CSC 311, 401, 501

Short Instructions On Mathematica

by

Dr. Marek A. Suchenek ©

Computer Science
CSUDH

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Using Help

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Open Mathematica and chose option

Notebook.

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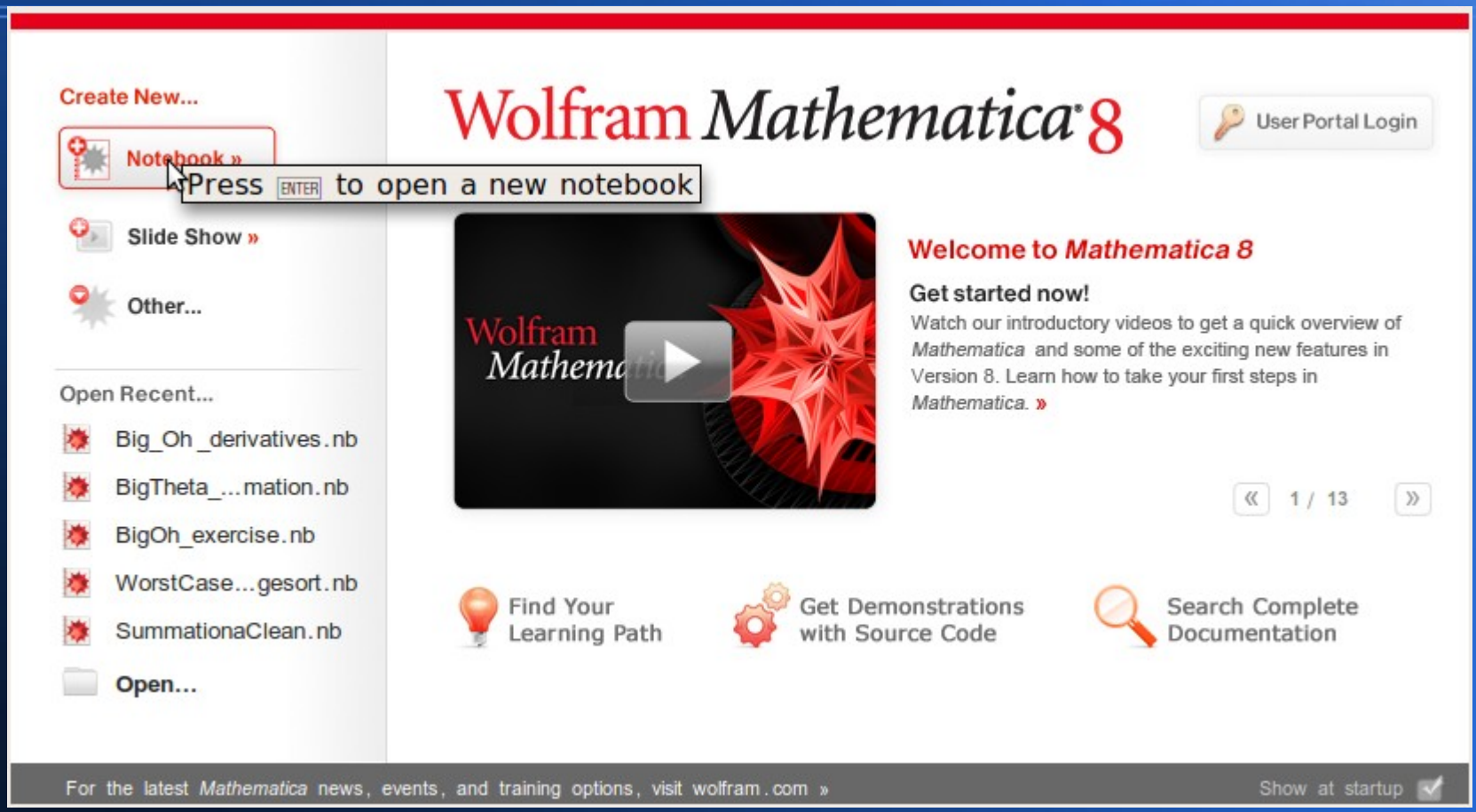

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Open Mathematica notebook and select Help from the menu bar.

Then click on Documentation.

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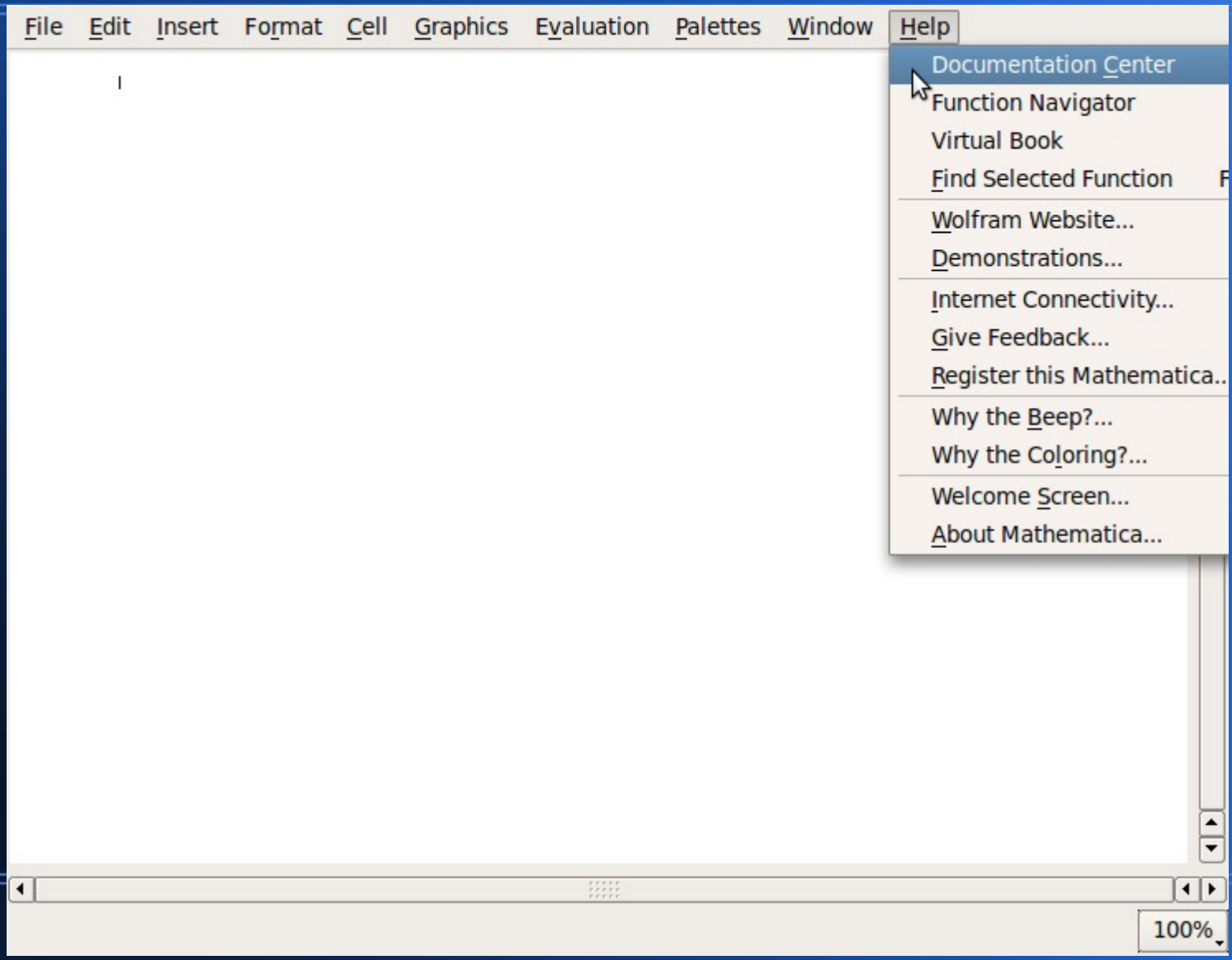

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Select

Notebooks and Documents

from the menu.

Mathematica - Wolfram Mathematica

File Edit Insert Format Cell Graphics Evaluation Palettes Window Help

SEARCH

Wolfram Mathematica 8
DOCUMENTATION CENTER

Getting Started Videos » Find Your Learning Path » Open Virtual Book »

- CORE LANGUAGE
- MATHEMATICS AND ALGORITHMS
- VISUALIZATION AND GRAPHICS
- DATA MANIPULATION
- COMPUTABLE DATA
- DYNAMIC INTERACTIVITY
- NOTEBOOKS AND DOCUMENTS

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Select

Special Characters

from the menu.

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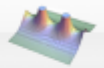
CORE LANGUAGE

MATHEMATICS AND ALGORITHMS

VISUALIZATION AND GRAPHICS



DATA MANIPULATION

COMPUTABLE DATA

DYNAMIC INTERACTIVITY

NOTEBOOKS AND DOCUMENTS

- Notebook Basics
- Special Characters
- Math Typesetting
- Presentations
- Document Generation
- New in 8.0 | 7.0 | 6.0
- Formatting & Styling
- Layout & Tables
- Customization
- Importing & Exporting
- Notebook Programming

SYSTEMS INTERFACES & DEPLOYMENT

paclet:guide/SpecialCharacters

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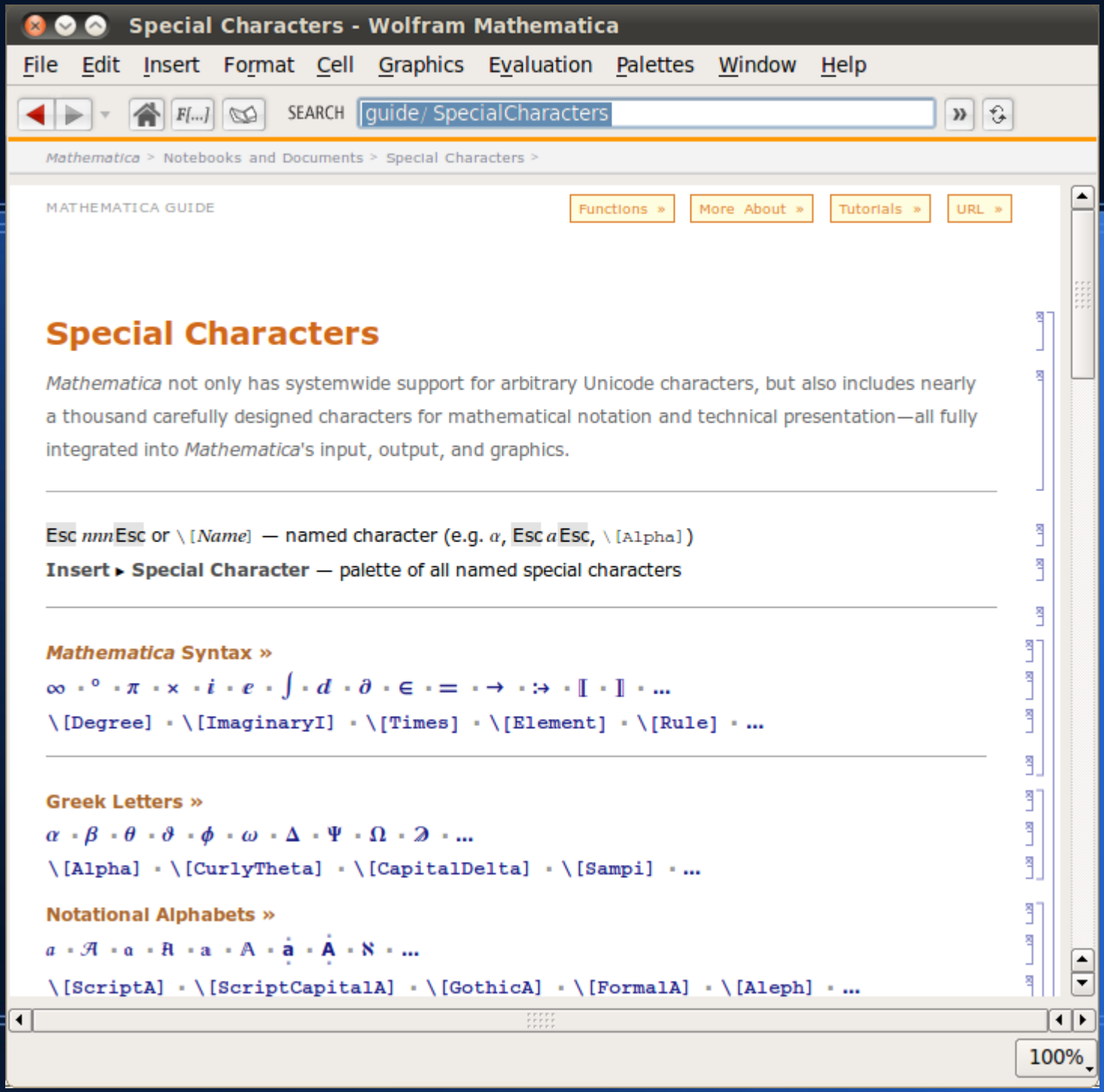
Scroll down ...


Special Characters - Wolfram Mathematica
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SEARCH guide/ SpecialCharacters
Mathematica > Notebooks and Documents > Special Characters >
MATHEMATICA GUIDE
Functions » More About » Tutorials » URL »
Special Characters
Mathematica not only has systemwide support for arbitrary Unicode characters, but also includes nearly a thousand carefully designed characters for mathematical notation and technical presentation—all fully integrated into Mathematica's input, output, and graphics.
Esc nnnEsc or \[Name] — named character (e.g. α, Esc αEsc, \[Alpha])
Insert ▸ Special Character — palette of all named special characters
Mathematica Syntax »
∞ ▪ ° ▪ π ▪ × ▪ i ▪ e ▪ ∫ ▪ d ▪ ∂ ▪ ∈ ▪ = ▪ → ▪ :→ ▪ ⟦ ▪ ⟧ ▪ ...
\[Degree] ▪ \[ImaginaryI] ▪ \[Times] ▪ \[Element] ▪ \[Rule] ▪ ...
Greek Letters »
α ▪ β ▪ θ ▪ ϑ ▪ ϕ ▪ ω ▪ Δ ▪ Ψ ▪ Ω ▪ ϡ ▪ ...
\[Alpha] ▪ \[CurlyTheta] ▪ \[CapitalDelta] ▪ \[Sampi] ▪ ...
Notational Alphabets »
a ▪ 𝒜 ▪ 𝔞 ▪ 𝔄 ▪ 𝐚 ▪ 𝔸 ▪ 𝗮̇ ▪ 𝗔̇ ▪ ℵ ▪ ...
\[ScriptA] ▪ \[ScriptCapitalA] ▪ \[GothicA] ▪ \[FormalA] ▪ \[Aleph] ▪ ...
100%

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... and select

Mathematical Notation

from the list

Special Characters - Wolfram Mathematica

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SEARCH guide/ SpecialCharacters

Mathematica > Notebooks and Documents > Special Characters >

∞ ▪ ° ▪ π ▪ × ▪ i ▪ e ▪ ∫ ▪ d ▪ ∂ ▪ ∈ ▪ = ▪ → ▪ :> ▪ ⟦ ▪ ⟧ ▪ ...

\[Degree] ▪ \[ImaginaryI] ▪ \[Times] ▪ \[Element] ▪ \[Rule] ▪ ...

Greek Letters »

α ▪ β ▪ θ ▪ ϑ ▪ ϕ ▪ ω ▪ Δ ▪ Ψ ▪ Ω ▪ ℑ ▪ ...

\[Alpha] ▪ \[CurlyTheta] ▪ \[CapitalDelta] ▪ \[Sampi] ▪ ...

Notational Alphabets »

a ▪ 𝒜 ▪ 𝔞 ▪ ℜ ▪ 𝐚 ▪ 𝔸 ▪ 𝗮 ▪ 𝗔 ▪ ℵ ▪ ...

\[ScriptA] ▪ \[ScriptCapitalA] ▪ \[GothicA] ▪ \[FormalA] ▪ \[Aleph] ▪ ...

Mathematical Notation »

∫ ▪ ∑ ▪ ∂ ▪ ∇ ▪ ∀ ▪ ⋂ ▪ ≡ ▪ ≳ ▪ ∠ ▪ ∈ ▪ ∅ ▪ ∧ ▪ ⊕ ▪ ...

\[Integral] ▪ \[Sum] ▪ \[Del] ▪ \[ForAll] ▪ \[CirclePlus] ▪ ...

Arrows & Arrow-Like Forms »

→ ▪ ⟶ ▪ ⇒ ▪ ⟹ ▪ ↔ ▪ ↕ ▪ ⇀ ▪ ↾ ▪ ⇥ ▪ ⇌ ▪ ⊣ ▪ ...

\[RightArrow] ▪ \[LongRightArrow] ▪ \[DoubleRightArrow] ▪ \[LeftRightArrow] ▪ ...

Textual Forms »

– ▪ — ▪ … ▪ • ▪ ¶ ▪ † ▪ ✓ ▪ “ ▪ ” ▪ ¿ ▪ © ▪ ...

\[Dash] ▪ \[LongDash] ▪ \[Bullet] ▪ \[Copyright] ▪ ...

Currency, Units, and Special Notations »

€ ▪ £ ▪ µ ▪ Å ▪ ℏ ▪ ♂ ▪ ♃ ▪ ♪ ▪ ♮ ▪ ♣ ▪ ...

paclet:guide/MathematicalNotationCharacters

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Find

Calculus & Analysis

and select desired symbol

Mathematical Notation Characters - Wolfram Mathematica

File Edit Insert Format Cell Graphics Evaluation Palettes Window Help

SEARCH guide/MathematicalNotationCharacters

Mathematica > Notebooks and Documents > Special Characters > Mathematical Notation Characters >

MATHEMATICA GUIDE

Functions » More About » URL »

Mathematical Notation Characters

Mathematica has the world's largest collection of consistent multifont mathematical notation characters—all fully integrated into both typesetting and symbolic expression construction.

Basic Mathematics

× \[Times] · ÷ \[Divide] · $\sqrt{}$ \[Sqrt] · :: \[Proportion]

∞ \[Infinity] · π \[Pi] · *e* \[ExponentialE] · *i* \[ImaginaryI] · ° \[Degree]

⩵ \[LongEqual] · ≠ \[NotEqual] · ≤ \[LessEqual] · ≥ \[GreaterEqual]

± \[PlusMinus] · ∓ \[MinusPlus] · ≃ \[TildeEqual]

Calculus & Analysis

∫ \[Integral] · *d* \[DifferentialD]

∑ \[Sum] · ∏ \[Product]

∂ \[PartialD] · ∇ \[Del] · □ \[Square]

∮ \[ContourIntegral] · ∯ · ∰ · *D*

′ \[Prime] · ″ · ‵ · ‶ · ‴ · …

Vectors, Matrices & Vector Spaces

⇀ \[RightVector] · × \[Cross] · ∧ \[Wedge] · ⊕ \[CirclePlus] · ⊗

paclet:ref/character/Sum

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This will give you detailed description how to type it

\[Sum] - Wolfram Mathematica

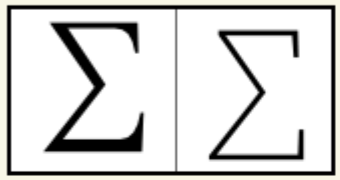
File Edit Insert Format Cell Graphics Evaluation Palettes Window Help

SEARCH ref/ character/ Sum

Mathematica > Notebooks and Documents > Special Characters > ∑ >

MATHEMATICA CHARACTER NAME

Tutorials » See Also » More About » URL »



\[Sum]

- Unicode: 2211.
- Alias: Esc sum Esc.
- Compound operator with built-in evaluation rules.
- $\sum_{i}^{i_{max}} f$ is by default interpreted as Sum[f, {i, i_{max}}].
- $\sum_{i=i_{min}}^{i_{max}} f$ is by default interpreted as Sum[f, {i, i_{min}, i_{max}}].
- Not the same as the Greek letter \[CapitalSigma].

SEE ALSO

\[Product] • \[Integral] • \[DifferenceDelta] • \[CapitalSigma]

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Now, you can navigate back.

\[Sum] - Wolfram Mathematica

File Edit Insert Format Cell Graphics Evaluation Palettes Window Help

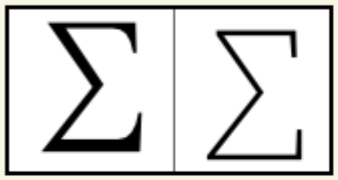
SEARCH ref/ character/ Sum

Go back one page

and Documents > Special Characters > ∑ >

MATHEMATICA CHARACTER NAME

Tutorials » See Also » More About » URL »



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SEE ALSO

\[Product] • \[Integral] • \[DifferenceDelta] • \[CapitalSigma]

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And back.

Mathematical Notation Characters - Wolfram Mathematica

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SEARCH guide/MathematicalNotationCharacters

Go back one page

and Documents > Special Characters > Mathematical Notation Characters >

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± \[PlusMinus] · ∓ \[MinusPlus] · ≃ \[TildeEqual]

Calculus & Analysis

∫ \[Integral] · d \[DifferentialD]

∑ \[Sum] · ∏ \[Product]

∂ \[PartialD] · ∇ \[Del] · □ \[Square]

∮ \[ContourIntegral] · ∯ · ∰ · D

′ \[Prime] · ″ · ‴ · ⁗ · ⋯

Vectors, Matrices & Vector Spaces

⇀ \[RightVector] · × \[Cross] · ∧ \[Wedge] · ⊕ \[CirclePlus] · ⊗

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And select

Listing of All Special Characters

Special Characters - Wolfram Mathematica

File Edit Insert Format Cell Graphics Evaluation Palettes Window Help

SEARCH guide/ SpecialCharacters

Mathematica > Notebooks and Documents > Special Characters >

■ ▪ ● ▪ • ▪ □ ▪ ◆ ▪ ▯ ▪ ▯ ▪ ▯ ▪ ...

\[FilledSquare] ▪ \[EmptySquare] ▪ \[HappySmiley] ▪ ...

Non-Printing Characters »

\[ThinSpace] ▪ \[NonBreakingSpace] ▪ \[InvisibleComma] ▪ \[AlignmentMarker] ▪ ...

International Characters »

é ▪ ö ▪ à ▪ á ▪ â ▪ ã ▪ ä ▪ å ▪ ç ▪ č ▪ ø ▪ æ ▪ ß ▪ ...

\[EAcute] ▪ \[ODoubleDot] ▪ \[CHacek] ▪ ...

ToCharacterCode ▪ **FromCharacterCode** ▪ **CharacterRange**

FullForm — show characters in their full named form

nn, \:*nnnn* — enter octal or Unicode forms

Esc \alpha Esc, Esc Α Esc, etc. — enter TEX, HTML, SGML, etc. forms

TUTORIALS

- Notebooks as Documents
- Keyboard Shortcut Listing

MORE ABOUT

- Mathematical Typesetting
- Listing of All Special Characters
- Character Operations
- Notation Package

paclet:guide/ListingOfNamedCharacters

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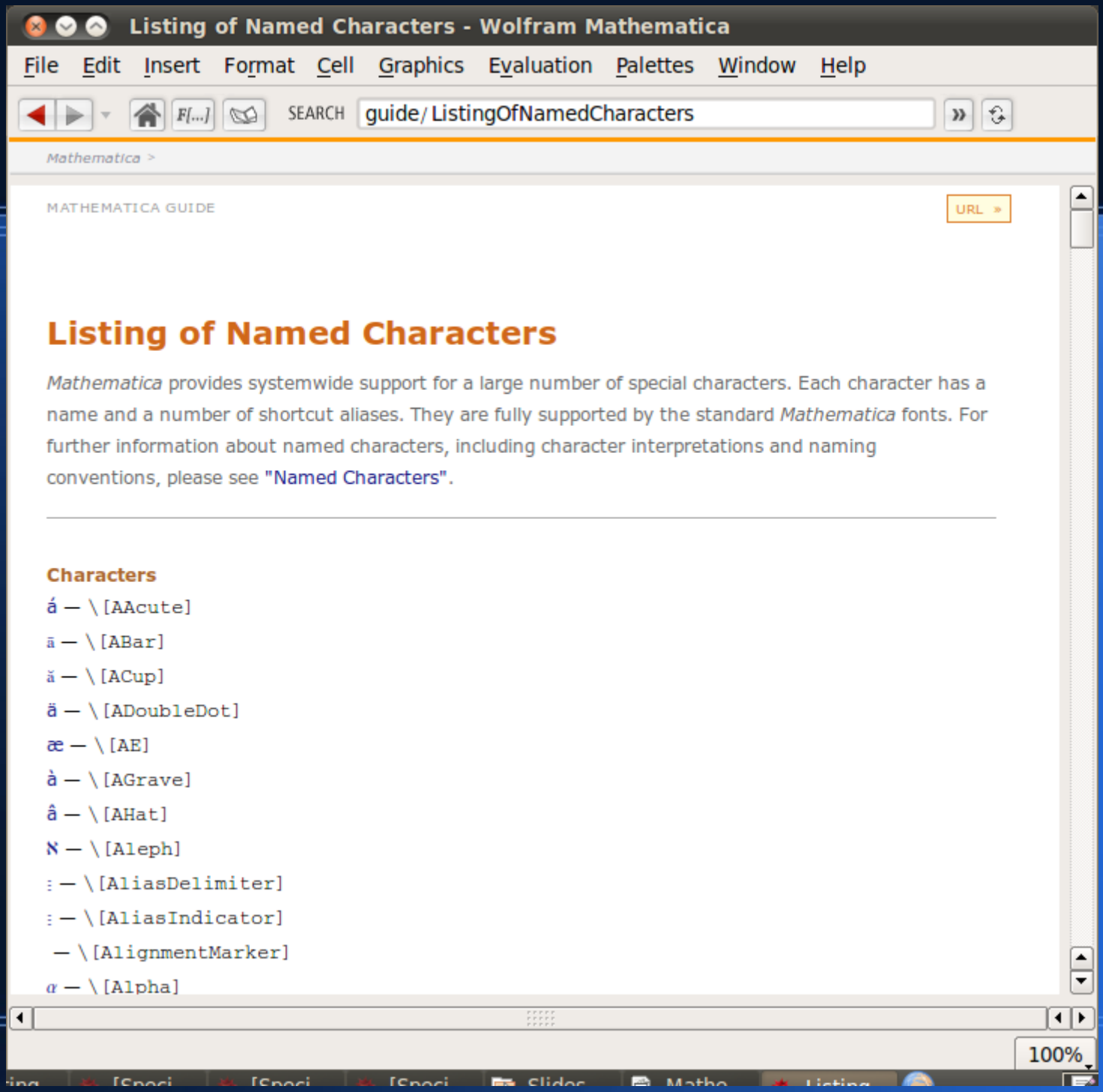
Here is the list.

Scroll it and find the symbols you need.


Listing of Named Characters - Wolfram Mathematica
File Edit Insert Format Cell Graphics Evaluation Palettes Window Help
SEARCH guide/ListingOfNamedCharacters
Mathematica >
MATHEMATICA GUIDE
URL »
Listing of Named Characters
Mathematica provides systemwide support for a large number of special characters. Each character has a name and a number of shortcut aliases. They are fully supported by the standard Mathematica fonts. For further information about named characters, including character interpretations and naming conventions, please see "Named Characters".
Characters
á — \[AAcute]
ā — \[ABar]
ă — \[ACup]
ä — \[ADoubleDot]
æ — \[AE]
à — \[AGrave]
â — \[AHat]
ℵ — \[Aleph]
: — \[AliasDelimiter]
: — \[AliasIndicator]
— \[AlignmentMarker]
α — \[Alpha]
100%

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For Help on typing formulas go back to Documentation Center and type

formulas

in the search box.

File Edit Insert Format Cell Graphics Evaluation Palettes Window Help

SEARCH formulas

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DOCUMENTATION CENTER

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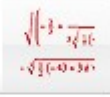
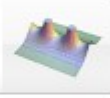
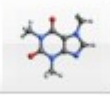
- CORE LANGUAGE 
- MATHEMATICS AND ALGORITHMS 
- VISUALIZATION AND GRAPHICS 
- DATA MANIPULATION 
- COMPUTABLE DATA 
- DYNAMIC INTERACTIVITY 
- NOTEBOOKS AND DOCUMENTS 
- SYSTEMS INTERFACES & DEPLOYMENT 

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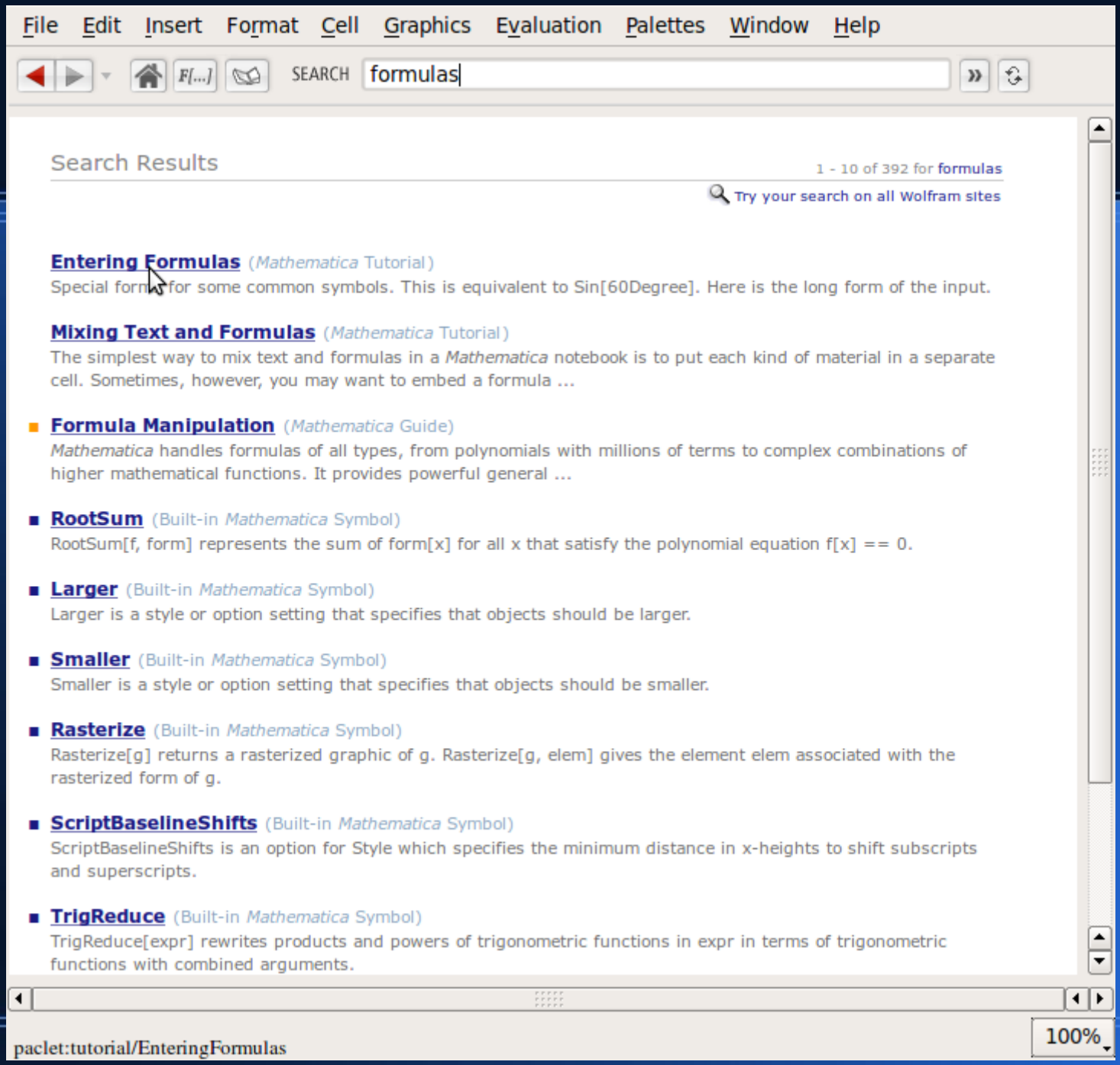
Hit Enter


File Edit Insert Format Cell Graphics Evaluation Palettes Window Help
SEARCH formulas
Search Results
1 - 10 of 392 for formulas
Try your search on all Wolfram sites
Entering Formulas (Mathematica Tutorial)
Special form for some common symbols. This is equivalent to Sin[60Degree]. Here is the long form of the input.
Mixing Text and Formulas (Mathematica Tutorial)
The simplest way to mix text and formulas in a Mathematica notebook is to put each kind of material in a separate cell. Sometimes, however, you may want to embed a formula ...
Formula Manipulation (Mathematica Guide)
Mathematica handles formulas of all types, from polynomials with millions of terms to complex combinations of higher mathematical functions. It provides powerful general ...
RootSum (Built-in Mathematica Symbol)
RootSum[f, form] represents the sum of form[x] for all x that satisfy the polynomial equation f[x] == 0.
Larger (Built-in Mathematica Symbol)
Larger is a style or option setting that specifies that objects should be larger.
Smaller (Built-in Mathematica Symbol)
Smaller is a style or option setting that specifies that objects should be smaller.
Rasterize (Built-in Mathematica Symbol)
Rasterize[g] returns a rasterized graphic of g. Rasterize[g, elem] gives the element elem associated with the rasterized form of g.
ScriptBaselineShifts (Built-in Mathematica Symbol)
ScriptBaselineShifts is an option for Style which specifies the minimum distance in x-heights to shift subscripts and superscripts.
TrigReduce (Built-in Mathematica Symbol)
TrigReduce[expr] rewrites products and powers of trigonometric functions in expr in terms of trigonometric functions with combined arguments.
paclet:tutorial/EnteringFormulas
100%

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Click on

Entering Formulas

File Edit Insert Format Cell Graphics Evaluation Palettes Window Help

SEARCH formulas

Virtual Book > Notebooks and Documents > Input and Output in Notebooks > Entering Formulas >

MATHEMATICA TUTORIAL

Related Tutorials » URL »

Entering Formulas

character	*short form*	*long form*	*symbol*
π	Esc p Esc	\[Pi]	Pi
∞	Esc inf Esc	\[Infinity]	Infinity
°	Esc deg Esc	\[Degree]	Degree

Special forms for some common symbols.

This is equivalent to Sin[60 Degree].

In[1]:= **Sin[60 °]**

Out[1]= $\frac{\sqrt{3}}{2}$

Here is the long form of the input.

In[2]:= **Sin[60 °]**

Out[2]= $\frac{\sqrt{3}}{2}$

You can enter the same input like this.

In[3]:= **Sin[60 :deg:]**

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Scroll down and explore

Find instructions how to type long summation.

File Edit Insert Format Cell Graphics Evaluation Palettes Window Help

SEARCH formulas

You should realize that even though a summation sign can look almost identical to a capital sigma it is treated in a very different way by *Mathematica*. The point is that a sigma is just a letter; but a summation sign is an operator which tells *Mathematica* to perform a `Sum` operation.

Capital sigma is just a letter.

```
In[13]:= a + Σ ^ 2
```

$$\text{Out[13]= } a + \Sigma^2$$

A summation sign, on the other hand, is an operator.

In[14]:= **Esc** sum **Esc** **Ctrl+++** `n=0` **Ctrl+%** `m` **Ctrl+Space** `1/f[n]`

$$\text{Out[14]= } \sum_{n=0}^{m} \frac{1}{f[n]}$$

Much as *Mathematica* distinguishes between a summation sign and a capital sigma, it also distinguishes between an ordinary `d`, the "partial d" ∂ that is used for taking derivatives, and the special "differential d" d that is used in the standard notation for integrals. It is crucial that you use the differential d—entered as Esc `dd` Esc—when you type in an integral. If you try to use an ordinary `d`, *Mathematica* will just interpret this as a symbol called `d`—it will not understand that you are entering the second part of an integration operator.

This computes the derivative of x^n.

```
In[15]:= ∂ x^n
```

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That's it for now.