

Further Mathematics

Building and using Library functions and Widgets in Core topics



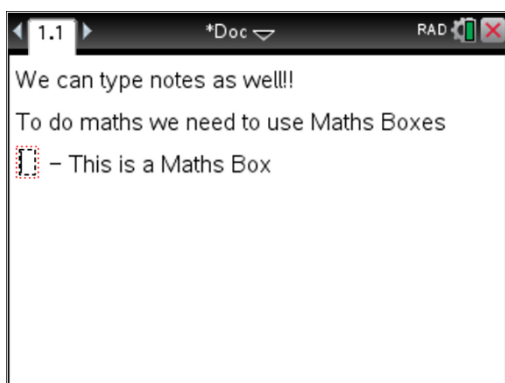
Summary of key button sequences:

Press: Ctrl, 4 to Group pages – up to 4 applications can be used to create up to 4 pages

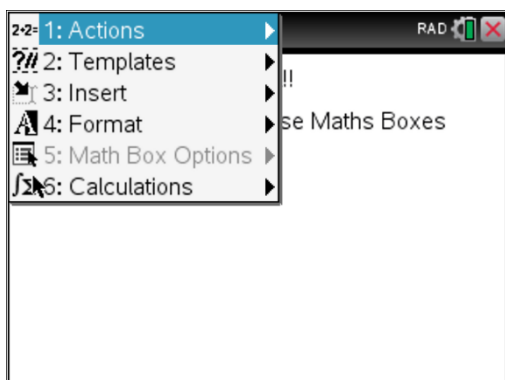
Press: Ctrl 6 to Split pages

- Press: Ctrl, A to select all.
- Press: Menu, 1,1 to activate the maths boxes.
- Press: Menu, Actions the deactivate all or activate all if you want to deactivate activate maths boxes on a notes application

Notes Page application is dynamic – update automatically with changes. Unlike Calculator application

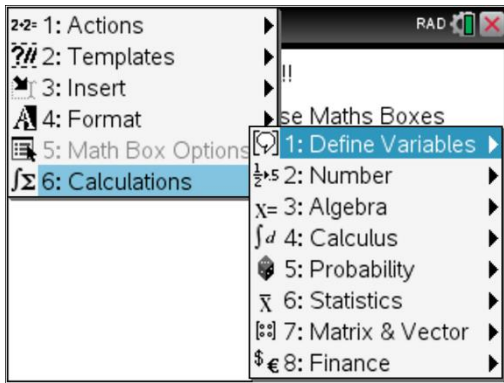


Ctrl, M: These are the buttons we can use to insert a **Maths Box**.

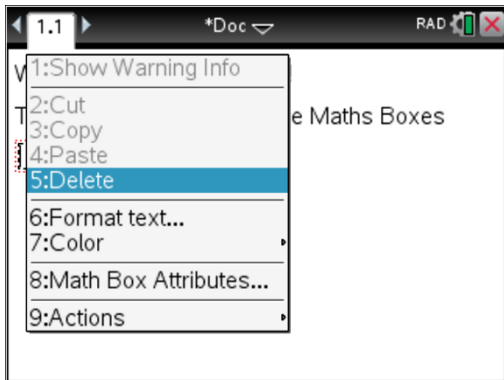


When **Menu** is pressed, the menu is different to what you may be used to when compared to the **Calculator** application.

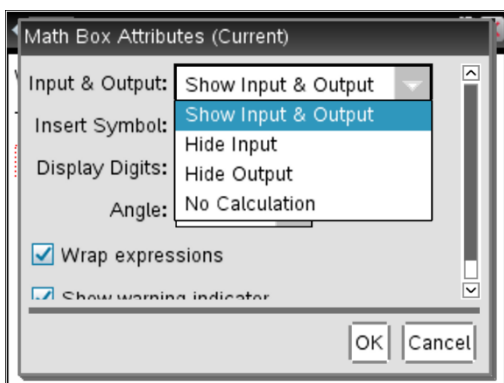
By pressing **6: Calculations**, you access the usual menu that you would be familiar with.



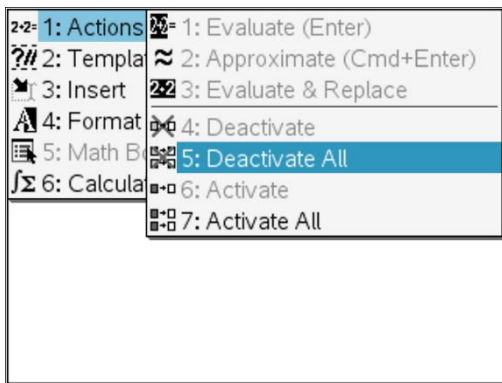
Another import feature of the **Notes Page Application** is the **Maths Box Attributes**. This allows basic formatting of the **Maths Box** you are working with. You must **highlight** the Maths Box, press **Ctrl, Menu**



When **8: Maths Box Attributes** is chosen you get the following menu:



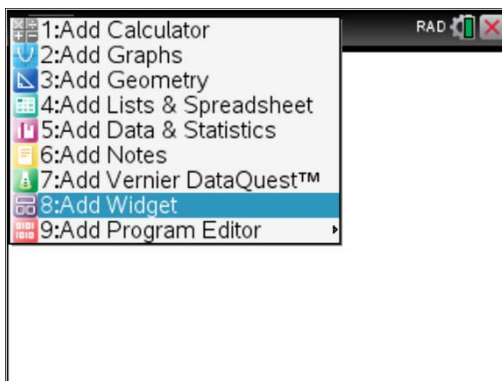
Another import feature is you can **Deactivate** and **Activate** all **Maths Boxes** on a page all at once. This is important. When you create a file with lots of Notes Pages, it can slow the calculators processing speed. By deactivating them, it solves this problem. Then Activate the page when you need to use it.



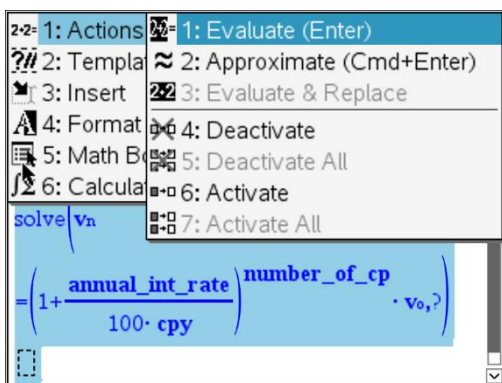
Widgets

These are files that can be created and saved into the **MyWidgets** folder. They are a single page that can be created. You would create a widget if you have to do lots of repeated calculations.

- You have to create the Widget.
- Save it into My Widgets.
- Open up a New Document.
- Option 8: Insert Widget – This will allow you to access the widgets that you created and want to use.



To **Activate** a lot of **Maths Boxes** in a widget Press: **Ctrl, A, Menu, 1:Actions, 1:Evaluate All**



- Widgets are saved in the MyWidgets folder. You scroll down the screen when you go through the saving process to find the **MyWidgets** folder. Click Until the top of the screen says **Save In: MyWidgets**.
- Give it a suitable file name and press save.
- The widget is ready to use. Open up a **New Document**. Press **8:Insert Widget**. Choose the widget. Press **Add**.

Key notes on User Defined function

- Use the program editor to create them
- File must be saved in MyLib
- All programs and Functions must be written in problem 1. Each separate problem is a “chapter” in the book that is created. The saved file is the “book”.
- The saving process is: 1: Ctrl B to store function or program, 2: Ctrl Save to save changes, 3: doc, refresh libraries
- File name (Book) no longer than 15 characters. Same for the file object (Chapter). Cannot start name with a number. Must be one word.

Some screen shots of possible user defined functions are included shown on the following pages. Some were also demonstrated on the webinar.

uvboxplotcalcs: This allows you to calculate the range, interquartile range lower fence and upper when the five figure summary is entered into the calculator.

```
uvboxplotcalcs 12/13
Define LibPub uvboxplotcalcs()=
Prgm
Request "Minimum = ",mi
Request "Q1 = ",q1
Request "Median = ",med
Request "Q3 = ",q3
Request "Maximum = ",ma
ran:=ma-mi
iqr:=q3-q1
lf:=q1-1.5·iqr
up:=q3+1.5·iqr
Disp "Range (max-min) =",ran
Disp "IQR (Q3-Q1) =",iqr
Disp "Lower fence (q1-1.5 x IQR) =",lf
Disp "Upper fence (q3+1.5 x IQR) =",up
EndPrgm
```

Uvdatacalcs: this calculate the key summary statistics when data for a variable has been created in a lists and spreadsheets application or as a list on a notes or calculator application

```
uvdatacalcs 1/17
Define LibPub uvdatacalcs(data)=
Prgm
OneVar data,1
stat.results
ran:=stat.MaxX-stat.MinX
iqr:=stat.Q3X-stat.Q1X
lf:=stat.Q1X-1.5*(stat.Q3X-stat.Q1X)
uf:=stat.Q3X+1.5*(stat.Q3X-stat.Q1X)
Disp "mean =",stat.x̄
Disp "standard deviation =",stat.sx
Disp "minimum =",stat.MinX
Disp "Q1 =",stat.Q1X
Disp "median =",stat.MedianX
Disp "Q3 =",stat.Q3X
Disp "maximim =",stat.MaxX
Disp "range (max - min) =",ran
Disp "IQR (Q3-Q1)=",iqr
Disp "Lower Fence (q1-1.5xIQR) =",lf
Disp "Upper Fence (q3+1.5xIQR) =",uf
EndPrgm
```

Bvdatatrans: calculates the equation to the least squares regression equation when a set of bivariate data is created in the lists and spreadsheets application. It also allows you to calculate the equations for the nonlinear models that are studied on the further maths course. In all cases the coefficient of determination and the correlation coefficient are also calculated.

```
bvdatatrans 7/7
Define LibPub bvdatatrans(xvar,yvar)=
Prgm
LinRegBx xvar,yvar,1
CopyVar stat.RegEqn,f1
stat.results
Disp "Vertical Intercept, a=",stat.a
Disp "Slope, b=",stat.b
Disp "Correlation Coeff, r=",stat.r
Disp "Coefficient of det, r2=",stat.r2
EndPrgm
```

Predictlin: When the equation of a linear equation is entered, it calculates the unknown value.

```
predictlin
5/7
Define LibPub predictlin()=
Prgm
Disp "Enter "?" for the unknown"
Request "Intercept Value, a= ",a
Request "Slope Value, b= ",b
Request "Explanatory Var Value= ",ev
Request "Response Var Value= ",rv
an:=solve(rv=a+b·ev,?)
Disp an
EndPrgm
```


Predict_xsq: When the equation of a linear equation is entered, it calculates the unknown value.

```
predict_xsq 5/7
Define LibPub predict_xsq()=
Prgm
Disp "Enter "?" for the unknown"
Request "Intercept Value, a= ",a
Request "Slope Value, b= ",b
Request "Explanatory Var Value= ",ev
Request "Response Var Value= ",rv
an:=solve(rv=a+b·ev2,?)
Disp an
EndPrgm
```