



Innovative Teaching Education in Mathematics - ITEM

Math apps and on-line CAS catalogue

Rodrigo Trujillo González, PhD

Universidad de La Laguna Tenerife- SPAIN rotrujil@ull.edu.es



Maths Apps for High Education

Power Scientific Calculator oriented apps

HiPER MyScript Calculator 2 Photomath

Socratic

Wabbitemu

CAS oriented apps

Wolfram math apps GEOMETRY PADS MATHS Desmos Graphing Calculator Grapher - Equation Plotter & Solver Graphing Calculator + Math, Algebra & Calculus Calculator N+ (Open source) - Math Solver

Databases for consulting

Maths Formulas Free All Math Formula

CAS on-line platforms



GeoGebra

WolframAlpha computational intelligence.

Maths Apps for High Education

Power Scientific Calculator oriented apps

Hiper



https://play.google.com/store/apps/details?id=cz.hipercalc https://hiperdevelopment.wixsite.com/home

HiPER Scientific Calculator is a popular calculator with rapidly growing downloads and high user ratings.





Photomath

Price: Free https://photomath.net/en/

Scan math problems for instant results





Learn with step-by-step instructions



Edit using the smart calculator



Explore beautiful graphs



CAS oriented apps



Grapher - Equation Plotter & Solver

https://play.google.com/store/apps/details?id=be.grapher

Grapher is a fast and effective equation plotter, capable of drawing any function, solving equations and calculating expressions. Especially if you're a student, teacher or



engineer, this app is made with you in mind! A wide range of predefined functions is available, including trigonometric & hyperbolic functions, differentiation and more. Anything you type will be processed and displayed instantly by a powerful math engine, in both 2D and 3D modes. Furthermore, functions can reference each other by their name.





Graphing Calculator + Math, Algebra & Calculus

https://play.google.com/store/apps/details?id=us.mathlab.android

http://help.mathlab.us/

Graphing Calculator by Mathlab is a scientific graphing calculator integrated with algebra and is an indispensable mathematical tool for students from high school to those in college or graduate school, or just anyone who needs more than what a basic calculator offers. It is designed to replace

bulky and costly handheld graphing calculators and works on virtually any Android phone or tablet.

		2.5	3142					2 8	3:43	_		2	3.44
≡ Calc	RAD	AUTO	ł.	=	Graph		μ,	30	ŧ.	=	Table	30	1
2x^2+3x-5=0			С	^	x^3+2x^2	4			C	x^3+	2x*2		С
22.24	5 - 0			- 80	$y = x^{2} + 2x^{2}$	°⊊ 1.	']	-	1	var	$\frac{x^3 + 2x^2}{2}$	sinx	
2X + 3X-	5 = 0 -	* X[1,2]				÷				-1.0	1.0	-0.8414709848	-
1 0 0/02				-		4	3.751			-0.9	0.891	-0.7833269096	
-3 - V3 - 4	×2×-)								-0.8	0.768	-0.7173560909	
1 2×2)					3				-0.7	0.637	-0.6442176872	
1 200				100		100				-0.6	0.504	-0.5646424734	
		1	-	- 610		21				-0.5	0.375	-0.4794255386	
-3+V3-4	$\times 2 \times -5$				4	1.333, 1.186				-0.4	0.256	-0.3894183423	
202		2->		~	1	NTL	anna1			-0.3	0.153	-0.2955202057	
2.4.2					40	1 00		N		-0.2	0.072	-0.1986693308	
(5	1	•		-	h h			5		-0.1	0.019	-0.0998334156	
x= (1	5			-	3		1 1		1.1	.0.0	0.0	0.0	
^[1,2]] 2'	1									0.1	0.021	0.0998334166	
() () () () () () () () () () () () () (· · · · · ·	-	-			L				0.2	0.088	0.1986693308	
4				-336		-2				0.3	0.207	0.2955202067	
T						ine of				0.4	0.384	0.3894183423	-
						-3 †				.0.5	0.625	0.4794255386	_
										0.6	0.936	0.5646424734	_
						-4				0.7	1.323	0.6442176872	
										8,0	1.792	0.7173550909	
1 2 3	0-9		0-00	[1]	2 3		0.9	a-z (a-w	1	2:3 3.0	0-9	41-00
4	0				4	0					4	0 🗆	

CAS on-line platforms







Download GeoGebra Apps

Free offline GeoGebra apps for iOS, Android, Windows, Mac, Chromebook and Linux





GeoGebra Classic

GeoGebra Classic joins graphing, geometry, 3D, spreadsheets, computer algebra and probability in one easy-to-use and powerful package. Millions of people around the world use GeoGebra to learn math and science. Join us!





GeoGebra Graphing Calculator

Easily graph functions and equations, find special points of functions, save and share your results. Millions of people around the world use GeoGebra to learn math and science. Join us!





B 🚸

GeoGebra CAS Calculator









GeoGebra Geometry

Easily construct triangles, drag points, draw parallel lines, intersect circles, save and share your results. Millions of people around the world use GeoGebra to learn mathematics and science. Join us!









(+	
—	

GeoGebra Scientific Calculator

Replace your traditional calculator with this easy to use app. You may even use it in tests with our special exam mode which turns your phone or tablet into a handheld calculator. Millions of people around the world use GeoGebra to learn math and science. Join us!

			-		3.09
= -					۰
U 25-2-2 = 34					-
H 14 + 6 ≡ 20					1.00
$\frac{1}{2} + \frac{2}{3}$ = $\frac{1}{4}$				1	-
n () (
\$23 (to) ARC					
o² x ¹¹ √3 ⊞	7	.0	9	×	+
sin cos tan n	4	5	6	+	1.
In $\log_{10}\log_{10} \Sigma ^{11}$	1	7	3	*	6
uma , ()	D		4	5	+
and a second second second				-	-

				•4	1 100
-	. *				۰
1	menta	A7.1.1	43,3		1
	= 1	34			
ц.	roden (d.	4,7,12,	13.30		-
	- 1	AT			
a l					
4					
4					
4					
4	100				
а 10 10	100		mean	stites	stdevo
ių + sin ^{ri}	100 	ton"	mean "Po	tties *G	stdeva 1
il + sir'	000 · · · · · · · · · · · · · · · · · ·	- - - 	mean "P, abs	store °G round	stdevg 1

-				4	
11 2	_				
= 11					
2) =+**(1.5)					4
= 1.94					
a. 1					
103 (10) (41)					
	.7	g	÷	×	
533 ⊡ ² x ⁵¹ √5 ⊕ 510 cos 500 π	7 4	8	0 6	× +	•
108	7 4	a 5 2	9 6 3	* +	+ - @

GeoGebra 3D Calculator

Easily solve 3D math problems, graph 3D functions and surfaces, create geometric constructions in 3D, save and share your results. With Augmented Reality enabled, you can place math objects on any surface and walk around them! Millions of people around the world use GeoGebra to learn mathematics and science. Join us: Dynamic Mathematics for everyone!







o.

.

Classroom Resources

Find over 1 million free activities, simulations, exercises, lessons, and games for math & science!



Geometry

Arithmetic







Making the world's knowledge computable

Compute expert-level answers using Wolfram's breakthrough algorithms, knowledgebase and AI technology



Made possible by the Wolfram Language-building on 30+ years of research & development

Wolfram|Alpha
=
Overlap and the standing
+
Image: Curated Data & the standing</

WOLFRAM MATHEMATICA

The world's definitive system for modern technical computing



Elementary Math

Do basic arithmetic. Work with fractions, percentages and similar fundamentals. Solve place value and word problems.

Do basic arithmetic:

125 + 375

Do exact arithmetic with fractions:

1/4*(4-1/2)

More examples

Algebra

Find roots of and expand, factor or simplify mathematical expressions—everything from polynomials to fields and groups.

Solve an equation:

=

=

=

=

=

 $x^{3} - 4x^{2} + 6x - 24 = 0$

Factor a polynomial:

```
factor 2x^5 - 19x^4 + 58x^3 - 67x^2 + 56x - 48
```

Simplify an expression:

1/(1+sqrt(2))

More examples

Calculus & Analysis

Compute integrals, derivatives and limits as well as analyze sums, products and series.

Compute an integral:

=

=

=

=

*

integrate sin x dx from x=0 to pi	=
alculate a derivative:	
derivative of x^4 sin x	=

Solve an ordinary differential equation:

y" + y = 0	=	
More examples		

Geometry

Compute the properties of geometric objects of various kinds in 2, 3 or higher dimensions. Explore and apply ideas from many subfields of geometry.

Compute properties of a geometric figure:

annulus, inner radius=2, outer radius=5

Plot a conic section and identify its type:

 $2x^{2} - 3xy + 4y^{2} + 6x - 3y - 4 = 0$

Compute properties of a polyhedron:

dodecahedron

More examples

Plotting & Graphics

Visualize functions, equations and inequalities. Do so in 1, 2 or 3 dimensions. Make polar and parametric plots.

Plot a function:

plot x^3 - 6x^2 + 4x + 12

Plot a region satisfying multiple inequalities:

plot x^2+y^2<1 and y>x

More examples

Differential Equations

Solve differential equations of any order. Examine solutions and plots of the solution families. Specify initial conditions to find exact solutions.

Solve a linear ordinary differential equation:

y" + y = 0	=

Specify initial values:



Solve a nonlinear equation:

 $f'(t) = f(t)^2 + 1$

More examples

=

Some basic ideas on how introduce innovation (dynamic learning tools) at classroom

- We may respect the teaching organization of the responsible Professors.
- There should never be a sense of contempt for the work (methodology) done so far.
- The teacher should not feel that he loses his position in the classroom.
- We may make him understand that we bring tools of the 21th century, time which our students live. It is not a "snobby" or seasonal proposal.
- Our proposals will allow us to teach better, initially we never propose to teach "other things", and we must avoid the fear that innovations modify the objectives for each subject.
- It can be an opportunity to make more complex problems, that will help to fix the basic concepts without having to be aware of cumbersome calculations, or only be able to propose the old-fashioned type of problems.
- We provide tools for lifelong learning, which become the tool-box for other disciplines / subjects and throughout their professional development.



Thanks for your attention