Algebra 2 Reference Sheet

Quadratic Functions

Standard Form: $y = ax^2 + bx + c$

Axis of symmetry: $\frac{-b}{2a}$

Vertex Form: $y = a(x-h)^2 + k$

Vertex: (h, k)

Axis of symmetry: $x = h$

Quadratic Formula when $ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Complex Number

$a + bi$ where a and b are real numbers and $i = \sqrt{-1}$

Composition of Functions

$(f \circ g)x = f(g(x))$

$(g \circ f)x = g(f(x))$

Exponential Function

$y = a(b)^x$, $a \neq 0$, $b > 0$, $b \neq 1$

Definition of Logarithmic Function

$\log_a x = y$ is the same as $x = a^y$

Change of Base Rule

$$\log_a x = \frac{\log x}{\log a} \quad \log_a x = \frac{ln\, x}{ln\, a}$$

Properties of Logarithms

Product Property: $\log_b xy = \log_b x + \log_b y$

Quotient Property: $\log_b \frac{x}{y} = \log_b x - \log_b y$

Power Property: $\log_b x^r = r \log_b x$

Special Properties

$\log_b 1 = 0$ because $b^0 = 1$

$\log_b b = 1$ because $b^1 = b$

$\log_b b^x = x$ and $b^{\log_b x} = x$

Exponents

$$a^{\frac{p}{q}} = \sqrt[q]{a^p} = \left(\sqrt[q]{a}\right)^p$$

$$a^{-n} = \frac{1}{a^n} = \left(\frac{1}{a}\right)^n$$

Factorial

$n! = n(n-1)(n-2).....3 \cdot 2 \cdot 1$

Permutation

$${}_nP_r = P(n, r) = \frac{n!}{(n-r)!}$$

Combination

$${}_nC_r = C(n, r) = \binom{n}{r} = \frac{n!}{r!(n-r)!}$$

Sine and Cosine Functions

$y = a \sin b(x-h) + k$ $\qquad$ $y = a \cos b(x-h) + k$

Amplitude $= |a|$ $\qquad$ Phase Shift $= h$

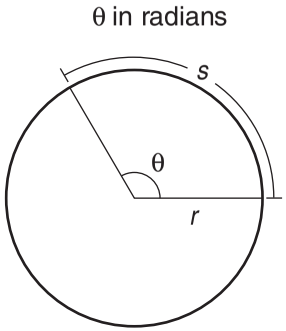
Period $= \frac{2\pi}{|b|}$ $\qquad$ Vertical Shift $= k$

$\sin \theta = \frac{opp}{hyp}$ $\quad$ $\cos \theta = \frac{adj}{hyp}$ $\quad$ $\tan \theta = \frac{opp}{adj}$

To rewrite a degree measure in radians, multiply by $\left(\frac{\pi \text{ radians}}{180°}\right)$

To rewrite a radian measure in degrees, multiply by $\left(\frac{180°}{\pi \text{ radians}}\right)$

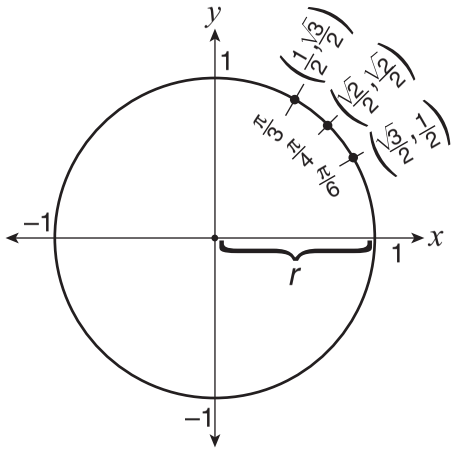
Circle



Arc Length: $s = r\theta$

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

Unit Circle



Álgebra 2
Hoja de Referencia

Funciones Cuadráticas

Forma Estándar: $y = ax^2 + bx + c$

Eje de Simetría: $\frac{-b}{2a}$

Formula de Vértice: $y = a(x-h)^2 + k$

Vértice: (h, k)

Eje de Simetría: $x = h$

Formula Cuadrática cuando $ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Número Complejo

$a + bi$ donde a y b son números reales y $i = \sqrt{-1}$

Composición de Funciones

$(f \circ g)x = f(g(x))$

$(g \circ f)x = g(f(x))$

Funciones Exponenciales

$y = a(b)^x$, $a \neq 0$, $b > 0$, $b \neq 1$

Definición de Función Logarítmica

$\log_a x = y$ es lo mismo que $x = a^y$

Regla de Cambio de Base

$$\log_a x = \frac{\log x}{\log a} \quad \log_a x = \frac{ln\, x}{ln\, a}$$

Propiedades de Logaritmos

Propiedad de Producto: $\log_b xy = \log_b x + \log_b y$

Propiedad de Cociente: $\log_b \frac{x}{y} = \log_b x - \log_b y$

Propiedad de Poder: $\log_b x^r = r \log_b x$

Propiedades Especiales

$\log_b 1 = 0$ porque $b^0 = 1$

$\log_b b = 1$ porque $b^1 = b$

$\log_b b^x = x$

$b^{\log_b x} = x$

Exponentes

$$a^{\frac{p}{q}} = \sqrt[q]{a^p} = \left(\sqrt[q]{a}\right)^p$$

$$a^{-n} = \frac{1}{a^n} = \left(\frac{1}{a}\right)^n$$

Factoriales

$n! = n(n-1)(n-2).....3 \cdot 2 \cdot 1$

Permutación

$${}_nP_r = P(n, r) = \frac{n!}{(n-r)!}$$

Combinación

$${}_nC_r = C(n, r) = \binom{n}{r} = \frac{n!}{r!(n-r)!}$$

Funciones de Seno y Coseno

$y = a \sin b(x-h) + k$ $\quad y = a \cos b(x-h) + k$

Amplitud $= |a|$ $\quad$ Cambio de Fase $= h$

Periodo de una función $= \frac{2\pi}{|b|}$ $\quad$ Cambio vertical $= k$

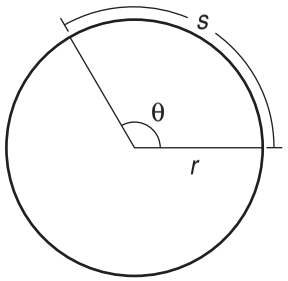
$\sin \theta = \frac{opp}{hyp}$ $\quad \cos \theta = \frac{adj}{hyp}$ $\quad \tan \theta = \frac{opp}{adj}$

Para convertir de Grados a Radianes multiplicar por $\left(\frac{\pi \text{ radianes}}{180°}\right)$

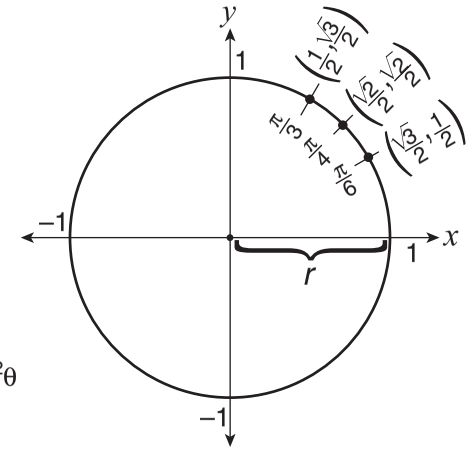
Para convertir de Radianes a Grados multiplicar por $\left(\frac{180°}{\pi \text{ radianes}}\right)$

Círculo

θ en radianes



Longitud de Arco: $s = r\theta$

Área de un sector: $A = \frac{1}{2} r^2 \theta$

Círculo Unidad