

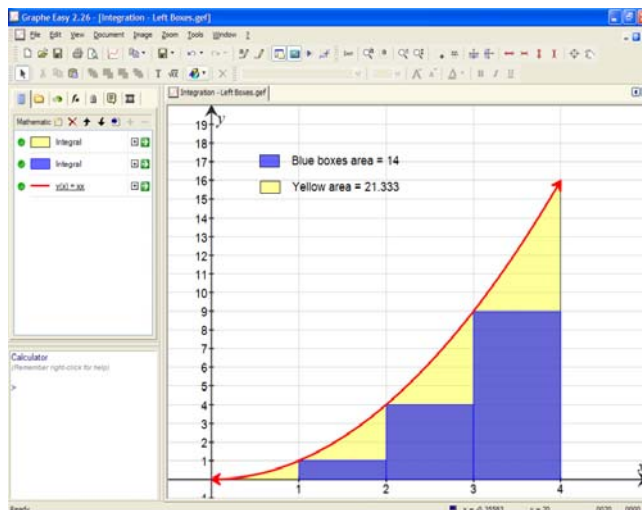
2 terrific technologies

V7

ClassPad (CAS) and Graphe Easy (software)



Presenter: Geoff Phillips



Session outline:

Part 1

ClassPad's ease/speed of use – a tour of some highlights

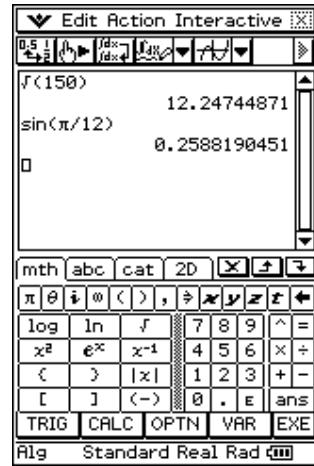
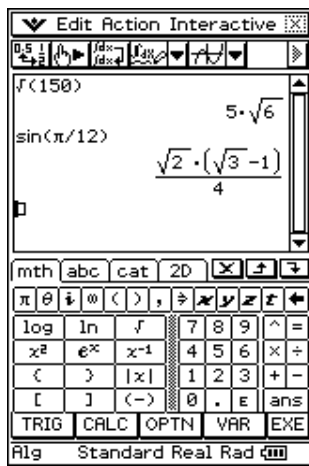
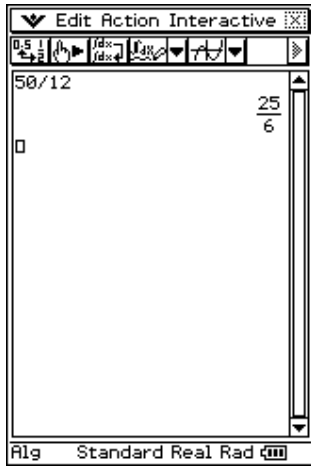
- Basic operation Modes (std/deg, rad/deg, recalc line/all)
- Drag and drop (within and between apps), live updating
- Keyboards 2D etc. simult. eqns, derivatives etc.
- CAS algebra solve, factorise, expand, differentiate, sim eqns etc.
- Wizards e.g. Normal curve calcs.
- Graphing $p(x) = x^3 + 5x^2 - 8x - 12$, locating key features, tangents and integrals, dynamic graph, panning.
- Sequences Defining explicit/implicit, tables, sum, graphs
- Solver Solve for any variable in an equation (no need to put = 0).
- Main – Geom dragging from Main to Geometry app & vice verse.
- Geometry unleashed incentre, theorems made fun, tangent animations, tables
- Spreadsheet application copying data from Geometry area investigation
- Statistics lists, stats calcs, regression calcs and plots.
- eActivity family of functions, dragging to Main for analysis.
- Questions How do I.....?

Part 2

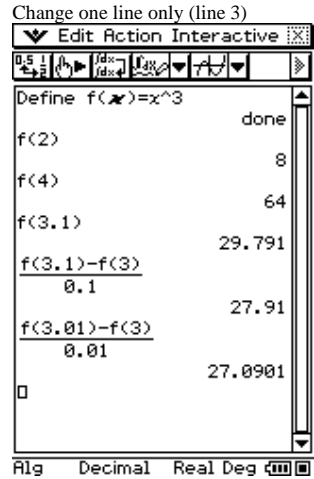
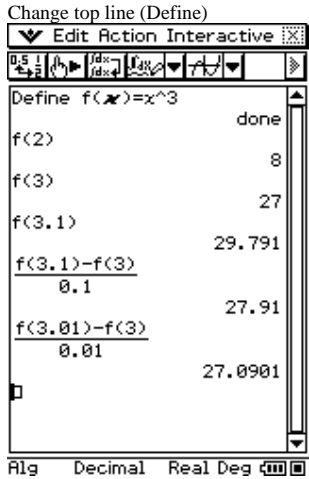
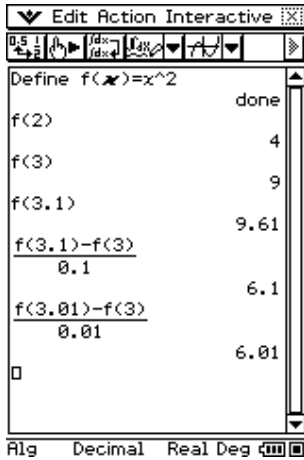
Graphe Easy – teaching aid and desktop publishing application

- Basic graphing $y = xx$
- Built in features Plot types, Parameters, Integration, Data, DEs etc.
- Teaching aid files Left boxes example, Gradient of secant.
- Representing data Scatter, column and box plots.
- Keyboard shortcuts Customising GE for use in desktop publishing.
- Desktop publishing Formatting for tests and worksheets.

Modes / keyboards

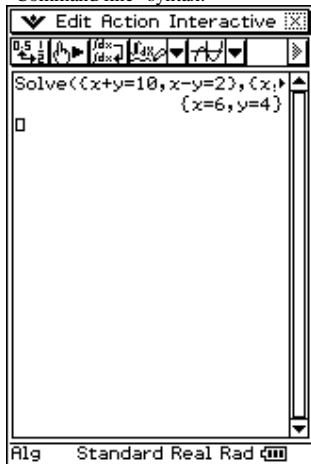


Drag and drop

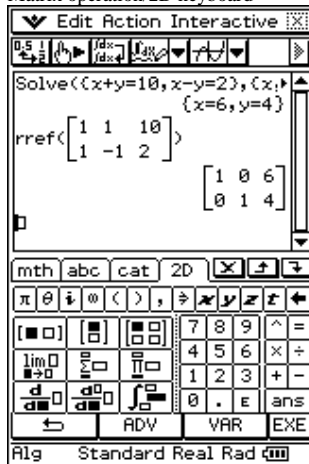


Simultaneous equations – 4 methods

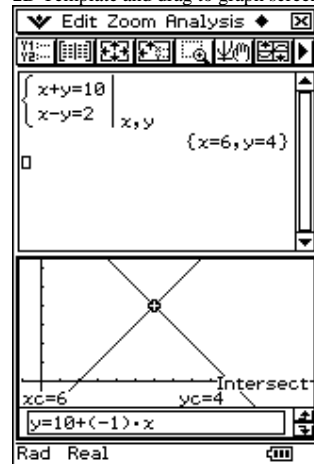
"Command line" syntax.



Matrix operation/2D keyboard



2D Template and drag to graph screen



2D Keyboard

2D Keyboard.

TI-84 Plus calculator screen showing a system of linear equations and their solution. The equations are $x + y = 10$ and $x - y = 2$. The solution is $x = 6, y = 4$. The screen also shows the 2D keyboard interface with various mathematical symbols and functions.

2D Keyboard→CALC.

TI-84 Plus calculator screen showing a limit calculation. The expression is $\lim_{h \rightarrow 0} \left(\frac{f(x+h) - f(x)}{h} \right)$ and the result is $3 \cdot x^2$. The screen also shows the 2D keyboard interface.

TI-84 Plus calculator screen showing a matrix inverse calculation. The matrix is $\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$ and the inverse is $\begin{bmatrix} 10 \\ 2 \end{bmatrix}$. The result is $\begin{bmatrix} 6 \\ 4 \end{bmatrix}$. The screen also shows the 2D keyboard interface.

CAS algebra

Action or Interactive menu/
Transformation

TI-84 Plus calculator screen showing CAS algebra transformations. The operations performed are: $\text{expand}((x+1)(x+2)(x-3))$ resulting in $x^3 - 7x - 6$; $\text{factor}(x^3 + 5x^2 - 8x - 12)$ resulting in $(x+6)(x+1)(x-2)$; $\frac{d}{dx}(x^3 + 5x^2 - 8x - 12)$ resulting in $3x^2 + 10x - 8$; $\int x^3 + 5x^2 - 8x - 12 dx$ resulting in $\frac{x^4}{4} + \frac{5x^3}{3} - 4x^2 - 12x$; and $\int_4^2 x^3 + 5x^2 - 8x - 12 dx$.

Wizards

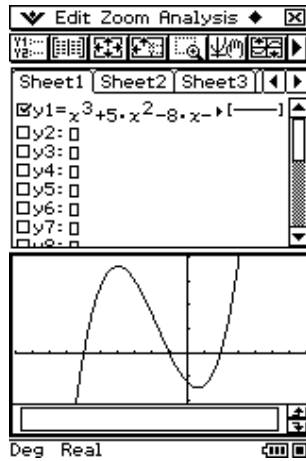
Interactive/Distribution/normCDF

TI-84 Plus calculator screen showing the normCDF wizard. The wizard is titled "normCDF" and has the following settings: Lower: -2, Upper: 2, σ : 1, μ : 0. The "upper boundary" option is selected. The screen also shows the 2D keyboard interface.

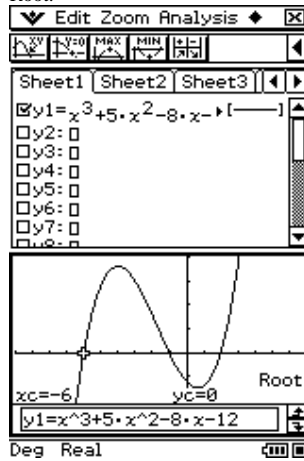
TI-84 Plus calculator screen showing the result of the normCDF wizard. The calculation is $\text{normCDF}(-2, 2, 1, 0)$ and the result is 0.9544997361 . The screen also shows the 2D keyboard interface.

Graphing $p(x) = x^3 + 5x^2 - 8x - 12$

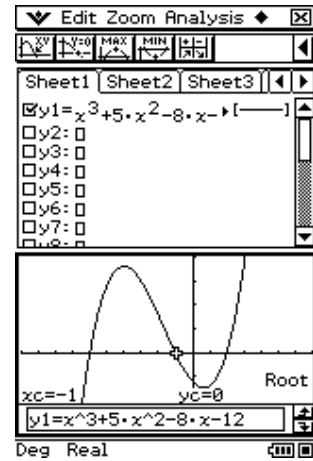
Graph icon, then Y=.



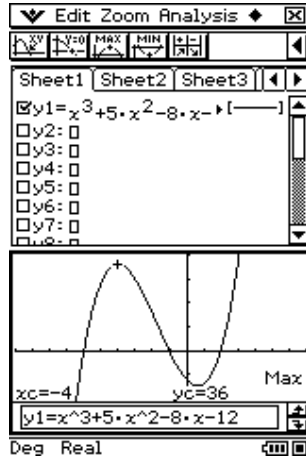
Toolbar icon or Analysis/G-Solve/Root.



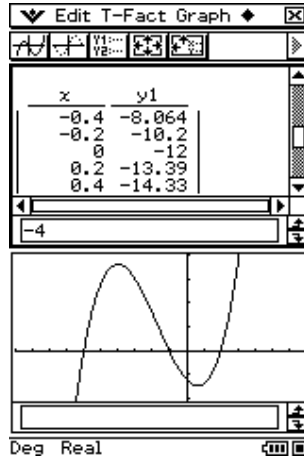
Arrow key for next root.



Toolbar icon or Analysis/G-Solve/Max

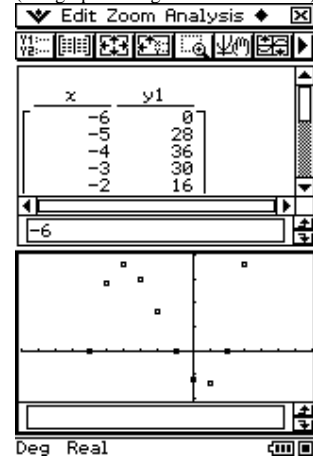


Tabulate icon.

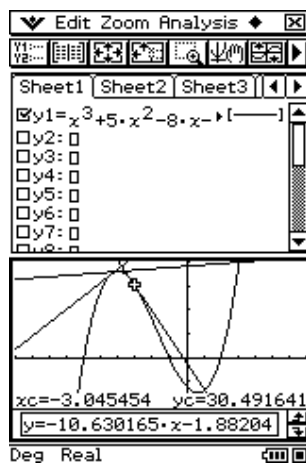


Points plot icon.

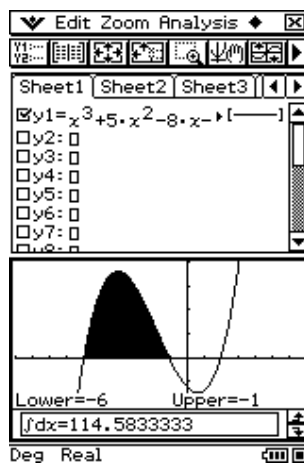
(Re-graph/click gr icon to clear dots)



Analysis/Sketch/Tangent.

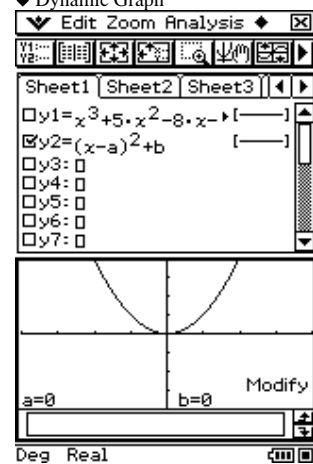


Analysis/G-Solve/∫dx/Key lower



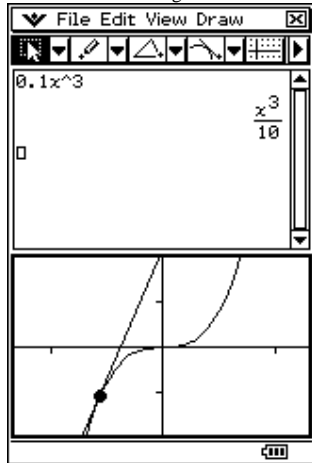
Include a and b in equation.

◆ Dynamic Graph

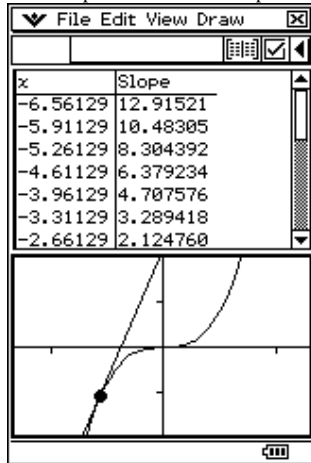


Main → Geometry

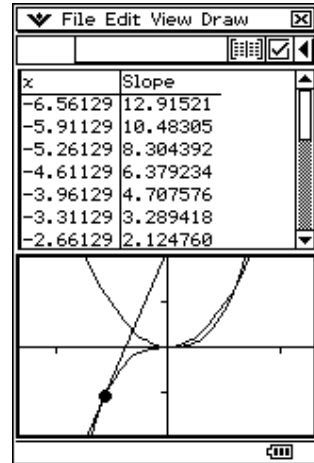
From Main, enter expression
 Drag to Geometry window
 Draw/Construct/Tangent to Curve



Create animation (Edit/Animate/Add)
 Edit/Animate/Go Once
 Tabulate point co-ords and slope

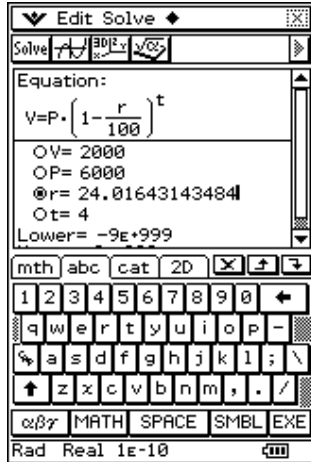
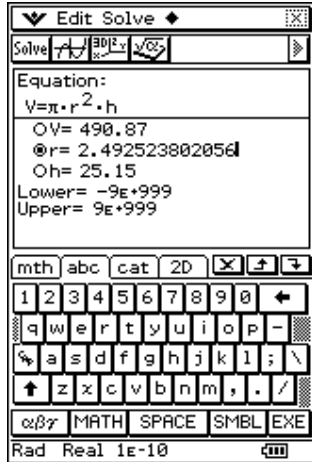


Drag table back to Geom window

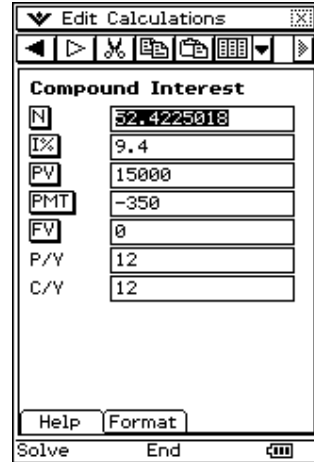


Solver / Financial app's TVM solver

Menu→NumSolve

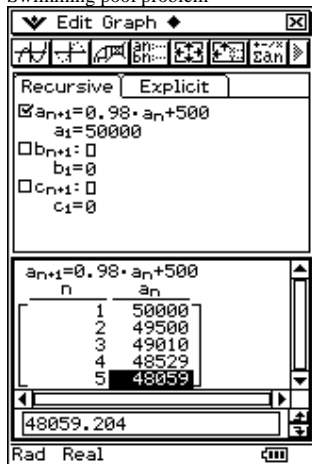


Menu→Financial

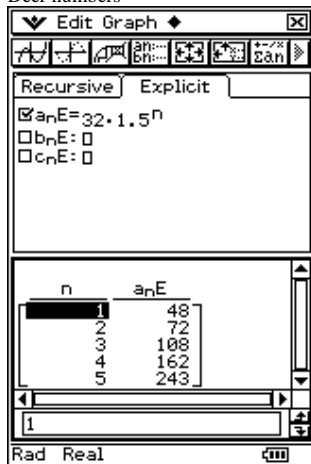


Sequences

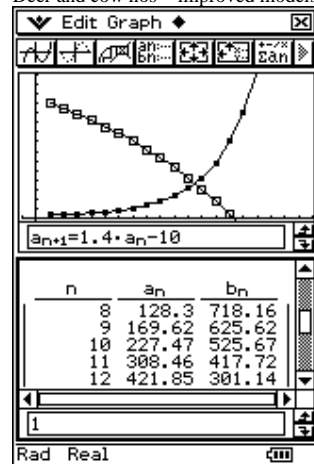
Swimming pool problem



Deer numbers

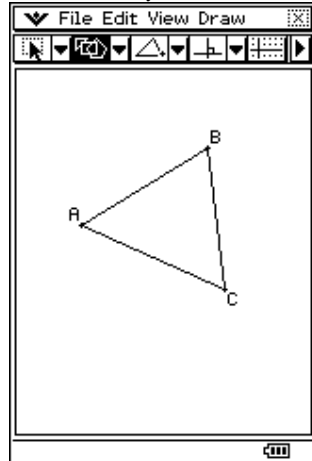


Deer and cow nos – improved models

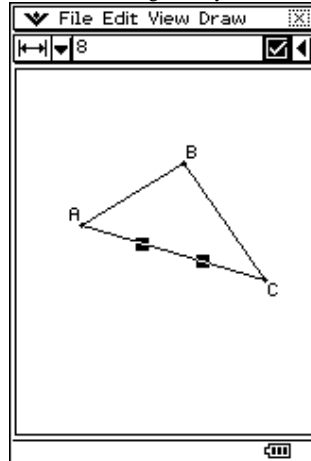


Geometry unleashed

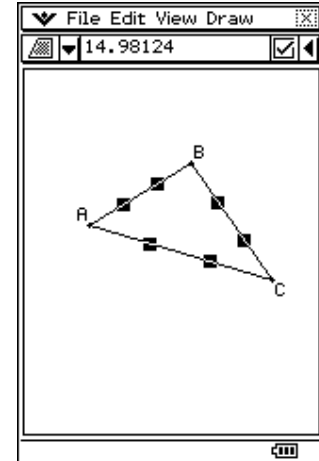
Menu→Geometry



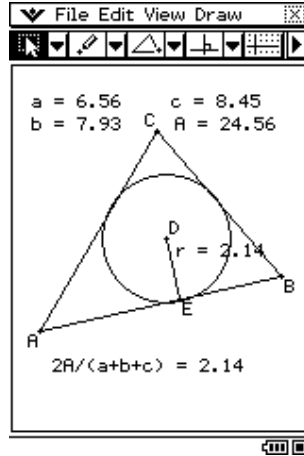
Constraint based geometry



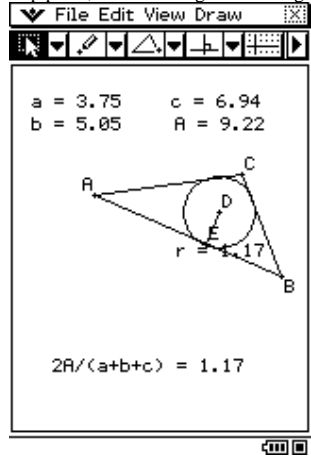
Measurement/calculations



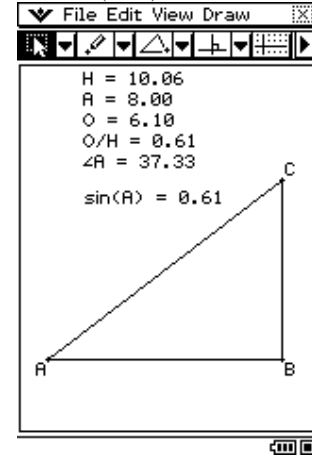
GP Geom/incentre



Tap point, then touch again and drag

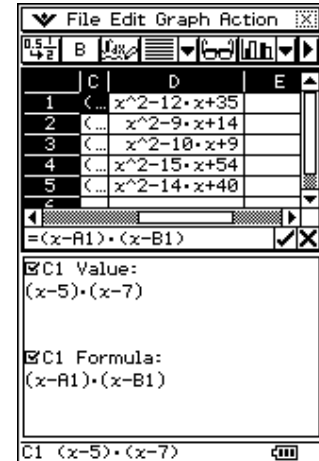
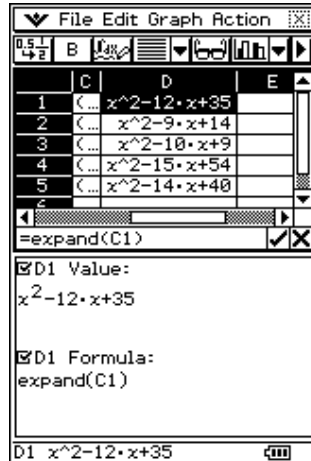
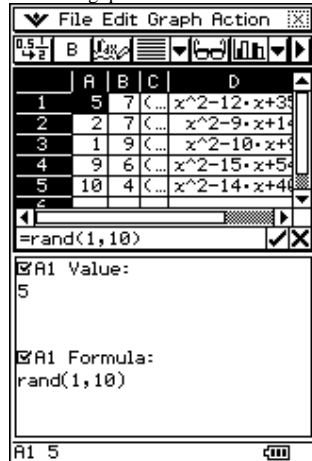


Sine ratio (sinrat)



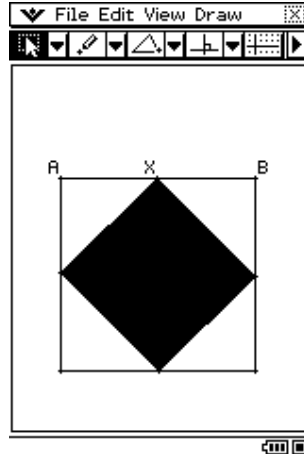
Spreadsheet application

Generating quadratics

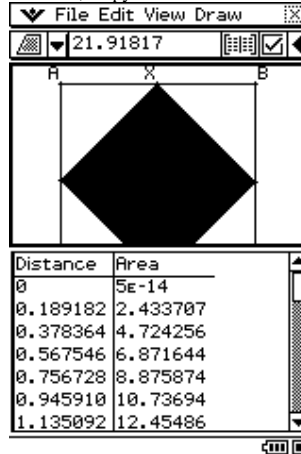


Combining applications (e.g. Geometry and Spreadsheet apps)

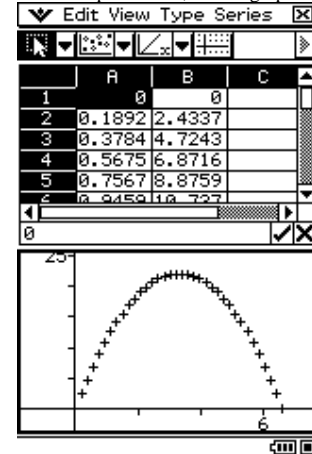
GP Geom/BlackAn



Animate, Copy data.

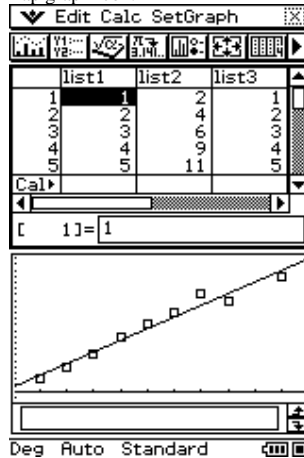


Paste to Spreadsheet, scatter graph.

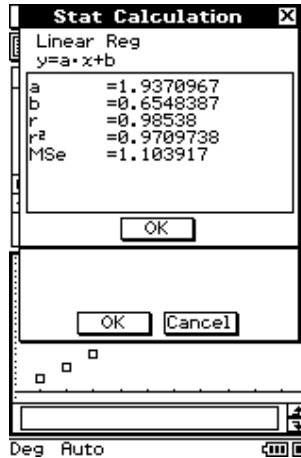


Statistics

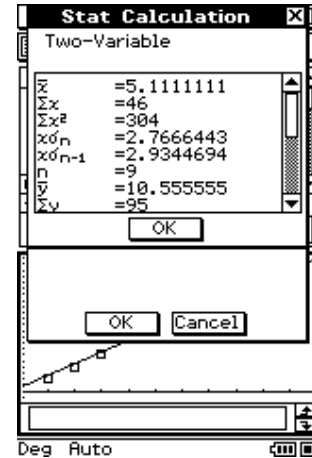
SetGraph, setting 1,2,3. Tick StatGraph1. Tap graph icon.



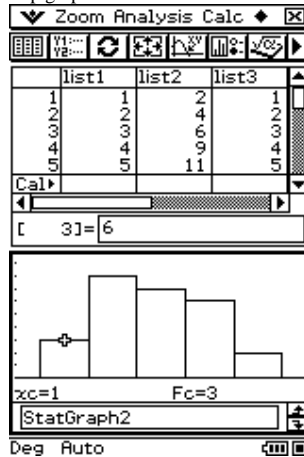
Calc, LinReg (list1, list2).



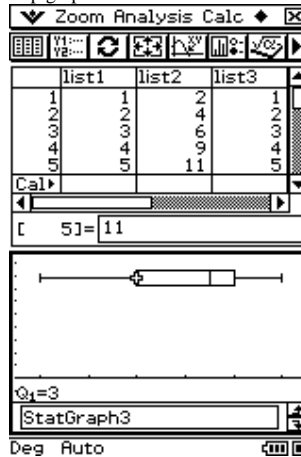
Calc, Two-variable (list1,list2).



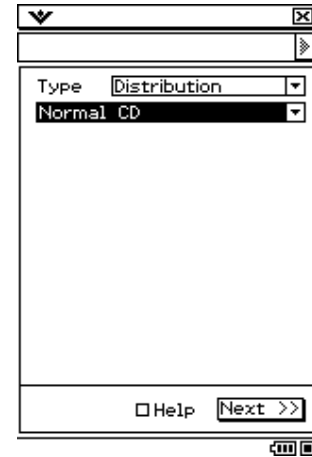
SetGraph, tick StatGraph2 only. Tap graph icon.



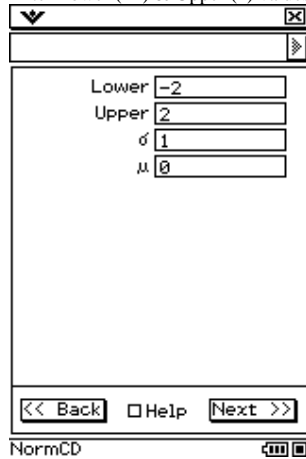
SetGraph, tick StatGraph3 only. Tap graph icon.



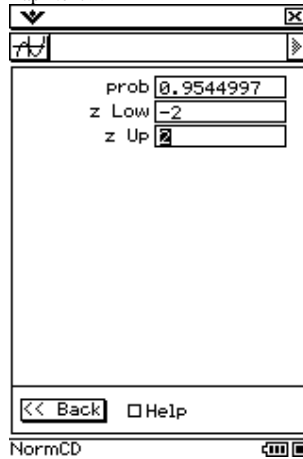
Calc, Distribution. Select NormalCD in bottom box.



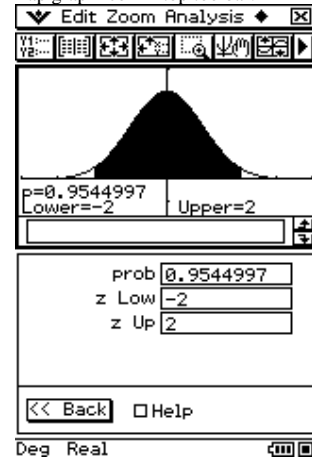
Enter Lower (-2) & Upper (2) values.



Tap Next >>

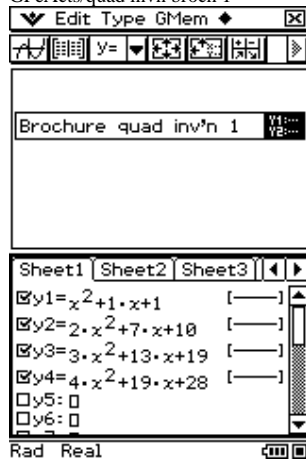


Tap graph icon in top toolbar.

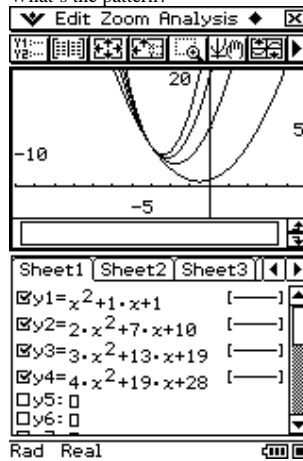


eActivities (i.e. Save-able files)

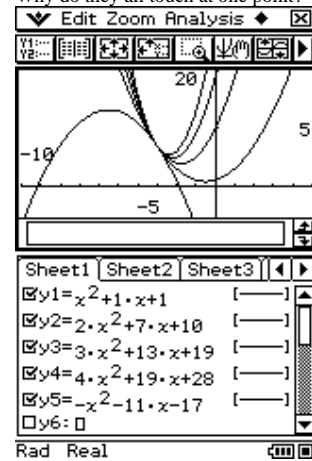
GPeActs/quad invn broch 1



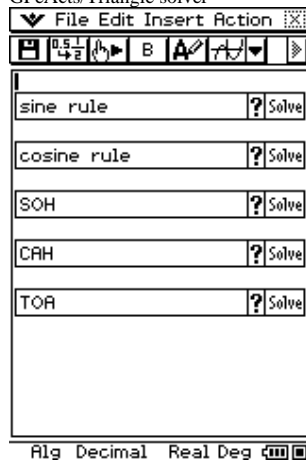
What's the pattern?



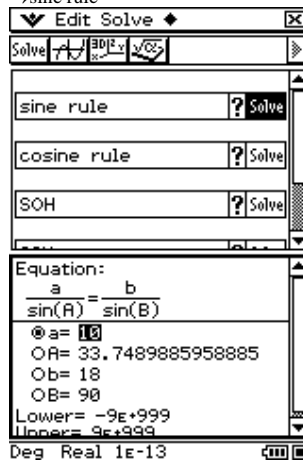
Why do they all touch at one point?



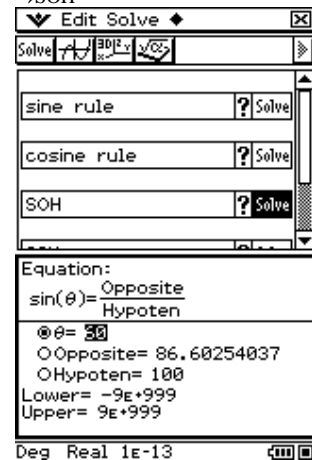
GPeActs/Triangle solver



→sine rule



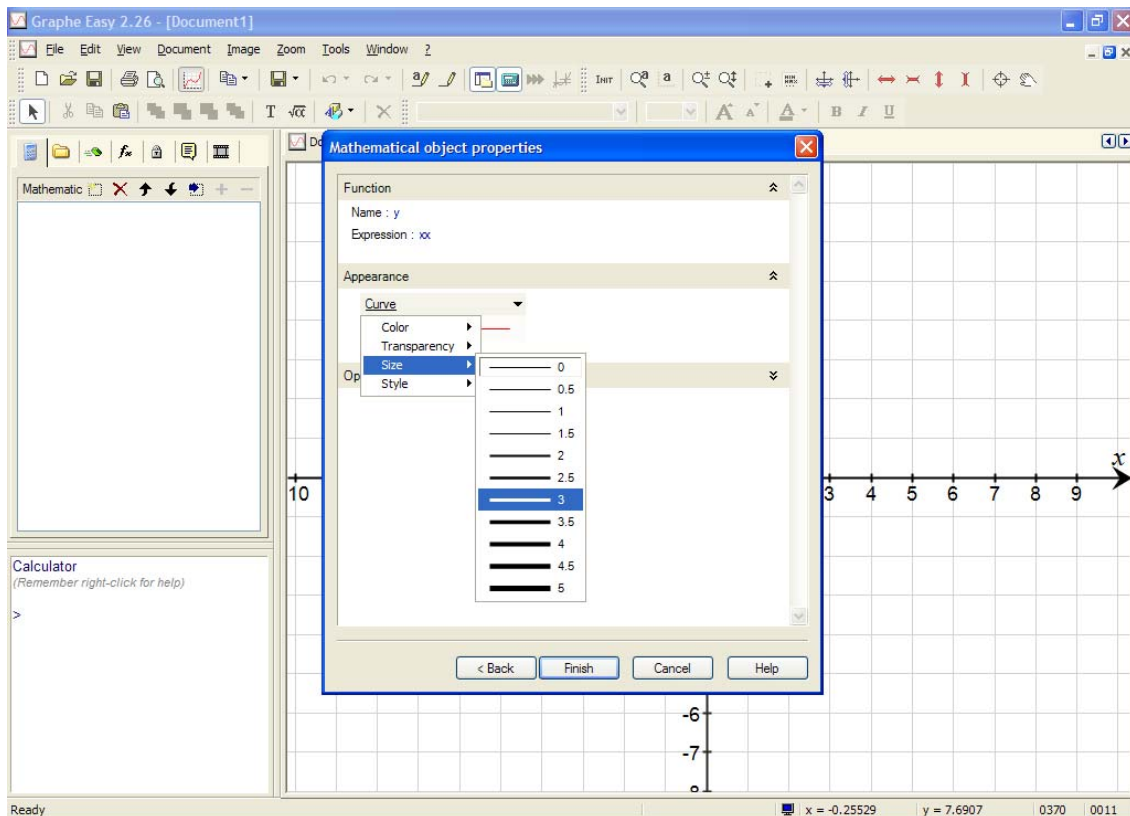
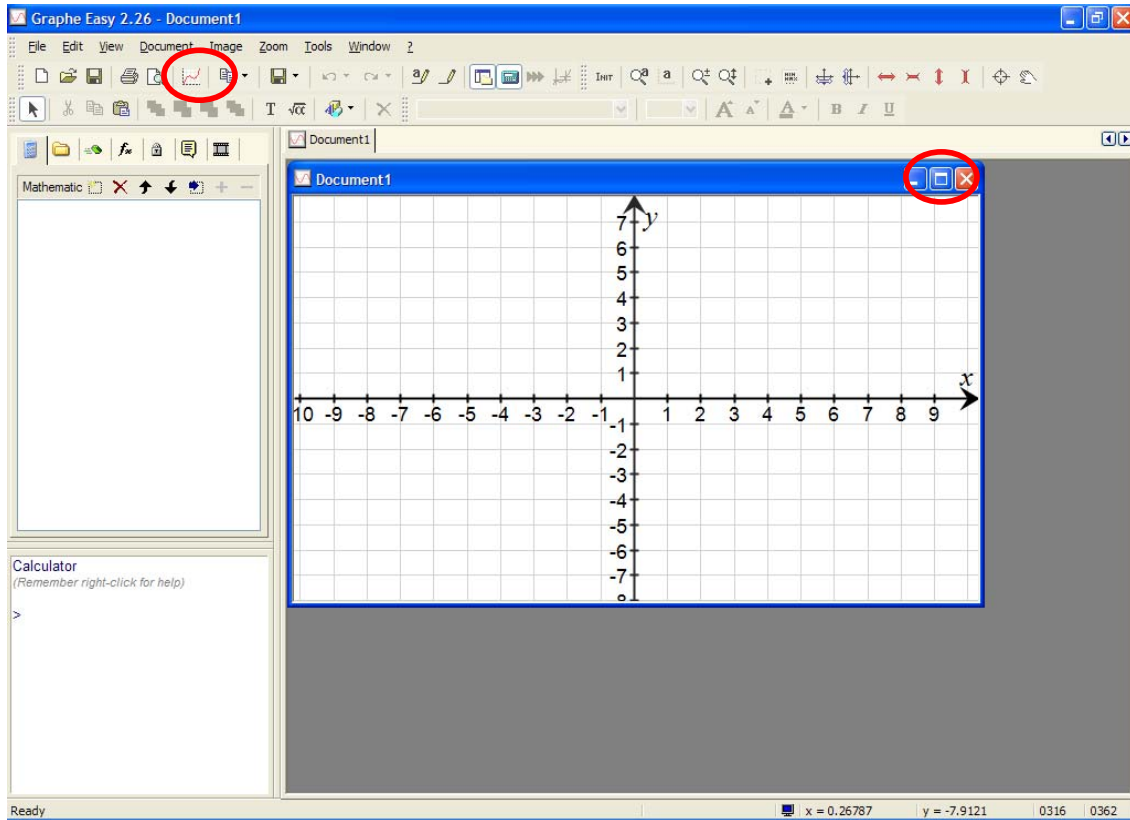
→SOH

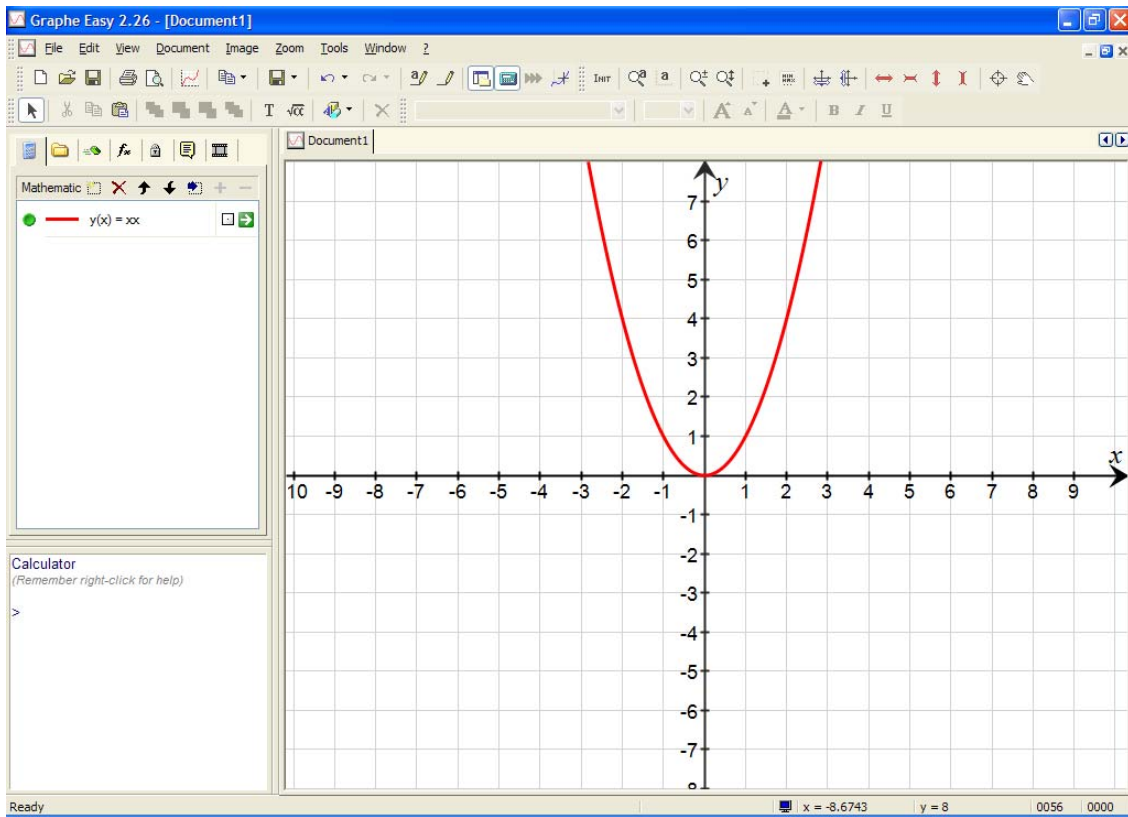


Questions – “How do I ...?”

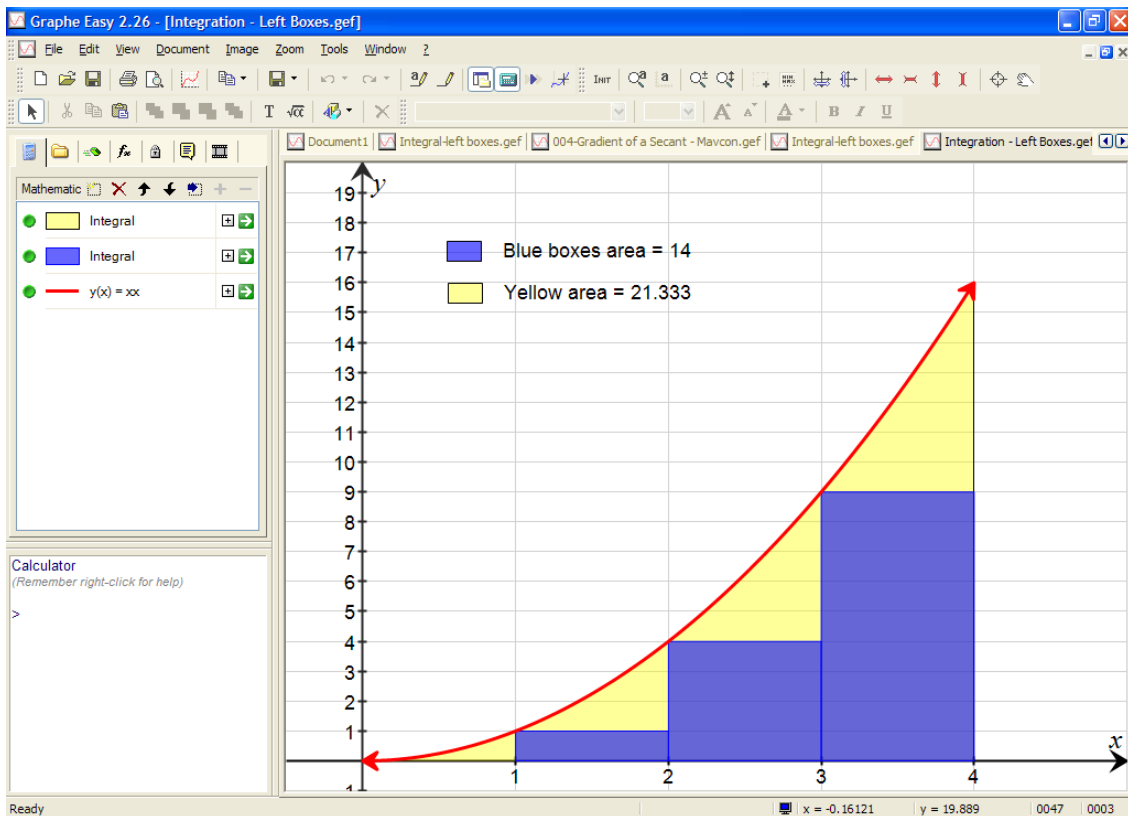
Part 2 Graphe Easy – teaching aid and desktop publishing application

Basic graphing $y(x) = x^2$

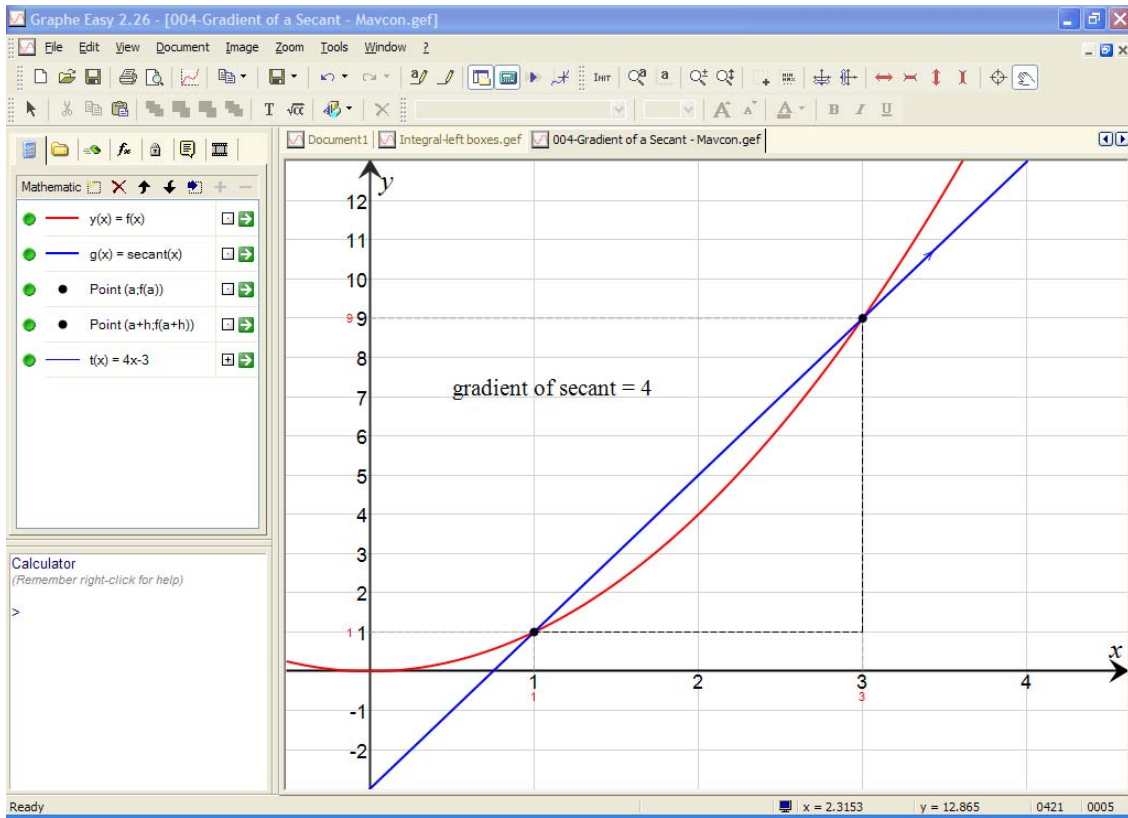




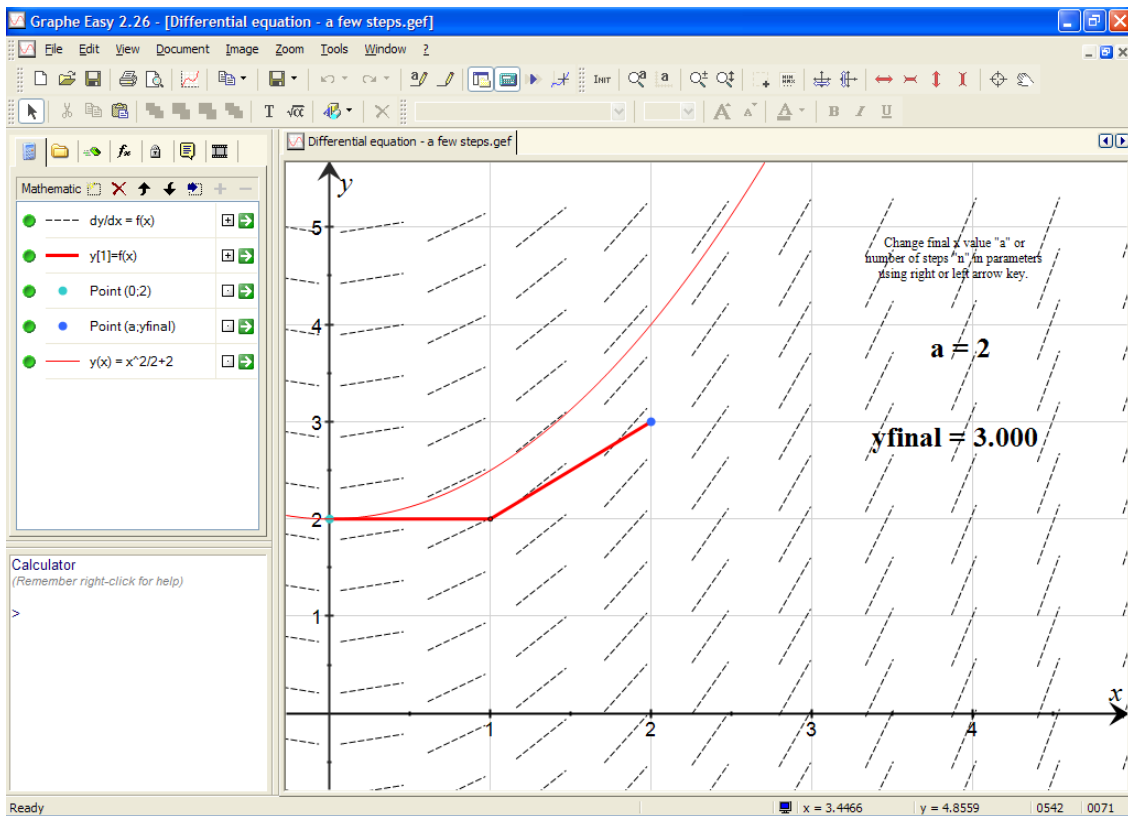
Built in features Parameters! Set up a , b and n .
Teaching aid file 1 Document→New Math Object→Integrals etc. Formatting.
 Text Calc (* *) box & Commands.



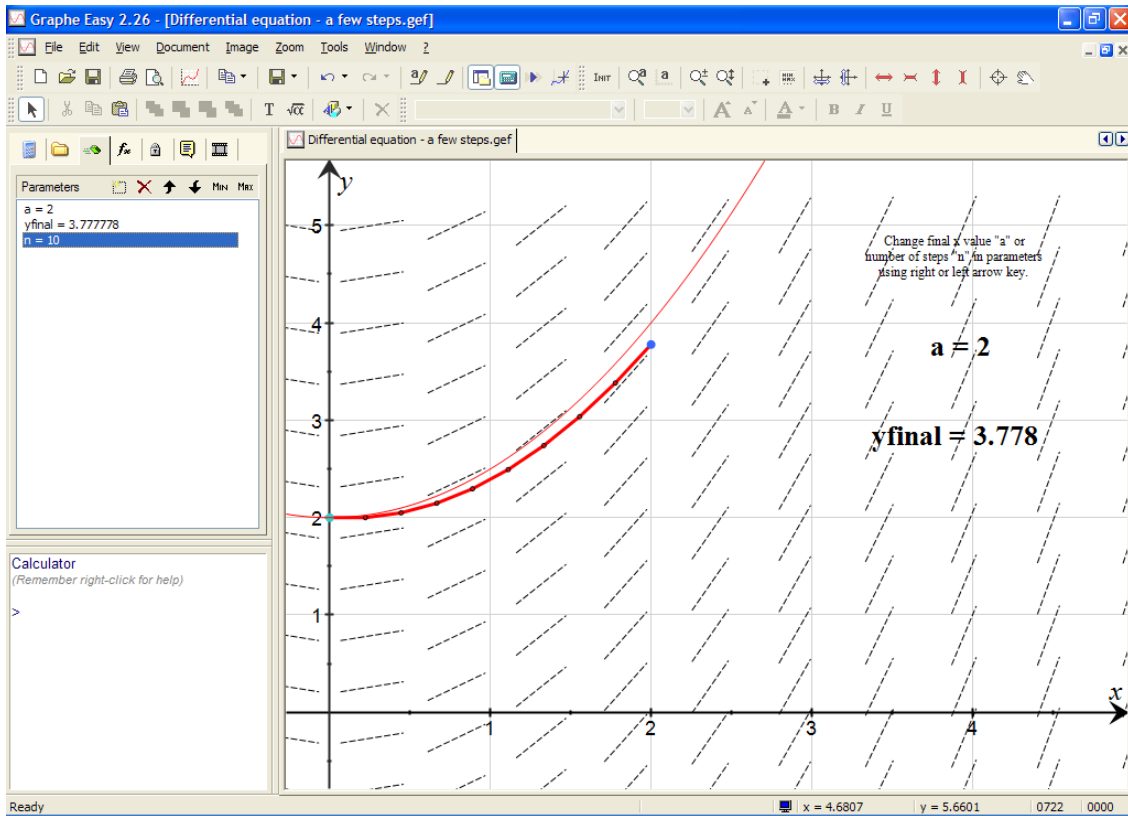
Teaching aid file 2 Introduction to limits, differential calculus



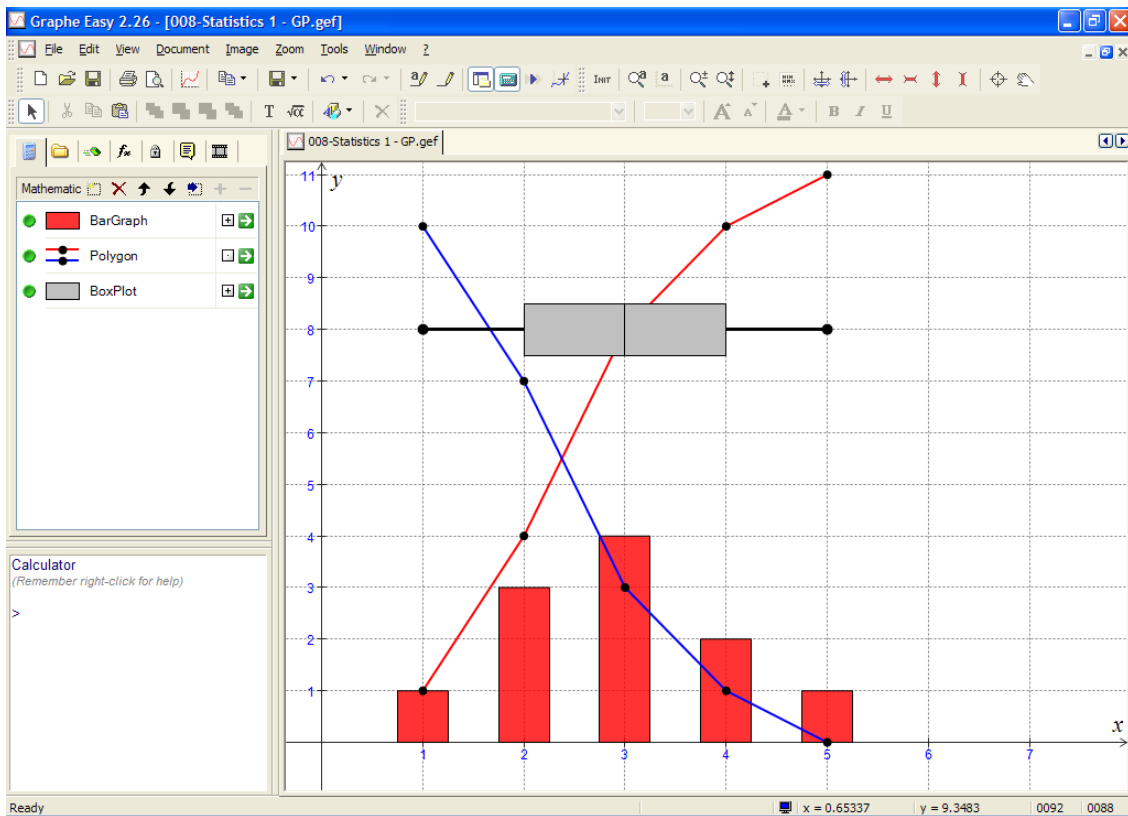
Teaching aid file 3 Differential equations and Euler's method (screen 1)



Teaching aid file 3 Differential equations and Euler's method (screen 2)

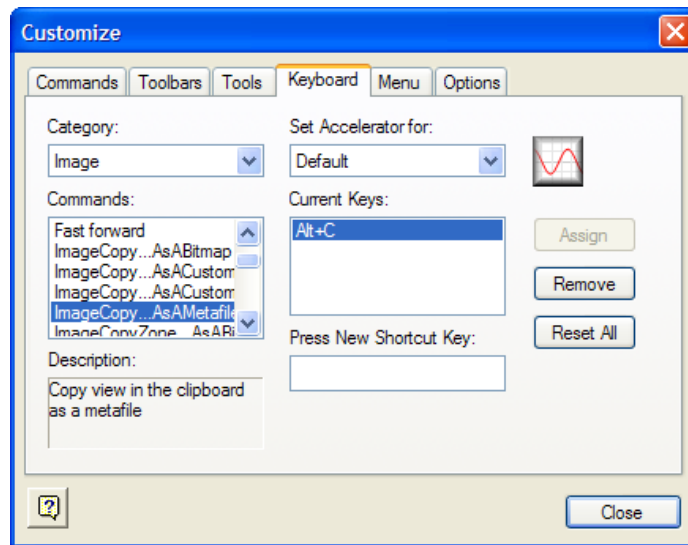
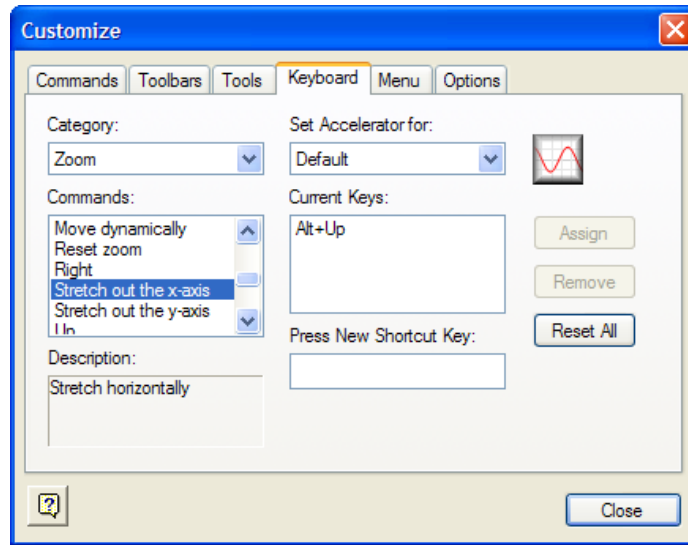


Representing data

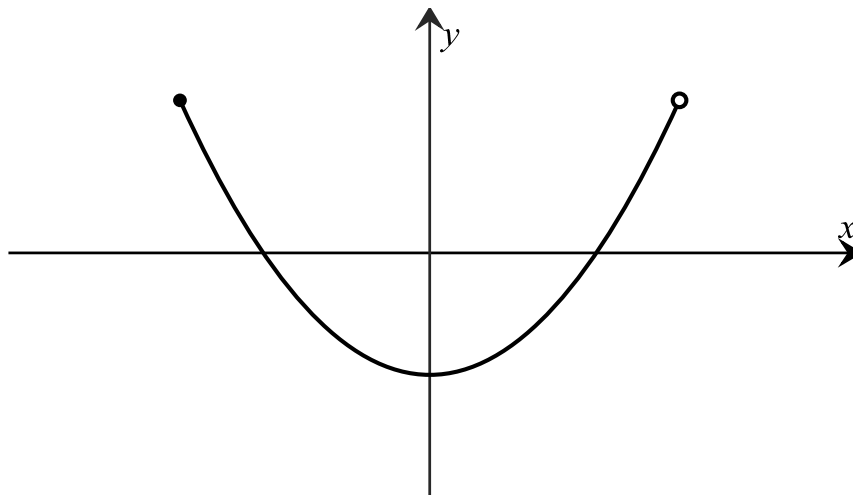


Keyboard shortcuts

Tools→Customise→Keyboard



Formatting for tests and worksheets



Appendix ClassPad Geometry and calculus – The gradient function eActivity

eActivity/Gradient function GP

File Edit Insert Action

Gradient function eActivity

Define $f(x) = \frac{x^3}{6} - 2x$

done

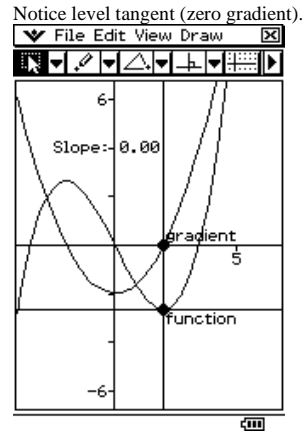
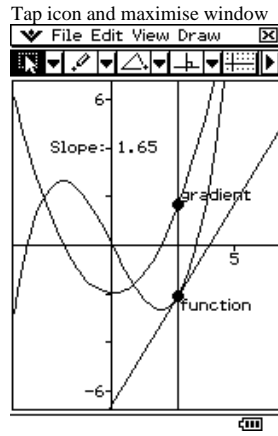
Tap icon below and choose Edit/Animate/Go once (or drag function point manually).

$\frac{d}{dx}(f(x))$

$\frac{x^2-4}{2}$

Tap →

Alg Standard Real Deg

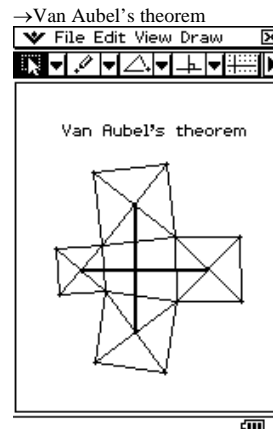
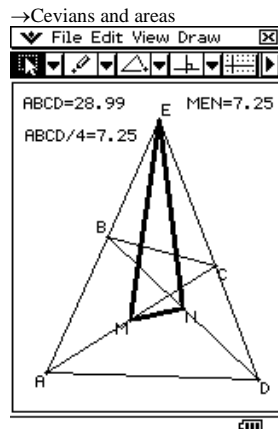


eActivity/More theorems/Circle tangents

File Edit View Draw

EC: 6.66

CGH perim: 13.31



Geometry→GP_Geom/BoxVol2

File Edit View Draw

l=15.98

w=5.98

Vol=192.08

x=2.01

