

CAS

Fix = fixes the amount of decimal places

Float = max amount of significant digits

Float (without a number) means use as many as possible

APPROXIMATE means the answer will be shown as a decimal.

AUTO means the answer will be displayed as "exact" whenever possible.

EXACT (*on CAS only*) means the answer will be displayed as a fraction or symbol except when a decimal is used in the problem

In the Graphs Screen, if the displayed coordinate does not display the correct number of decimal places, then use the TouchPad or NavPad arrows to produce the hand directly over either the x or y value and press + to increase the number of decimal places and - to decrease the number of decimal places.

FINDING INTERCEPTS

Solve()

Menu->3->1

Syntax: solve(equation, variable) | variable > number and variable < number

Factor()

Menu->3->2

Syntax: factor(expression)

Zeros()

Menu->3->4

Syntax: zeros(equation, variable)

Equation cannot be a function

TANGENT AND NORMAL LINES

Define f(x) = expression

y=tangentline(f(x), x=point) <gives function for tangent at point>

y=normalline(f(x), x=point) <gives function for normal at point>

tangentLine and normalLine are found in Menu 4: Calculus, 9 or A respectively.

TURNING POINT FORM

Menu->3->5 gives Complete the square

Syntax: CompleteSquare(expression, variable)

PROPFRAC()

Menu->3->9->1

Syntax: propFrac(expression/expression)

<gives quotient + remainder/divisor>

HYBRID FUNCTIONS

Ctrl and x gives the hybrid function template

| number < x < number gives domain

FMIN and FMAX

Syntax:

Fmin(expression, variable) | variable > number and variable < number

Menu->4->7 Fmin

Menu->4->8 Fmax

TRIG GENERAL EQUATIONS (where n is integer)

if sin(x) = a then

$$x = 2n * \pi + \sin^{-1}(a) \quad x = (2n + 1) \pi + \sin^{-1}(a)$$

where a is [-1, 1]

If cos(x) = a then

$$x = 2n * \pi \mp \cos^{-1}(a) \quad \text{where a is } [-1, 1]$$

If tan(x) = a then $x = n * \pi + \tan^{-1}(a)$ where a is real

FORMULA

Hyperbola

$$y = a(x - b)^{-1} + c$$

a is dilation factor. It dilates away from the x axis (multiply y value of a point by a)

if a is negative, it is reflected in x axis

Vertical asymptote = b

Horizontal asymptote = c

Truncus

$$y = a(x - b)^{-2} + c$$

a is dilation factor. It dilates away from the x axis (multiply y value of a point by a)

if a is negative, it is reflected in x axis

Vertical asymptote = b

Horizontal asymptote = c

Square root function

$$y = a\sqrt{x - b} + c$$

a is dilation factor. It dilates away from the x axis (multiply y value of a point by a)

if a is negative, it is reflected in x axis

The end point of the graph is (b, c)

Circular Function

$$y = \mp \sqrt{r^2 - x^2} \quad x^2 + y^2 = r^2$$

Center not at (0, 0)

$$(x - h)^2 + (y - k)^2 = r^2 \quad \text{center at (h, k)}$$

SET THEORY

{ . . } refers to a set.

∈ means 'is an element of'.

∉ means 'is not an element of'.

⊂ means 'is a subset of'.

⊄ means 'is not a subset (or is not contained in)'.

∩ means 'intersection with'.

∪ means 'union with'.

\ means 'excluding'.

∅ refers to 'the null, or empty set'.

{(a, b), (c, d), . . .} is a set of ordered pairs.

..

A relation is a set of ordered pairs.

N refers to the set of natural numbers.

Z refers to the set of integers.

Q refers to the set of rational numbers.

R refers to the set of real numbers.

IDENTITIES

$$\sin^2(x) + \cos^2(x) = 1 \quad \tan(x) = \frac{\sin(x)}{\cos(x)}$$

$$\sin\left(\frac{\pi}{2} - x\right) = \cos(x) \quad \cos\left(\frac{\pi}{2} - x\right) = \sin(x)$$

CUBE GENERAL EQUATIONS

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

DISCRIMINANT and QUADRATIC FORMULA

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

if discriminant = 0, there is 1 solution. >0 there are two, <0 no solutions

FINDING GRADIENTS:

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad m = \tan(\theta)$$

$$m = \sin(\theta) / \cos(\theta)$$

Perpendicular gradients:

$$m_{\text{perpendicular}} = \frac{-1}{m}$$

SIMULTANEOUS EQUATIONS

Menu->3->7->1