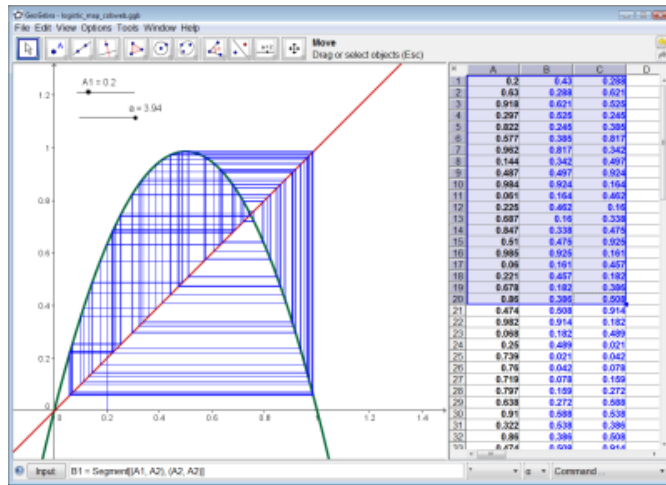


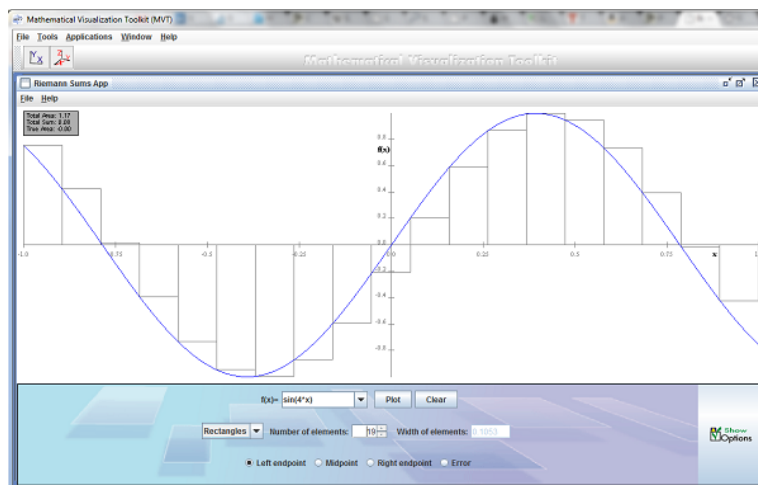
Some free mathematics applications/programmes as compiled by David Wees:

Geogebra



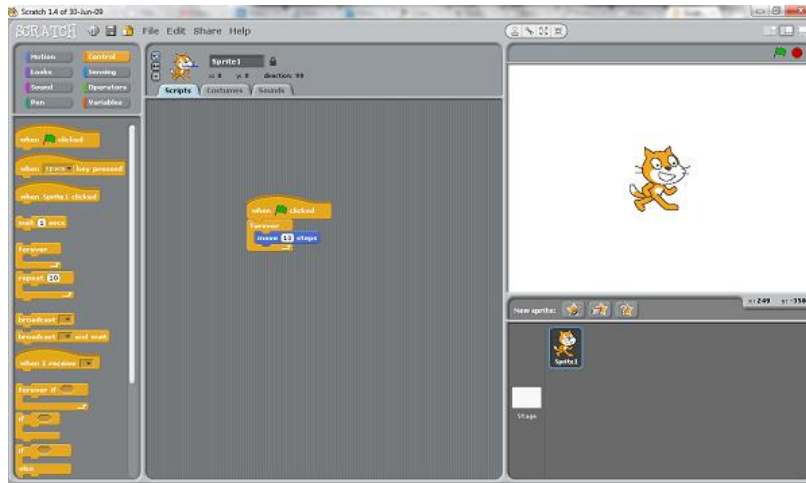
[This program](#) lets you explore algebra and geometry, much like its proprietary cousin, Geometer's Sketchpad. Having used both, I actually prefer [Geogebra](#) because I find it to be more flexible and easier to use. It requires Java to run, and can either run in a web browser with no download, or you can install it to your computer using the offline installer.

Mathematics Visualization Toolkit



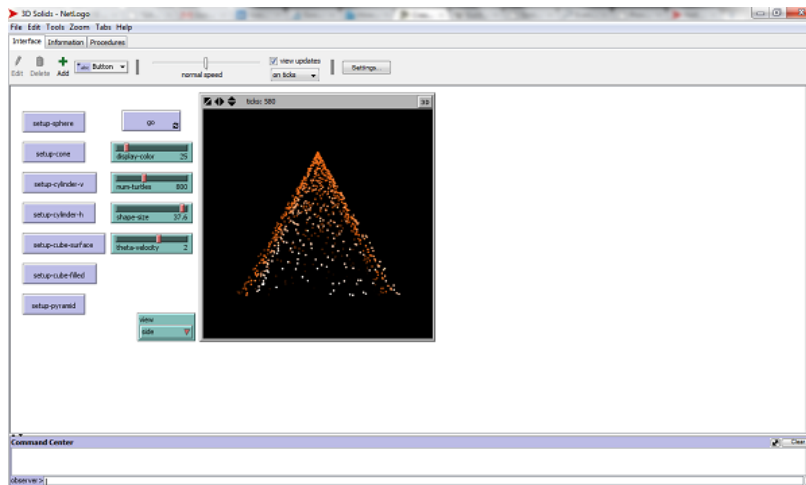
[The Mathematics Visualization Toolkit](#) is exactly that, a program which lets you visualize mathematics. You can use it to build complex visualizations, or you can use the visualizations which are already included (which are awesome by themselves). You can either use the web start version of the toolkit, or download an offline installer.

Scratch



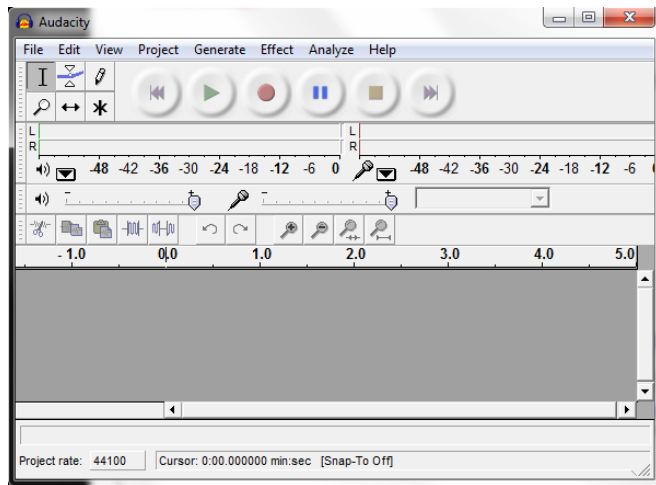
[Scratch](#) is an excellent program for learning programming but also mathematics like variables, sequences, Cartesian coordinates, and other useful mathematical concepts. Developed at MIT, it is a free download and includes a strong user community to seek help, and see what else can be done with the program.

Netlogo



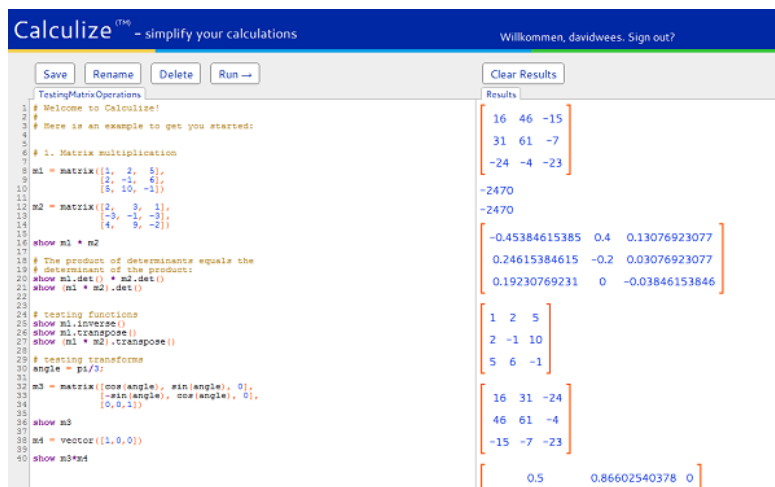
Netlogo is "a multi-agent programming modelling environment" (According to [the Netlogo website](#)). It comes with hundreds of models for all areas of science and mathematics pre-programmed. It is a free download and will work on any computer which has Java 5 or later installed.

Audacity



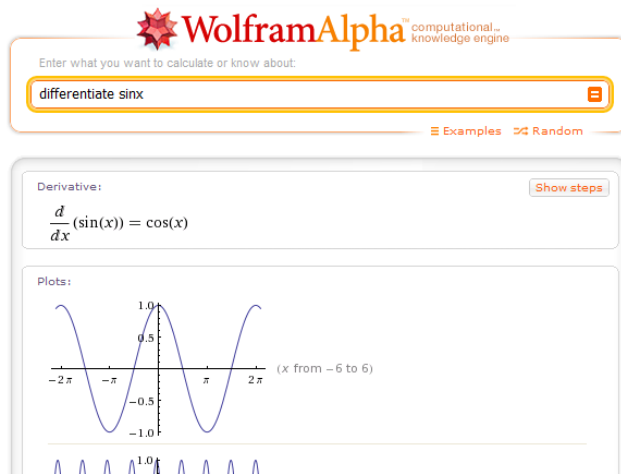
[Audacity](#) is an open source audio editor and recorder. One example use in mathematics is to record a bouncing ball, and use the visual data from audacity's recording to turn this into a graph of bounce versus time between bounces. You can also use it so students can record 60 second podcasts explaining some aspect of mathematics.

Calculize



[Calculize](#) is a free (currently) web app which lets students perform mathematical computations using a reasonably simple programming language.

Wolfram Alpha



[Wolfram Alpha](#) is a computational engine built on top of the Mathematica architecture. It is amazingly powerful, and turns some homework assignments into a breeze. Recommendation: change your homework assignments, or do away with them all together.

Logo

The screenshot shows the Logo emulator interface. At the top left, the "Logo" logo is displayed with the tagline "Powerful ideas in mind-sized bites" and "Seymour Papert". To the right of the logo are two columns of commands. The first column contains: "FD x - Go Forward x pixels", "BK x - Go Back x pixels", "RT x - Turn Right x degrees", and "LT x - Turn Left x degrees". The second column contains: "PU - Pen Up", "PD - Pen Down", "CL - Clear Screen", and "H - Reset Turtle Loc". Below the commands is a large black rectangular area representing the screen. In the center of the screen, a small yellow turtle is positioned at the bottom-left corner of a white square, which it has just drawn. Below the screen, there is a section titled "Try Some of these" which contains three bullet points: "Square: REPEAT 4 [FD 100 RT 90]", "Circle: REPEAT 90 [FD 10 RT 4]", and "Octagon: REPEAT 8 [FD 50 RT 45]".

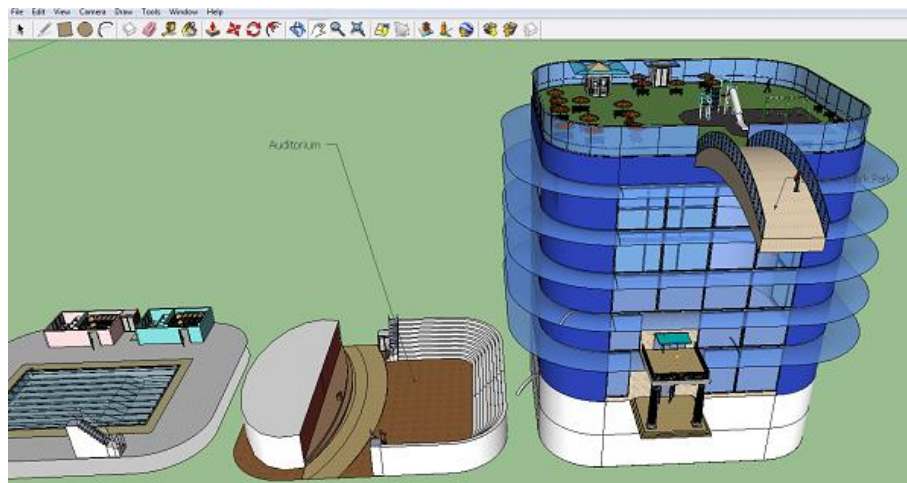
This [Logo emulator](#) lets students play with the classic programming environment [Logo](#), built for kids by [Seymour Papert](#) and his colleagues at MIT, all online. It requires Java, but should run on most computers (sorry, no iPads...).

Google Earth



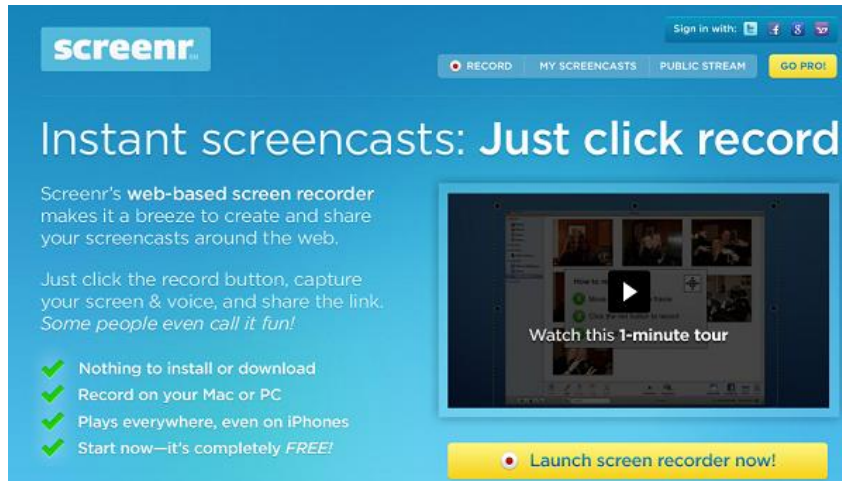
Google Earth is free (but proprietary) software that allows students to explore the world in 3d. One could use it for [GIS](#) applications, or even to explore the relationship between our 2d mapping system (longitude/latitude) and 3d space.

Google Sketchup



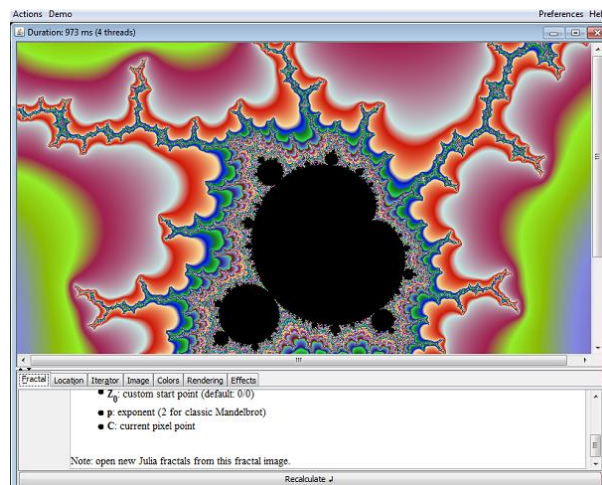
[Google Sketchup](#) (another free, but proprietary program) that allows students to create highly complex (or very simple, if they prefer) models. I've used it to have students construct their "ideal" school, and then from this model, they calculate the cost to build their school.

Screenr

The screenshot shows the Screenr website homepage. At the top, there's a navigation bar with the Screenr logo, a 'Sign in with:' section featuring social media icons, and buttons for 'RECORD', 'MY SCREENCASTS', 'PUBLIC STREAM', and 'GO PRO!'. The main heading is 'Instant screencasts: Just click record'. Below this, a paragraph describes the service as a 'web-based screen recorder' that is easy to use and share. A sub-headline says 'Just click the record button, capture your screen & voice, and share the link. Some people even call it fun!'. To the right, there's a video player showing a '1-minute tour'. Below the text, a list of features is shown with green checkmarks: 'Nothing to install or download', 'Record on your Mac or PC', 'Plays everywhere, even on iPhones', and 'Start now—it's completely FREE!'. At the bottom right, there's a yellow button that says 'Launch screen recorder now!'.

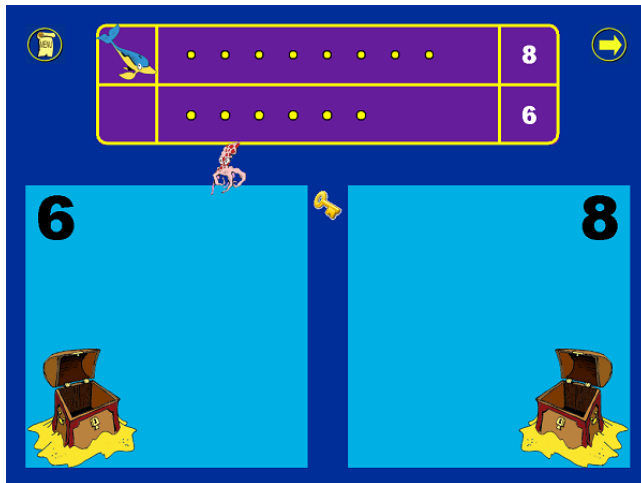
[Screenr](#) is a free (for up to 5 minute recordings) screen-casting (think record your screen as a video) software. Some possible uses of it are for students to use it to create video tutorials, record their process of solving a problem, or create their own video word problems. Another alternative for screen-casting is [Jing](#), but it publishes to a format which is harder to share in the free version.

Endlos



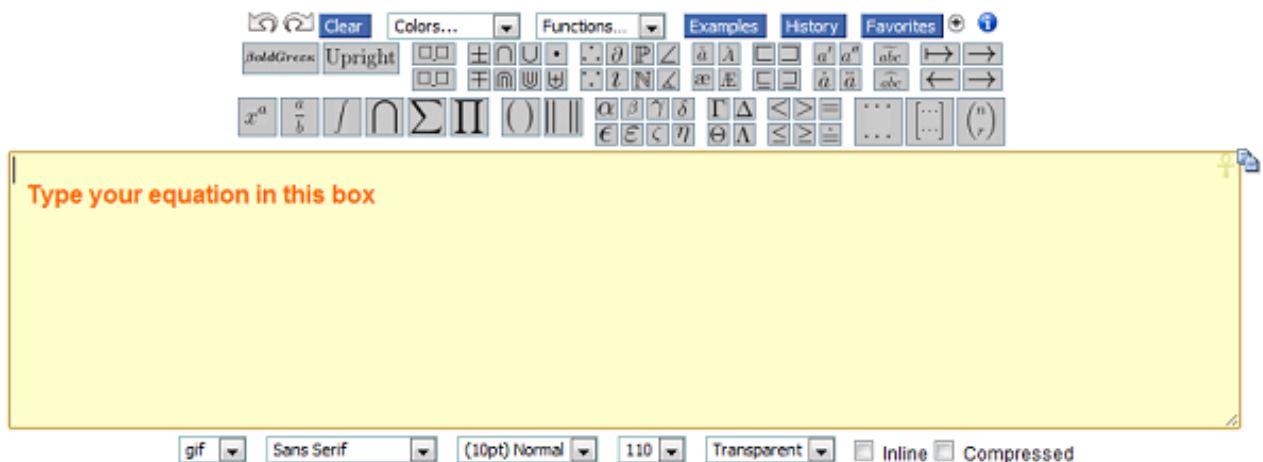
[Endlos](#) is an open source fractal generator which I've found runs very fast. It runs in Java, so it should run on any computer capable of supporting Java. The ability to experiment with, and explore fractals is a very interesting thing for students to do, but very tedious to do by hand...

The Number Race



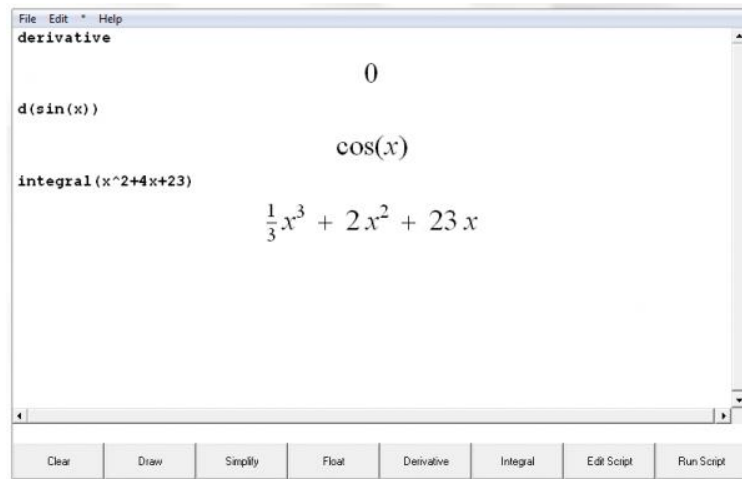
[The Number Race](#) is an open source program intended to help students who have dyscalculia develop their number sense. It has many levels of difficulty, and runs in Java, which means it should run on a wide variety of computers.

Code Cogs equation editor



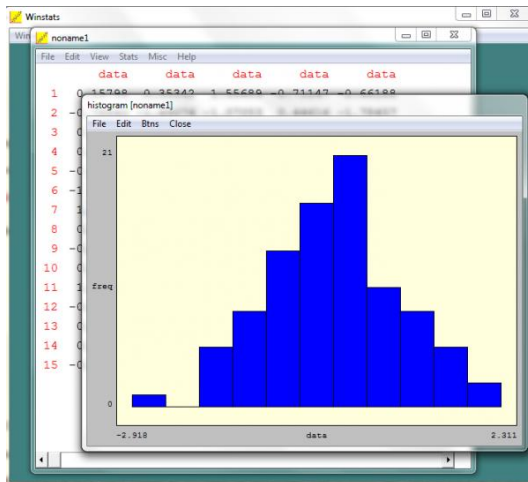
This [free to use online equation editor](#) could be a nice way for students (and teachers potentially) to construct equation images for use in a website.

Eigenmath



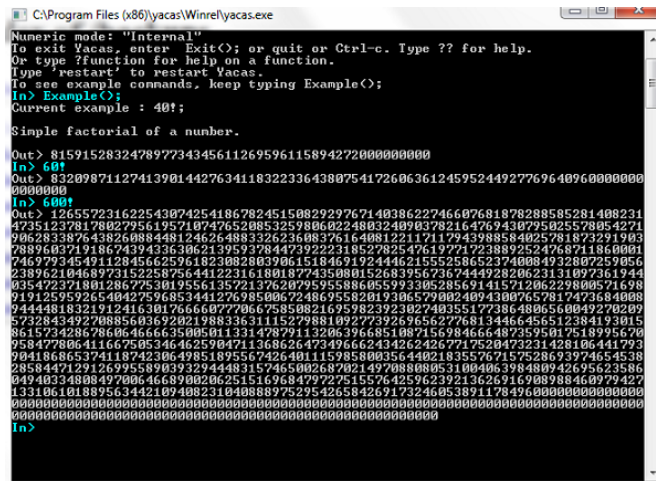
[Eigenmath](#) is an open source program for symbolic manipulation in math. It runs either in Windows or on a Mac. Some examples of what it can do are shown above.

Peanut math programs



[These 9 free programs](#) cover a wide range of different types of mathematics. Above is the popular statistics calculation and visualization program included in the package.

Yacas



```
C:\Program Files (x86)\yacas\WinRel\yacas.exe
Numeric mode: "Internal"
To exit Yacas, enter Exit(); or quit or Ctrl-c. Type ?? for help.
Or type ?function for help on a function.
Type 'restart' to restart Yacas.
To see example commands, keep typing Example();
In> Example();
Current example : 40!;

Simple factorial of a number.
Out> 815915283247897734345611269596115894272000000000
In> 60!
Out> 832098711274139014427634118322336438075417260636124595244927769640960000000
0000000
In> 600!
Out> 126552231622543074254186782451508292976714038622746607681878288585281408231
47351237817802795619571074765208532598060224803240903782164769430795025578054271
90628338764382608844812462648833262360837616408122117117943988584025781873221903
78996037191867439433630621395937844739222318527325476197712238892524766711860061
7469793454911284562596182308280390615184691924446215552586523740884932807259056
23896210468973152258756441223161801877435080152683956736744492820623131097361944
03547237180128677530195561357213762079595588605599330528569141571206229800571698
9191259526540427526853441226985086724869558201930657908240943007657817473584008
9444481832191241630176666077066758508216959823923027403551773864806560049270209
57328434927088560367202198833631115279881092773926965627768134466456512384193015
861573428678606466635005011314787911320639668510871569846664873595017518995670
95847780641166758534646259047113686264724966624342624267717520473231428106441793
9041868653741187423064985189556742640111595800356440218355767157528693974654538
28584471291269955890393294448315746500268702149708808053100406398480942695623586
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133106101889534421094082310408897529542650426917324605389117649600000000000000
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In>
```

[Yacas](#) (Yet Another Computer Algebra System) is a command line program which allows for the symbolic manipulation and calculation of mathematical expressions. One thing I like about it is that it calculated 600! in a fraction of a second, so it is very fast (an aside, [ever wondered what 6000! factorial is?](#))

Other free programs which I have used either for constructing mathematical diagrams/simulations or with students in some way include:

[The Gimp](#), [Programmer's Notepad](#), [Flex Builder](#) (free with an education license), [Open Simulator](#), [VLC Player](#), [Wolfram Demonstrations](#) (requires a free browser plugin)

You might find these programs as useful alternatives to the "free apps" which "help" students memorize formulas & algorithms. For an enormous list of other free programs [see this helpful list](#).