P(-x) = 3x^6 - 4x^5 - 3x^3 + x - 3$$
1 or 3 negative real roots

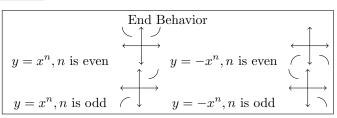
Logarithm Formulas
$$\log(m \cdot n) = \log m + \log n$$
$$\log\left(\frac{m}{n}\right) = \log m - \log n$$
$$\log(m^n) = n \cdot \log m$$
$$\log_b b^x = x = b^{\log_b x}$$



Slant Asymptotes
$$y = \frac{x^2 - 4x - 5}{x - 3}$$
 Original Equation
$$= x - 1 - \frac{8}{x - 3}$$
 Divide
$$= x - 1$$

$$x \to \infty, \text{ other terms} \to \text{tiny}$$





Trig Identities

$$\sin^2 + \cos^2 = 1$$

$$\tan^2 + 1 = \sec^2$$

$$1 + \cot^2 = \csc^2$$