

VIDEO

# Hands-on Start to Mathematica 11

[https://www.youtube.com/watch?v=O6h9\\_Xx-nLA&t=72s](https://www.youtube.com/watch?v=O6h9_Xx-nLA&t=72s)

<http://www.wolfram.com/language/fast-introduction-for-math-students/en/>

## Entering Input

In a Wolfram notebook on the desktop or web, just type an input, then press

SHIFT+ENTER to compute:

**2 + 2** SHIFT + ENTER ← input  
In[1]:=

Out[1]= **4** ← output

[In\[n\]](#) and [Out\[n\]](#) label successive inputs and outputs. The [%](#) symbol refers to the most recent output:

In[1]:= **1 + 2 + 3**

Out[1]= **6**

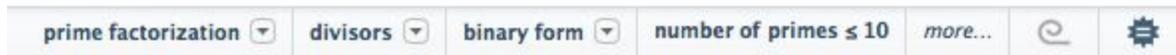
In[2]:= **% + 4**

Out[2]= **10**

After you perform a calculation, the [Suggestions Bar](#) will provide options for further computation:

```
In[2]:= % + 4
```

```
Out[2]= 10
```



Standard symbols work for mathematical operations:

(Use a space or \* for multiplication, not the “x” character.)

```
In[1]:= 5 + 2 * 3 - 7.5
```

```
Out[1]= 3.5
```

Use parentheses (not braces or brackets) to show levels of grouping:

```
In[2]:= ((5 - 3)^(1 + 2)) / 4
```

```
Out[2]= 2
```

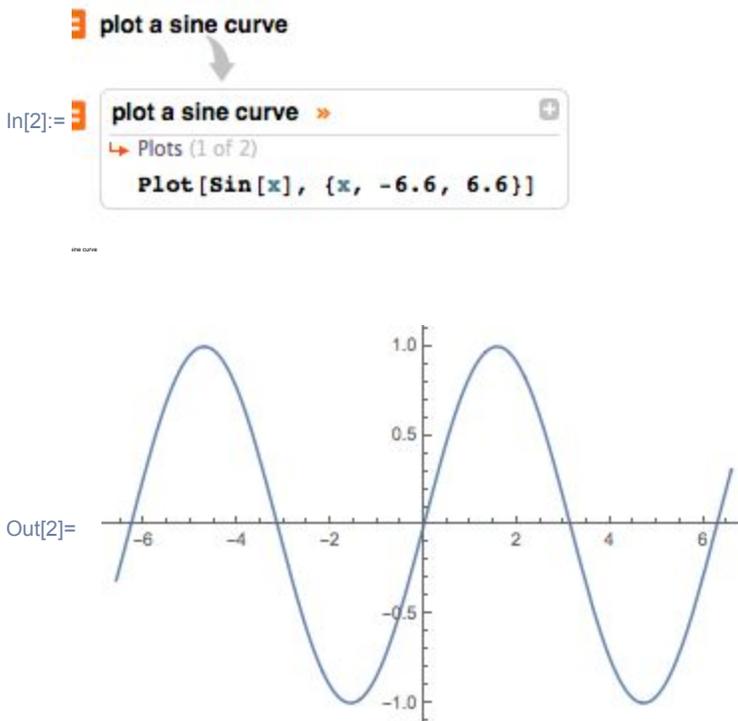
The Wolfram Language has nearly 6,000 built-in functions, covering many areas of mathematics.

Arguments to built-in functions are separated by commas and enclosed in square brackets:

```
In[1]:= GCD[12, 15]
```

```
Out[1]= 3
```

If you don't know what function to use, type = at the beginning of a line for [natural-language input](#):



[Lists](#) represent collections of items and are indicated by `{...}`:

**1, 2, 3}**

In[1]:= **x, y, z}**

0.2.0

Lists are ordered. They can contain numbers, variables, computations or even other lists.

Many operations are applied elementwise:

In[2]:= **{1, 2, 3} + 2**

Out[2]= **{3, 4, 5}**

Starting at 1, parts of lists can be extracted using [\[\[...\]\]](#):

```
In[3]:= {a, b, c, d}[[3]]
```

```
Out[3]= c
```

Easily [construct lists](#) with functions like [Range](#):

```
In[1]:= Range[10]
```

```
Out[1]= {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
```

<https://reference.wolfram.com/language/tutorial/GettingStartedOverview.html>

## Your First Wolfram Language Calculations

Type `2+2` and then press Shift+Enter (hold down the Shift key and press Enter) to tell the Wolfram Language to evaluate your input.

Note that labels are added automatically, and output is placed below the input:

```
In[1]:= 2 + 2
```

```
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to  
clipboard.
```

```
Out[1]= 4
```

Your first calculation will take longer than subsequent calculations because the Wolfram Language kernel has to start up.

You can use the Wolfram Language just like a calculator. Type the input  $9.7^{200}$  and press Shift+Enter. Here is the result.

A basic numerical calculation:

In[2]:= **9.7<sup>200</sup>**

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clipboard

Out[2]= **2.26124 × 10<sup>10</sup>**

Here is an example from algebra. Type the input `Factor[x25-1]` and note that as you type, the first bracket after the function name `Factor` has a special color until the closing bracket is typed.

A basic algebraic calculation:

In[3]:= **Factor[x<sup>25</sup>**

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Out[3]=  **$(-1+x)(1+x+x^2+x^3+x^4)(1+x^5+x^{10}+x^{15}+x^{20})$**

You can use Greek letters or letters from other alphabets as variables:

In[4]:= **Factor[ $\alpha^{21}$**

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Out[4]=  **$(-1+\alpha)(1+\alpha+\alpha^2)(1+\alpha+\alpha^2+\alpha^3+\alpha^4+\alpha^5+\alpha^6)(1-\alpha+\alpha^3-\alpha^4+\alpha^5-\alpha^6)$**

You can recall your most recent input (or output) in your next evaluation by pressing Null (or Null).

The Wolfram Language uses syntax coloring to help you compose expressions that are complicated. As part of that, function names and variables that are known to the Wolfram Language kernel are colored black. New symbol names are by default colored blue, but turn black after being evaluated for the first time.

You can configure the syntax coloring system using the Syntax Coloring dialog box. To open the dialog box, choose Edit ► [Preferences](#), click the Appearance tab, and then the Syntax Coloring tab.

Here are some more examples.

[Integrate](#) is just one of over a thousand built-in Wolfram Language functions.

Note that the variable of integration is specially colored in the input:

In[5]:= **Integrate**[1/(x<sup>3</sup> -

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Out[5]=

$$-\frac{\text{ArcTan}\left[\frac{1+2x}{\sqrt{3}}\right]}{\sqrt{3}} + \frac{1}{3} \text{Log}[1-x] - \frac{1}{6} \text{Log}$$

## ***Cryptography in Matematica***

<http://demonstrations.wolfram.com/topic.html?topic=cryptography&limit=20>

## **HOW IT WORKS: Morse Code**

[https://www.youtube.com/watch?v=xsDk5\\_bktFo](https://www.youtube.com/watch?v=xsDk5_bktFo)