Constant Function (zeroth degree):

$y = k$
$(0,k)$ is the y-intercept

Linear Function (first degree):

$y = ax + k$
a is the slope, $(0,k)$ is the y-intercept

Quadratic Function (second degree):

$y = ax^2 + bx + c$ ..... General Form
$y = a(x - x_1)(x - x_2)$ .... X-intercept Form
$y = a\big(b(x - h)\big)^2 + k$ ..... Standard Form

(h,k) is the Vertex

Absolute Value Function:

$y = a|b(x - h)| + k$ ..... Standard Form

(h,k) is the Vertex

Greatest Integer Function:

$y = a[b(x - h)] + k$ ..... Standard Form

(h,k) is a solid point

$L = \dfrac{1}{|b|}$ ..... Step length

If b > 0 then the step is open on the right, closed on the left
If b < 0 then the step is closed on the right, open on the left

$D = |a|$ ..... Vertical distance between steps

$m = ab$ ..... Slope of the graph

Rational Function:

$y = \frac{a}{b(x-h)} + k$ ..... Standard Form

$x = h, y = k$ ..... Asymptotes

Square-Root Function:

$y = a\sqrt{b(x-h)} + k$ ..... Standard Form

(h,k) is the Vertex
$b(x-h) \geq 0$ is the Domain

Quadratic Functions

$y = ax^2 + bx + c$	General Form
$\Delta = b^2 - 4ac$	Discriminant
$x = \frac{-b \pm \sqrt{\Delta}}{2a}$	Quadratic Formula
$V\left(\frac{-b}{2a}, \frac{-\Delta}{4a}\right)$	Vertex formula
$(0, c)$	Y-intercept
$x = \frac{-b}{2a}$	Axis of Symmetry
$y = a(x - x_1)(x - x_2)$ Where x_1 and x_2 are the x-intercepts of the graph.	X-intercept form
$y = a(x - h)^2 + k$	Standard Equation
$V(h, k)$	

Exponential Functions

$$f(x) = ac^{b(x-h)} + k$$

Asymptote: y = k

Logarithmic Functions

$$f(x) = a\log_c b(x-h) + k$$

Asymptote: x = h

Logarithmic Laws

1. $\log_c c = 1$
2. $\log_c 1 = 0$
3. $\log_c c^n = n$
4. $\log_c M + \log_c N = \log_c (M \times N)$
5. $\log_c M - \log_c N = \log_c \left(\frac{M}{N}\right)$
6. $\log_c M^n = n \log_c M$
7. $\log_{1/c} M = -\log_c M$
8. $\log_c M = \frac{\log M}{\log c}$

Exponential Expression to Logarithmic Expression

$y = a^x \leftrightarrow \log_a y = x$

Theorems

$if\ c^x = c^y, then\ x = y$

$if\ a^x = b^y, then\ \log a^x = \log b^y$

Exponential Growth and Decay

$$A(t) = A_o(1 + \frac{r}{k})^{kt}$$

A(t) = Amount after t time

A_o = Initial Amount

r = Rate, expressed as a decimal

k = Compounding Constant

$$A(t) = ac^{kt}$$

a = initial amount

c = rate of change

k = rate constant

A(t) = amount after t time

Exponents and Radicals

Laws of Exponents

1. $a^m \times a^n = a^{(m+n)}$
2. $\frac{a^m}{a^n} = a^{(m-n)}$
3. $a^{-n} = \frac{1}{a^n}$
4. $a^0 = 1$
5. $\left(a^n\right)^m = a^{n \times m}$
6. $(abc)^n = a^n b^n c^n$
7. $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

Radicals to Exponents

$\sqrt[n]{a^m} = a^{\frac{m}{n}}$

Laws of Radicals

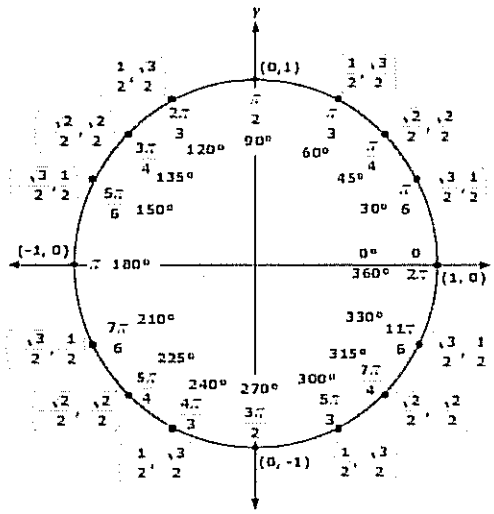
1. $\sqrt{a \times b} = \sqrt{a} \times \sqrt{b}$
2. $r\sqrt{a} \times s\sqrt{b} = (r \times s)\sqrt{a \times b}$
3. $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$
4. $\frac{r\sqrt{a}}{s\sqrt{b}} = \frac{r}{s}\sqrt{\frac{a}{b}}$
5. $r\sqrt{a} + s\sqrt{a} = (r + s)\sqrt{a}$

TRIGONOMETRY

Degrees and Radians

$$180^\circ = \pi$$

The Unit Circle



$$P(\theta) = (\cos\theta, \sin\theta)$$

Trigonometric Functions

$$F(x) = a \sin b(x - h) + k$$
OR
$$F(x) = a \cos b(x - h) + k$$

Amplitude: $A = |a|$

Period: $p = \dfrac{2\pi}{|b|}$

Phase Shift: $D = h$

Central Axis: $y = k$

Trigonometric Identities

$$\sin x = \frac{1}{\csc x} \qquad \sec x = \frac{1}{\cos x}$$
$$\cos x = \frac{1}{\sec x} \qquad \csc x = \frac{1}{\sin x}$$
$$\tan x = \frac{1}{\cot x} \qquad \cot x = \frac{1}{\tan x}$$
$$\tan x = \frac{\sin x}{\cos x} \qquad \cot x = \frac{\cos x}{\sin x}$$

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

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

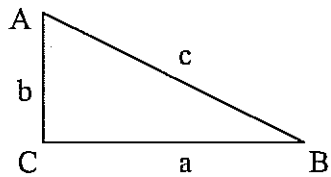
$$1 + \cot^2 x = \csc^2 x$$

$$\sin(A + B) = \sin A \cos B + \sin B \cos A$$
$$\sin(A - B) = \sin A \cos B - \sin B \cos A$$
$$\sin(2A) = 2 \sin A \cos A$$

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$
$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$
$$\cos(2A) = \cos^2 A - \sin^2 A$$

$$\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$
$$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$
$$\tan(2A) = \frac{2 \tan A}{1 - \tan^2 A}$$

Trigonometric Ratios



$$\sin B = \frac{opp}{hyp} = \frac{b}{c} \qquad \sec B = \frac{hyp}{adj} = \frac{c}{a}$$
$$\cos B = \frac{adj}{hyp} = \frac{a}{c} \qquad \csc B = \frac{hyp}{opp} = \frac{c}{b}$$
$$\tan B = \frac{opp}{adj} = \frac{b}{a} \qquad \cot B = \frac{adj}{opp} = \frac{a}{b}$$