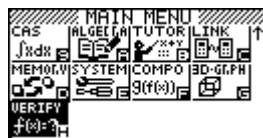


Try verifying this: $x^2-1=(x-1)(x+1)$.

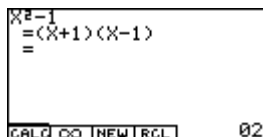
Choose Verify software on the MENU and press **EXE**.



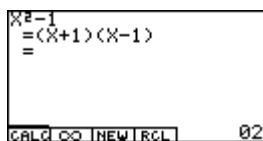
Input the left side of the equation you wish to handle and press **EXE**.



Input the right side of an equation you wish to verify and press **EXE**.



When the left side is not equivalent to the right side, a message is displayed. You should press **ESC**, correct the equation, and verify it again. Try this:



▶ Menu Functions

CALC; Shows the menu for mathematical functions.



∞ ; Infinite

NEW; Clear the display to begin a new problem.

RCL; Recall allows you to view expressions that have scrolled off the screen. Or, after pressing NEW, RCL will display the previous problem.

Syntax for Mathematical Functions in CALC Menu

diff; Differentiates an expression
 diff(exp, variable, order, value), where order and value are optional parameters
 diff(x^2+x , x) = $2x+1$
 diff(x^2+x , x , 2) = 2
 diff(x^2+x , x , 1, 0) = 1

\int ; Integrates an expression.
 \int (exp, variable, integration constant), where integration constant is an optional parameter
 \int (exp, variable, lower limit, upper limit)

- $\int (x^2, x) = x^3/3$
 $\int (x^2, x, C) = x^3/3 + C$
 $\int (x^2, x, 1, 3) = 26/3$
- lim;** Determines the limits of an expression.
 $\text{lim}(\text{exp, variable, limiting point, direction})$, where direction is an optional parameter
 $\text{lim}(1/x, x, \infty) = 0$
 $\text{lim}(1/x, x, 0, 1) = \infty$
 $\text{lim}(1/x, x, 0, -1) = -\infty$
- Σ ;** Calculates a sum.
 $\Sigma(\text{exp, variable, start value, end value})$
 $\Sigma(x^2, x, 1, 10) = 385$
- \prod ;** Calculates a product.
 $\prod(\text{exp, variable, start value, end value})$
 $\prod(x^2, x, 1, 5) = 14400$
- taylor;** Finds a Taylor polynomial.
 $\text{taylor}(\text{exp, variable, order, center point})$, where the center point is assumed to be zero when it is not specified (e.g. Maclaurin series).
 $\text{taylor}(\sin(x), x, 5) = x^5/120 - x^3/6 + x$
 $\text{taylor}(\sin(x), x, 5, \pi) = -(x-\pi)^5/120 + (x-\pi)^3/6 - x + \pi$

Examples

Basic Calculation

$1/2 + 1/3$
 $= 3/6 + 2/6$
 $= 5/6$
 $=$

126
 $= 2 \times 63$
 $= 2 \times 3 \times 21$
 $= 2 \times 3 \times 3 \times 7$
 $=$

$\sqrt{12} - \sqrt{75}$
 $= \sqrt{4 \times 3} - \sqrt{25 \times 3}$
 $= 2\sqrt{3} - 5\sqrt{3}$
 $= -3\sqrt{3}$
 $=$

$2 / (3 + \sqrt{6})$
 $= 2(3 - \sqrt{6}) / (9 - 6)$
 $= (6 - 2\sqrt{6}) / 3$
 $=$

Simplifying

$3x - (5x - 4)$
 $= 3x - 5x - 4$
 $=$

$3x - (5x - 4)$
 $= 3x - 5x + 4$
 $=$

Sorry, not equivalent.
Press: [ESC]

$3x - (5x - 4)$
 $= 3x - 5x + 4$
 $=$

$3x - (5x - 4)$
 $= 3x - 5x + 4$
 $=$

Complex Number

$$i \times i$$

$$= -1$$

$$=$$

CALC 00 NEW RCL 02

$$(2+i)(3-4i)$$

$$= 2(3-4i) + i(3-4i)$$

$$= 6-8i+3i+4$$

$$= 10-5i$$

$$=$$

CALC 00 NEW RCL 04

$$(2-i(-2))(2+i(-2))$$

$$= 4-(i(-2))^2$$

$$= 4-(i\sqrt{2})^2$$

$$= 4+2$$

$$= 6$$

$$=$$

CALC 00 NEW RCL 05

Factorial

$$x^2-2$$

$$= (x-\sqrt{2})(x+\sqrt{2})$$

$$=$$

CALC 00 NEW RCL 02

$$x^2+2x+1$$

$$= (x+1)(x+1)$$

$$= (x+1)^2$$

$$=$$

CALC 00 NEW RCL 03

$$2x^3-4x^2-10x+12$$

$$= 2(x^3-2x^2-5x+6)$$

$$= 2(x^2(x-1)-(x^2+5x-6))$$

$$= 2(x-1)(x^2-x-6)$$

$$= 2(x-1)(x-3)(x+2)$$

$$=$$

CALC 00 NEW RCL 05

Polynomial

$$(2x-5y)(3x+4y)$$

$$= 2x(3x+4y) - 5y(3x+4y)$$

$$= 6x^2+8xy-15xy-20y^2$$

$$= 6x^2-7xy-20y^2$$

$$=$$

CALC 00 NEW RCL 04

$$\frac{1}{x+1} \div \frac{1}{1+x}$$

$$= \frac{(1+x)+x}{(x(x+1))}$$

$$= \frac{(1+2x)}{(x(x+1))}$$

$$=$$

CALC 00 NEW RCL 03

$$x^3+2x^2+x-5$$

$$= (x+3)(x^2-x+4)-17$$

$$=$$

CALC 00 NEW RCL 02

$$3x^2+6x-10$$

$$= 3(x^2+2x)-10$$

$$= 3(x+1)^2-3-10$$

$$= 3(x+1)^2-13$$

$$=$$

CALC 00 NEW RCL 04

Trigonometry

$$\sin 45$$

$$= \sqrt{2}/2$$

$$=$$

CALC 00 NEW RCL 02

$$\cos \theta$$

$$= \cos(-\theta)$$

$$= \cos(\theta+2\pi)$$

$$= \cos(-\theta-2\pi)$$

$$=$$

CALC 00 NEW RCL 04

$$\sin 30 + \sin 60$$

$$= \sqrt{3}/2 + 1/2$$

$$= 2 \sin 45 \cos 15$$

$$= \sqrt{2} \cos 15$$

$$=$$

CALC 00 NEW RCL 04

$$(\sin X)^2 + 2(\cos X)^2$$

$$= 1 + (\cos X)^2$$

$$= 1 + 1 - (\sin X)^2$$

$$= 2 - (\sin X)^2$$

$$=$$

CALC 00 NEW RCL 04

Logarithm and Exponent

$$\log(10000)$$

$$= \log 10^4$$

$$= 4 \log 10$$

$$= 4$$

$$=$$

CALC 00 NEW RCL 04

$$\ln 12 + \ln \sqrt{7} - \ln 2$$

$$= \ln((12 \times \sqrt{7})/2)$$

$$= \ln(6\sqrt{7})$$

$$=$$

CALC 00 NEW RCL 03

$$5^{\ln 5}$$

$$= e^{(31 \ln 5)}$$

$$=$$

CALC 00 NEW RCL 02

$$\sqrt[3]{3+6/\sqrt{3}}$$

$$= \sqrt[3]{3+6/\sqrt{3}}$$

$$= \sqrt[3]{9/\sqrt{3}}$$

$$= \sqrt[3]{3 \times 3/\sqrt{3}}$$

$$= \sqrt[3]{3}$$

$$=$$

CALC 00 NEW RCL 05

$$x^2 \times x^{1/3}$$

$$= x^{(2+1/3)}$$

$$= x^{(7/3)}$$

$$=$$

CALC 00 NEW RCL 03

Limit

$$\lim_{X \rightarrow 0} (X/(1+X), X, \odot)$$

$$= 1$$

CALC ∞ NEW | RCL 02

$$\lim_{X \rightarrow 0} ((\cos X - 1)/X, X, \odot)$$

$$= 0$$

CALC ∞ NEW | RCL 02

$$\lim_{X \rightarrow 0} (\sin X/X, X, \odot)$$

$$= 1$$

CALC ∞ NEW | RCL 02

$$\lim_{X \rightarrow \infty} ((1+1/X)^X, X, \odot)$$

$$= e$$

CALC ∞ NEW | RCL 02

$$\lim_{K \rightarrow \infty} ((1+R/X)^(KX), X, \odot)$$

$$= e^{RK}$$

CALC ∞ NEW | RCL 02

$$\lim_{X \rightarrow 0^+} (1/X, X, \odot, 1)$$

$$= \infty$$

CALC ∞ NEW | RCL 02

$$\lim_{X \rightarrow 0^-} (1/X, X, \odot, -1)$$

$$= -\infty$$

CALC ∞ NEW | RCL 02

Differentiation

$$\text{diff}(X^2+5X-6, X)$$

$$= 2X+5$$

CALC ∞ NEW | RCL 02

$$\text{diff}(X/\ln X, X)$$

$$= (\ln X - 1)/(\ln X)^2$$

CALC ∞ NEW | RCL 02

$$\text{diff}(X \sin X, X)$$

$$= X \cos X + \sin X$$

CALC ∞ NEW | RCL 03

$$\text{diff}(\ln(5X^2+2X+1))$$

$$= (10X+2)/(5X^2+2X+1)$$

CALC ∞ NEW | RCL 02

$$\text{diff}(e^{X^2+X}, X)$$

$$= e^{X^2+X} \times \text{diff}(X^2+X)$$

$$= (2X+1)e^{X^2+X}$$

CALC ∞ NEW | RCL 03

$$\text{diff}(B^X)$$

$$= \text{diff}(e^{X \ln B}, X)$$

$$= e^{X \ln B} \times \ln B$$

$$= B^X \times \ln B$$

CALC ∞ NEW | RCL 04

Summation

$$\Sigma(-7+3X, X, 1, 5)$$

$$= -4 - 1 + 2 + 5 + 8$$

$$= 10$$

CALC ∞ NEW | RCL 03

$$\Sigma(K^2, K, 1, N)$$

$$= N(N+1)(2N+1)/6$$

CALC ∞ NEW | RCL 02

$$\Sigma(1/2^X, X, 1, \odot)$$

$$= \lim(\Sigma(1/2^X, X, 1, N))$$

$$= \lim(1 - 1/2^N, N, \odot)$$

$$= 1$$

CALC ∞ NEW | RCL 04

$$\Sigma(3(-1/5)^X, X, 2, \odot)$$

$$= 3 \times (-1/5)^2 / (1 - (-1/5))$$

$$= 1/10$$

CALC ∞ NEW | RCL 03

Integration

$$\int (X + \sin X, X)$$

$$= \int (X, X) + \int (\sin X, X)$$

$$= X^2/2 + (-\cos X)$$

$$= X^2/2 - \cos X$$

CALC ∞ NEW | RCL 04

$$\int (X^2, X, A, B)$$

$$= \int (X^2, X, B, A)$$

$$= (B^3 - A^3)/3$$

CALC ∞ NEW | RCL 03

```
J(1/X,X,0,1)
=
=
CALC 00 | NEW | RCL | 02
```

```
J(J(9-X^2),X,-3,3)
=9π/2
=
CALC 00 | NEW | RCL | 02
```

```
J(e(X)/X,X)
=e(X)/K
=
CALC 00 | NEW | RCL | 02
```

```
J(Xe(X),X)
=Xe(X)-J(e(X),X)
=Xe(X)-e(X)
=(X-1)e(X)
=
CALC 00 | NEW | RCL | 04
```

```
J(ln X,X)
=(ln X)X-J(X*1/X,X)
=Xln X-X
=
CALC 00 | NEW | RCL | 03
```

```
J(1/X^2,X,1,0)
=lim(J(1/X^2,X,1,T),T)
=lim(-T^-1+1,T,0)
=1
=
CALC 00 | NEW | RCL | 04
```

```
J(1/X,X,1,0)
=lim(J(1/X,X,1,T),T)
=lim(ln T,T,0)
=0
=
CALC 00 | NEW | RCL | 04
```

```
J(e(X),X,-0,0)
=lim(J(e(X),X,T,0),T)
=lim(1-e(T),T,-0)
=1
=
CALC 00 | NEW | RCL | 04
```

Product

```
Π(X,X,1,10)
=3628800
=
CALC 00 | NEW | RCL | 02
```

```
Π(1/X,X,1,5)
=1×1/2×1/3×1/4×1/5
=1/120
=
CALC 00 | NEW | RCL | 03
```

Taylor Expansion

```
taylor(cos X,X,4)
=1-X^2/2+X^4/24
=
CALC 00 | NEW | RCL | 02
```

```
taylor(e(X),X,3)
=1+X+X^2/2+X^3/6
=
CALC 00 | NEW | RCL | 02
```

Limitations

Verify does not support the List function.

```
{2,3}+{1,2}
=
CALC 00 | NEW | RCL |
```

```
{2,3}+{1,2}
Syntax ERROR
Press:[ESC]
CALC 00 | NEW | RCL |
```

When using variables instead of numbers, the variables can cause a complex number result. Note that $\log(A)$, for $A < 0$, is a complex number. If you use positive numbers instead of variables, you will get equivalent. For example, try $\log(15) = \log(3) + \log(5)$.

$\log(AB) = \log(A) + \log(B)$? Only if $A > 0$ and/or $B > 0$.

```
log(AB)
=log A+log B
=
CALC 00 | NEW | RCL | 01
```

```
log(AB)
Syntax ERROR
Sorry, not
equivalent.
Press:[ESC]
CALC 00 | NEW | RCL | 01
```

$\ln(x^2/(x+1)^2) = \ln(x^2) - \ln((x+1)^2)$? Only if $x > 0$.



$\sqrt{x^2y^2} = xy$? When $x=y=i$, they are not equivalent.
If you use real numbers instead of variables, you will get equivalent.



This is a limitation of the calculator. In the calculator π is 3.14....
This causes a strange result, due to rounding, and we are sorry. We are still working on a solution to this limitation.

$\cos^{-1}(0.5) = \pi/2 - \sin^{-1}(0.5)$, $\cos^{-1}(0.2) = \pi/2 - \sin^{-1}(0.2)$?

