

**SYMBOLIX**

***Computer Algebra System***

# Users Manual

Revision 4  
January 13, 2008

## Introduction

Symbolix is an easy to use algebraic tool for students. It's capable of doing some tasks that a normal computer algebra system would do. Symbolix features tools for simplifying, expanding, factoring, substitution and differentiation.

## User Interface

Symbolix features a simple user interface for entering commands. To save you from the hassle of typing out commands, Symbolix uses a menu interface system similar to CASIO operating system. The function keys each represent a command.

```
—
Symbolix v0.4
Computer Algebra System

Programmed by kucalc
http://www.casicalc.org

[expi] [fact] [quad] [coef] [quad] [ ] >
```

## Commands

Commands available in Symbolix are shown in the menu. Each command accomplishes a different task. Each command requires certain arguments. Note, commands don't require a closing parenthesis. Parentheses are what separates commands from functions.

### expand

This command multiplies factors and creates an expanded polynomial.

```
expand((a+b)(c-d)_
a*c-a*d+b*c-b*d

[expi] [fact] [quad] [coef] [quad] [ ] >
```

### factor

This command is the inverse of expand. It decomposes an expanded polynomial and breaks it into smaller terms.

```
factor(x^3-64_
(x^2+4x+16)(x-4)

[expi] [fact] [quad] [coef] [quad] [ ] >
```

## quad

This command factors quadratics using the quadratic equation. The results produced can be used to find the exact value roots of a quadratic.

$$x^2 - 27 = 0$$

$$x = -3\sqrt{3}, 3\sqrt{3}$$

```
quad(x^2-27_  
(x-3*3^0.5)(x+3*3^0.5  
)  
  
expn factor quad cofct polydiv | ▶
```

## cofct

This command factors out common terms.

```
cofct(x*y*z+y*z+z_  
(x+1)*y+1)*z  
  
expn factor quad cofct polydiv | ▶
```

## polydiv

This command divides two polynomials. This command requires two arguments separated by a comma. This first argument is the numerator and the second numerator is the denominator. The degree of the polynomial in the numerator must be higher than the degree of the polynomial in the denominator.

$$\frac{x^3 + 5x + 2}{x - 2} = \frac{20}{x - 2} + x^2 + 2x + 9$$

```
Polydiv(x^3+5x+2,x-2_  
(20/(x-2))+x^2+2x+9  
  
expn factor quad cofct polydiv | ▶
```

## diff

The command differentiates an expression.

```
diff((x^3+5x^2+2)(3x-  
10))_  
12*x^3+15*x^2-100x+6
```

diff ccoef ratio prim subtr >

## ccoeff

This command collects common coefficients and groups them.

```
ccoeff(a*x+b*x_  
(b+a)(x)
```

diff ccoef ratio prim >

## ration

This command converts decimals to ratios.

```
ration(0.2536_  
317/1250
```

diff ccoef ratio prim >

## prime

This command prime factorizes an integer.

```
Prime(412_  
103*2*2
```

diff ccoef ratio prim >

## **subst**

This command substitutes a variable with another variable or expression.

```
subst(5(x^2+x)+3(x-5)  
,x=3y_  
45*y^2+24y-15  
  
diff coef ratio prim subst | >
```

## **Functions**

Symbolix provides the user several functions:

- Trigonometric functions – sin, cos, tan, acos, asin, atan, cosh, sinh, tanh, r
- Log arithmetic functions – log, ln
- Utility functions - abs, rand, sign, min, max, mod

Trigonometric functions (except r), log arithmetic functions, abs, rand, sign, min and max require only one argument. mod and r requires two arguments. r calculates the hypotenuse of a triangle given two sides using the Pythagorean theorem, thus requiring two arguments.

Functions can be nested.

## **Notes**

When using Symbolix, there are some things you should be aware of.

- When multiplying variables and functions, be sure to separate them with a \*

## **Disclaimer**

Symbolix can't do everything for you. You'll have to think sometimes. Symbolix provides you the tools to accomplish your tasks. Don't always trust Symbolix to give you the right answers. Always check them.

## **Questions?**

You can contact me at <http://www.casiocalc.org> or by email, [kucalc@gmail.com](mailto:kucalc@gmail.com)