Pre-Calculus Cheat Sheet Cheat Sheet

by fgabe358 via cheatography.com/197565/cs/41665/

Properties of Square Roots

$\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}$

$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$

$(\sqrt{a})^m = \sqrt{a^m}$

$\sqrt{ab} = \sqrt{|a|} \cdot \sqrt{|b|}$

$\sqrt{\frac{a}{b}} = \frac{\sqrt{|a|}}{\sqrt{|b|}}$

$\sqrt{a^m} = (\sqrt{|a|})^m$

$\sqrt[n]{a} = \sqrt[nk]{a^k}$

$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{a \cdot b}$

$\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$

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

$\sqrt[n]{\sqrt[m]{a}} = \sqrt[nm]{a}$

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Laws of Exponents and Logarithms

Exponent Rules	Logarithm Rules
$a^m \cdot a^n = a^{m+n}$	$\log(mn) = \log m + \log n$
$\frac{a^m}{a^n} = a^{m-n}$	$\log\left(\frac{m}{n}\right) = \log m - \log n$
$(a^m)^n = a^{mn}$	$\log m^n = n \log m$

Find an equation of a line that:

passes through two points	y = mx + b
that is parallel to one another	isolate b
that is perpendicular to one another	solve for x

Graphing Trigonometric Functions

$y = A\sin[B(x-C)] + D$

$|A|$ is the amplitude

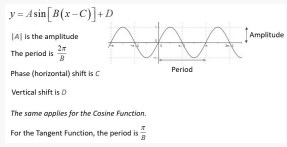
The period is $\frac{2\pi}{B}$

Phase (horizontal) shift is C

Vertical shift is D

The same applies for the Cosine Function.

For the Tangent Function, the period is $\frac{\pi}{B}$



Change of Base Formula

Change of Base Formula

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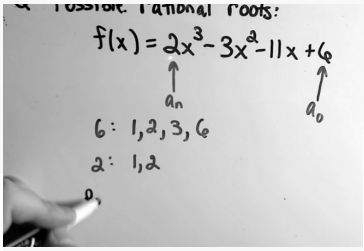
$\log_b a = \frac{\log_c a}{\log_c b}$

(OR)

$\log_b a . \log_c b = \log_c a$

Formulas

Rational Root Theorem



Side Ratios

Special Right Triangles

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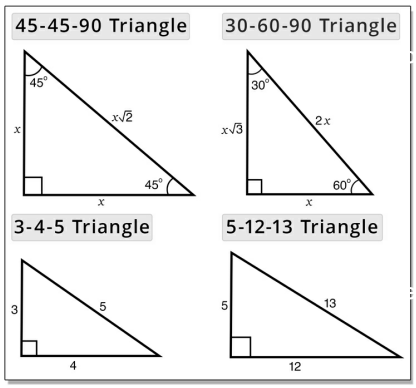
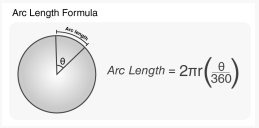


Trigonometric Functions

Functions	Domain	Range
(i) sine	R	[-1, 1]
(ii) cosine	R	[-1, 1]
(iii) tangent	$R - \{x : x = (2n+1)\frac{\pi}{2}, n \in Z\}$	R
(iv) cosecant	$R - \{x : x = n\pi, n \in Z\}$	$R - (-1, 1)$
(v) secant	$R - \{x : x = (2n+1)\frac{\pi}{2}, n \in Z\}$	$R - [-1, 1]$
(vii) cotangent	$R - \{x : x = n\pi, n \in Z\}$	R

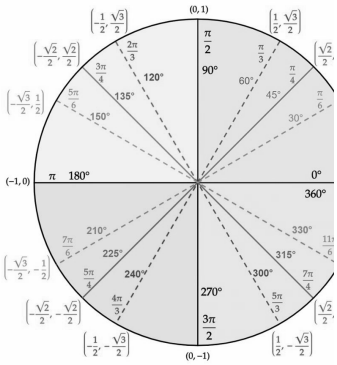
Arc Length

Arc Length Formula



Unit Circle

The Unit Circle Chart



Conversion

Radians = $\left(\frac{\pi}{180^\circ}\right)$ × degrees

Degrees = $\left(\frac{180^\circ}{\pi}\right)$ × radians

Sector Area

Area of a Sector Formula

$A = \frac{1}{2} r^2 \theta$ for θ in ra

$A = \frac{\theta}{360} \pi r^2$ for θ in de

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Continuous Interest

Formula

$$P(t) = P_0 e^{rt}$$

$P(t)$ = value at time t

P_0 = original principal sum

r = nominal annual interest rate

t = length of time the interest is applied

Rational Functions

Find an equation (in factored form) of a rational function, f, that satisfies the following conditions:

vertical asymptote: $x = 4$

Need factor in the denominator $x - 4 = 0$

x-intercept: $(-3, 0)$ $x = -3$

Need factor in the numerator $x + 3 = 0$

hole at $x = -1$ $x + 1 = 0$

Need same factor in numerator and denominator

horizontal asymptote: $y = -\frac{2}{5}$

Need degree of numerator and denominator to be the same and ratio of leading coefficients $= -\frac{2}{5}$

$f(x) = \frac{-2(x+3)(x+1)}{5(x-4)(x+1)}$

Compound Interest

Formula

$$A = P(1 + \frac{r}{n})^{nt}$$

A = final amount

P = initial principal balance

r = interest rate

n = number of times interest applied per time period

t = number of time periods elapsed

Reference Angle

Quadrant I	given angle
Quadrant II	180 - given angle
Quadrant III	given angle - 180
Quadrant IV	360 - given angle

Trig Signs