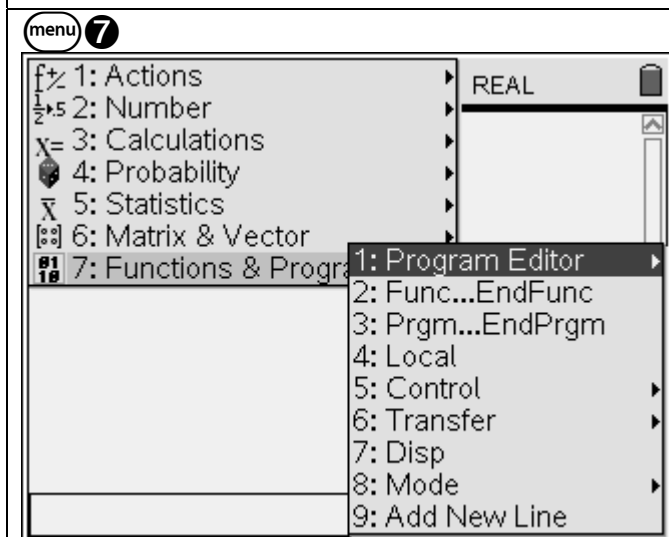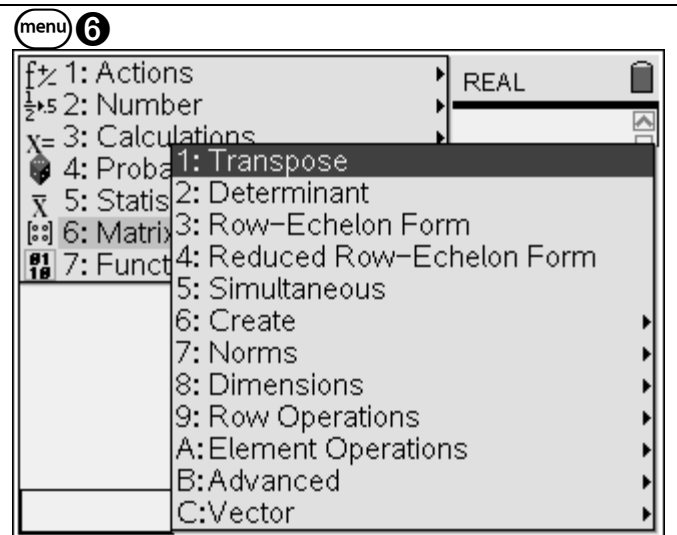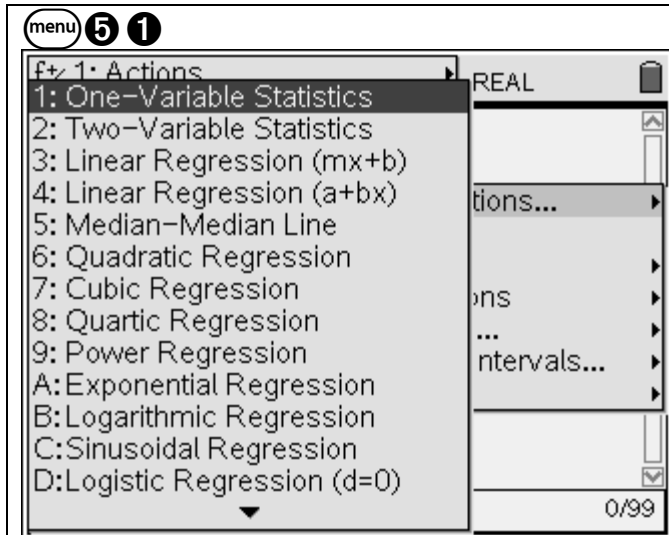|	
⌂ ⑥ **☰ Home** √x̄ 1:Calculator ∨△ 2:Graphs & … ⊞ 3:Lists & Sp… T 4:Notes ⋰ 5:Data & Sta… 6:New Doc… 7:My Docu… 8:System Info ?9:Hints Create a new document. You will be asked to save and close the currently open document.	▶ enter≈ *medians Name △ | Size DALLAS 69K Save Do you want to save changes to medians before exiting? Yes No Cancel
1.1 RAD AUTO REAL CAPS 1:Add Calculator 2:Add Graphs & Geometry 3:Add Lists & Spreadsheet 4:Add Notes 5:Add Data & Statistics	❶ 1.1 RAD AUTO REAL CAPS 0/99
Continue in the following fashion: ⌂ ❷ ⌂ ❸ ⌂ ❹ ⌂ ❺	1.2 1.3 1.4 1.5 RAD AUTO REAL CAPS Click to add variable **No lists in this problem** Click to add variable
You have now created a document. Note the tabs at the top of your viewing window. These indicate problem 1 page 1 through problem 1 page 5.	To navigate through the document press ctrl ◀ to move to the previous page and ctrl ▶ to move to the next page.
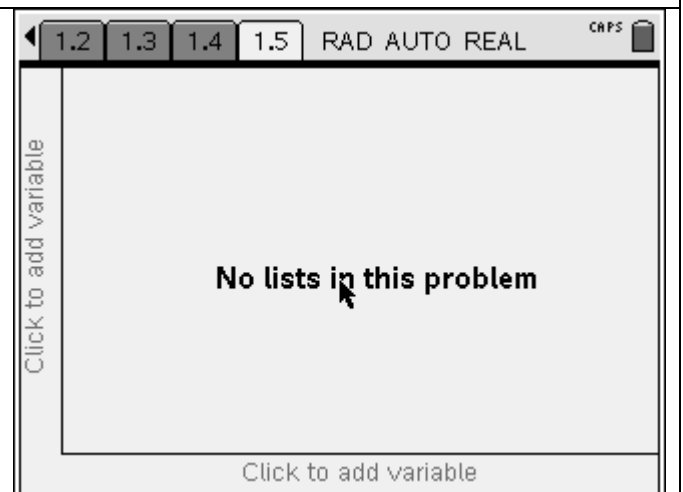
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Calculator Application page:

Move to a Calculator page

(menu)

		REAL	
f±	1: Actions	▶	
½▸5	2: Number	▶	
χ=	3: Calculations	▶	
🎲	4: Probability	▶	
x̄	5: Statistics	▶	
[::]	6: Matrix & Vector	▶	
🔢	7: Functions & Programs	▶	

0/99

(menu) ❶

f±	1: Actions	1: Define
½▸5	2: Number	2: Recall Definition...
χ=	3: Calculations	3: Delete Variable
🎲	4: Probability	4: Clear a–z...
x̄	5: Statistics	5: Clear History
[::]	6: Matrix & Vector	6: Insert Comment
🔢	7: Functions & Prog	7: Library ▶

0/99

(menu) ❷

f±	1: Actions	▶ REAL	1: Convert to Decimal
½▸5	2: Number		2: Factor
χ=	3: Calculatio		3: Least Common Multiple
🎲	4: Probabilit		4: Greatest Common Divisor
x̄	5: Statistics		5: Remainder
[::]	6: Matrix &		6: Fraction Tools ▶
🔢	7: Functions		7: Number Tools ▶
			8: Complex Number Tools ▶

0/99

(menu) ❸

f±	1: Actions	▶ REAL	
½▸5	2: Number	▶	
χ=	3: Calcu	1: Numerical Solve	
🎲	4: Proba	2: Numerical Function Minimum	
x̄	5: Statis	3: Numerical Function Maximum	
[::]	6: Matri	4: Numerical Derivative	
🔢	7: Func	5: Numerical Integral	
		6: Finance Solver	

0/99

(menu) ❹

f±	1: Actions	▶ REAL	
½▸5	2: Number	▶	
χ=	3: Calculations	▶	
🎲	4: Probability	1: Factorial (!)	
x̄	5: Statistics	2: Permutations	
[::]	6: Matrix & Vector	3: Combinations	
🔢	7: Functions & Program	4: Random ▶	
		5: Distributions... ▶	

0/99

(menu) ❺

f±	1: Actions	▶ REAL	
½▸5	2: Number	▶	
χ=	3: Calculations	▶	
🎲	4: Probability	▶	
x̄	5: Statistics	1: Stat Calculations... ▶	
[::]	6: Matrix & Vec	2: Stat Results	
🔢	7: Functions & F	3: List Math ▶	
		4: List Operations ▶	
		5: Distributions... ▶	
		6: Confidence Intervals... ▶	
		7: Stat Tests... ▶	

0/99

f+z 1: Actions
1: One−Variable Statistics   REAL
2: Two−Variable Statistics
3: Linear Regression (mx+b)
4: Linear Regression (a+bx)   tions...
5: Median−Median Line
6: Quadratic Regression
7: Cubic Regression   ns
8: Quartic Regression
9: Power Regression   ...
A: Exponential Regression   ntervals...
B: Logarithmic Regression
C: Sinusoidal Regression
D: Logistic Regression (d=0)
▼   0/99

f+z 1: Actions   REAL
½▸5 2: Number
χ= 3: Calculations
🎲 4: Proba
x̄ 5: Statis   1: Transpose
⠿ 6: Matrix   2: Determinant
🔢 7: Funct   3: Row−Echelon Form
       4: Reduced Row−Echelon Form
       5: Simultaneous
       6: Create
       7: Norms
       8: Dimensions
       9: Row Operations
       A: Element Operations
       B: Advanced
       C: Vector

f+z 1: Actions   REAL
½▸5 2: Number
χ= 3: Calculations
🎲 4: Probability
x̄ 5: Statistics
⠿ 6: Matrix & Vector
🔢 7: Functions & Progra   1: Program Editor
       2: Func...EndFunc
       3: Prgm...EndPrgm
       4: Local
       5: Control
       6: Transfer
       7: Disp
       8: Mode
       9: Add New Line

Graphs & Geometry Application page:

Open a Graphs & Geometry page

menu ❶

- 1: Action → 1: Pointer
- 2: View → 2: Select
- 3: Grap → 3: Hide/Show
- 4: Wind → 4: Attributes
- 5: Trace → 5: Delete all
- 6: Point → 6: Text
- 7: Meas → 7: Coordinates and Equations
- 8: Shap → 8: Calculate
- 9: Cons → 9: Redefine
- A: Trans → A: Insert Slider

f1(x)=

menu ❷

- 1: Actions
- 2: View
  - 1: Graphing View
  - 2: Plane Geometry View
  - 3: Hide Analytic Window
  - 4: Hide Axes
  - 5: Show Grid
  - 6: Hide Entry Line   (Ctrl+G)
  - 7: Show Scale
  - 8: Show Axes End Values
  - 9: Add Function Table   (Ctrl+T)
- 3: Grap
- 4: Wind
- 5: Trac
- 6: Poin
- 7: Mea
- 8: Shap
- 9: Cons
- A: Tran

f1(x)=

menu ❸

- 1: Actions
- 2: View
- 3: Graph Type
  - 1: Function
  - 2: Parametric
  - 3: Polar
  - 4: Scatter Plot
- 4: Window
- 5: Trace
- 6: Points & Lines
- 7: Measurement
- 8: Shapes
- 9: Construction
- A: Transformation

f1(x)=

menu ❹

- 1: Actions
- 2: View
- 3: Graph Type
- 4: Window
  - 1: Window Settings
  - 2: Zoom – Box
  - 3: Zoom – In
  - 4: Zoom – Out
  - 5: Zoom – Standard
  - 6: Zoom – Quadrant 1
  - 7: Zoom – User
  - 8: Zoom – Trig
  - 9: Zoom – Data
  - A: Zoom – Fit
  - B: Zoom – Square
- 5: Trace
- 6: Points & Line
- 7: Measuremen
- 8: Shapes
- 9: Construction
- A: Transformati

f1(x)=

menu ❺

- 1: Actions
- 2: View
- 3: Graph Type
- 4: Window
- 5: Trace
  - 1: Graph Trace
  - 2: Trace Settings
  - 3: Geometry Trace
  - 4: Erase Geometry Trace
- 6: Points &
- 7: Measure
- 8: Shapes
- 9: Construction
- A: Transformation

f1(x)=

menu ❻

- 1: Actions
- 2: View
- 3: Graph Type
- 4: Window
- 5: Trace
- 6: Points & Lin
  - 1: Point
  - 2: Point On
  - 3: Intersection Point(s)
  - 4: Line
  - 5: Segment
  - 6: Ray
  - 7: Tangent
  - 8: Vector
  - 9: Circle arc
- 7: Measureme
- 8: Shapes
- 9: Construction
- A: Transformat

f1(x)=

menu ❼

- 1: Actions ▸
- 2: View ▸
- 3: Graph Type ▸
- 4: Window ▸
- 5: Trace ▸
- 6: Points & Lines ▸
- 7: Measurement ▸
- 8: Shapes ▸
- 9: Construction ▸
- A: Transformation ▸

D AUTO REAL

- 1: Length
- 2: Area
- 3: Slope
- 4: Angle
- 5: Integral

$f1(x)=$

menu ❽

- 1: Actions ▸
- 2: View ▸
- 3: Graph Type ▸
- 4: Window ▸
- 5: Trace ▸
- 6: Points & Lines ▸
- 7: Measurement ▸
- 8: Shapes ▸
- 9: Construction ▸
- A: Transformation ▸

D AUTO REAL

- 1: Circle
- 2: Triangle
- 3: Rectangle
- 4: Polygon
- 5: Regular Polygon

$f1(x)=$

menu 9

- 1: Actions ▸
- 2: View ▸
- 3: Graph Type ▸
- 4: Window ▸
- 5: Trace ▸
- 6: Points & Lines ▸
- 7: Measurement ▸
- 8: Shapes ▸
- 9: Construction ▸
- A: Transformation ▸

D AUTO REAL

- 1: Perpendicular
- 2: Parallel
- 3: Perpendicular Bisector
- 4: Angle Bisector
- 5: Midpoint
- 6: Locus
- 7: Compass
- 8: Measurement transfer

$f1(x)=$

menu Ⓐ

- 1: Actions ▸
- 2: View ▸
- 3: Graph Type ▸
- 4: Window ▸
- 5: Trace ▸
- 6: Points & Lines ▸
- 7: Measurement ▸
- 8: Shapes ▸
- 9: Construction ▸
- A: Transformation ▸

D AUTO REAL

- 1: Symmetry
- 2: Reflection
- 3: Translation
- 4: Rotation
- 5: Dilation

$f1(x)=$

Lists & Spreadsheets Application page:

Open a Lists & Spreadsheets page
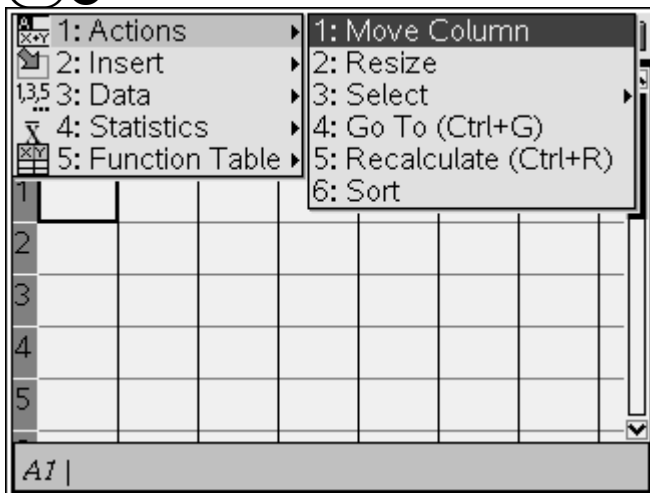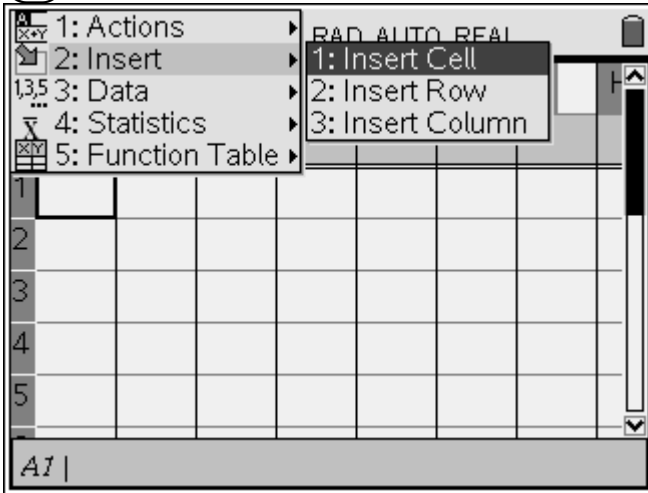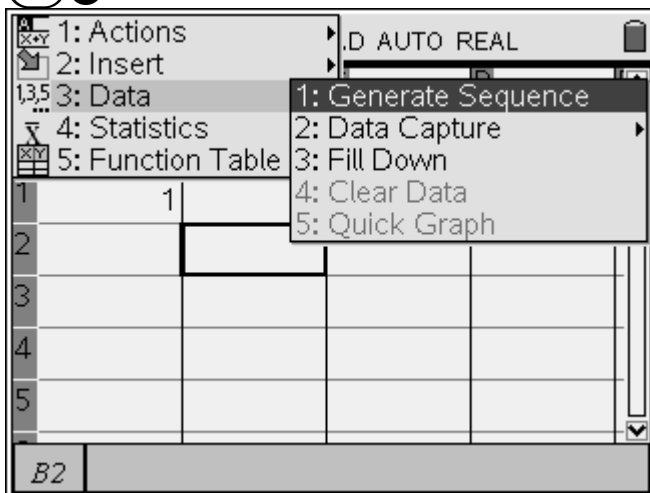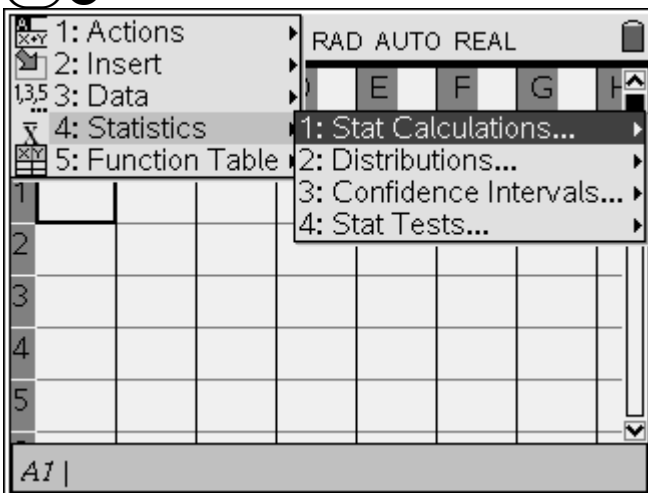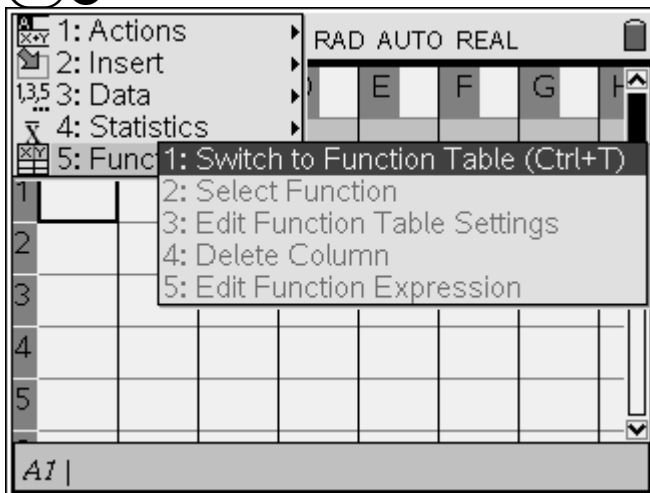
Notes Application page:

Open a Notes application page

menu ❶

?// 1: Templates ▶	**? 1: Q&A** REAL 🔋
↘ 2: Insert ▶	**// 2: Proof**
A 3: Format ▶	**A 3: Default**
♌= 4: Actions ▶	

menu ❷

?// 1: Templates ▶	RAD AUTO REAL 🔋	
↘ 2: In	**▦ 1: Math Expression Box**	(Ctrl+M)
A 3: F	**∠A 2: Shape**	▶
♌= 4: A	**◊ 3: Comment**	▶

menu ❸

?// 1: Templates ▶	RAD AUTO REAL 🔋
↘ 2: Insert ▶	
A 3: Format ▶	**A 1: Bold**
♌= 4: Actions ▶	**A 2: Italic**
	A 3: Underline
	A₁ 4: Subscript
	A¹ 5: Superscript

menu ❹

?// 1: Templates ▶	RAD AUTO REAL 🔋
↘ 2: Insert ▶	
A 3: Format ▶	
♌= 4: Actions ▶	**♌= 1: Evaluate Selection**
	♌= 2: Evaluate
	⟋ 3: Hide Answer

Data & Statistics Application page:

Open a Data Statistics page

menu ❶

1: Plot Type	1: Dot Plot
2: Plot Prop	2: Box Plot
3: Actions	3: Histogram
4: Analyze	4: Normal Probability Plot
5: Window/Z	5: Scatter Plot
	6: XY Line Plot
	7: Dot Chart
	8: Bar Chart
	9: Pie Chart

Click to add variable

Click to add variable

menu ❷

.D AUTO REAL

1: Plot Type	1: Connect Data Points
2: Plot P	2: Histogram Properties
3: Action	3: Extend Box Plot Whiskers
4: Analyz	4: Add X Variable
5: Windo	5: Remove X Variable
	6: Add Y Variable
	7: Remove Y Variable
	8: Force Numeric X
	9: Force Numeric Y
	A: Clear All

Click to add variable

Click to add variable

menu ❸

.D AUTO REAL

1: Plot Type	
2: Plot Properties	
3: Actions	1: Remove
4: Analyze	2: Hide Text
5: Window/Zoom	3: Insert Text
	4: Insert Slider
	5: Select All Points

No lists in this problem

Click to add variable

Click to add variable

menu ❹

.D AUTO REAL

1: Plot Type	
2: Plot Properties	
3: Actions	1: Remove
4: Analyze	2: Add Movable Line
5: Window/Z	3: Lock Intercept at Zero
	4: Plot Function
	5: Shade Under Function
	6: Regression
	7: Residuals
	8: Plot Value
	9: Show Normal PDF
	A: Graph Trace

Click to add variable

menu ❺

:G AUTO REAL

1: Plot Type	
2: Plot Properties	
3: Actions	
4: Analyze	
5: Window/Zoom	1: Window Settings
	2: Zoom – Data
	3: Zoom – In
	4: Zoom – Out

Click to add variable

Click to add variable

To Save the Document: ⓒtrl (🏠) ❶   ❸ (note the shortcut Ctrl+S)

1.1	1.2				CAPS

🔧 **Tools**

1: Fil **1: New Document** (Ctrl+N)
2: Ed **2: My Documents**
3: Vi **3: Save** (Ctrl+S)
4: Ins **4: Save As...**
5: Pa **5: Send**
6: Re **6: Document Settings...**
7: Login

0/99

1.1	1.2	1.3	1.4	▶RAD AUTO REAL	CAPS

Save As...

Save In: [Examples ▽]

File Name: [DOC1]

[OK] [Cancel]

0/99
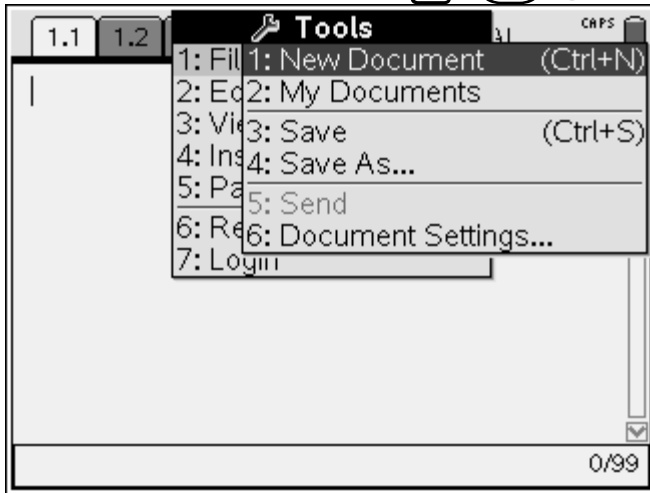
TAB to OK then (enter) or (⭐)

Working on a calculator Application page

Entering fractions:

❶ ⬢÷ ❷ ⬢+ ❸ ⬢÷ ❺

| 1.1 | 1.2 | 1.3 | 1.4 | ▶RAD AUTO REAL | CAPS |

1/2+3/5

0/99

| 1.1 | 1.2 | 1.3 | 1.4 | ▶RAD AUTO REAL | CAPS |

$$\frac{1}{2}+\frac{3}{5} \qquad \frac{11}{10}$$

|

1/99
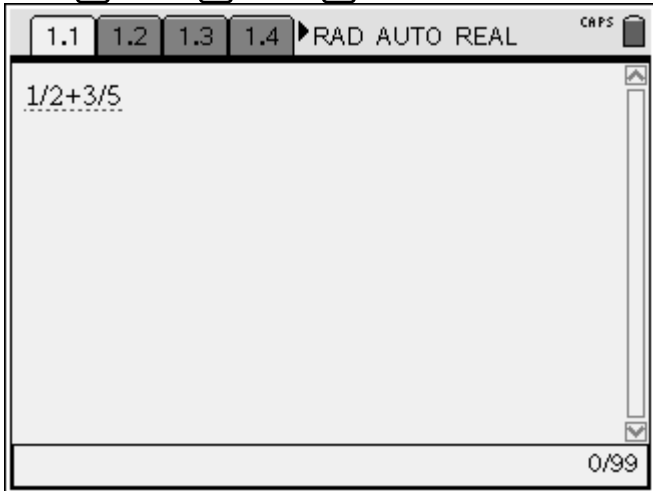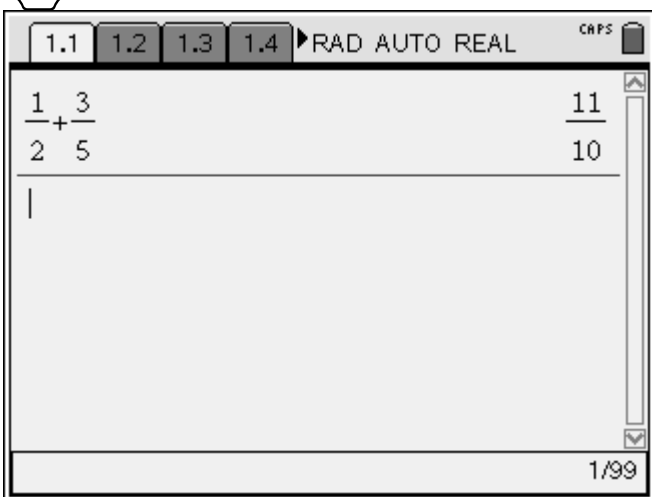
Interesting appearance … no?

What about absolute value?

⬢📖 ❶

| 1.1 | 1.2 | 1.3 | 1.4 | ▶RAD AUTO REAL | CAPS |

| 1:📖 | 2:∫Σ | 3:∞β° | 4:◖◗ | 5:▦ |

abs(
amortTbl(
and
angle(
ANOVA
ANOVA2way

⌃   ☐ Use Wizard

abs(Value)

enter ⬢ans(–) ❹

| 1.1 | 1.2 | 1.3 | 1.4 | ▶RAD AUTO REAL | CAPS |

$$\frac{1}{2}+\frac{3}{5} \qquad \frac{11}{10}$$

abs(-4)

1/99
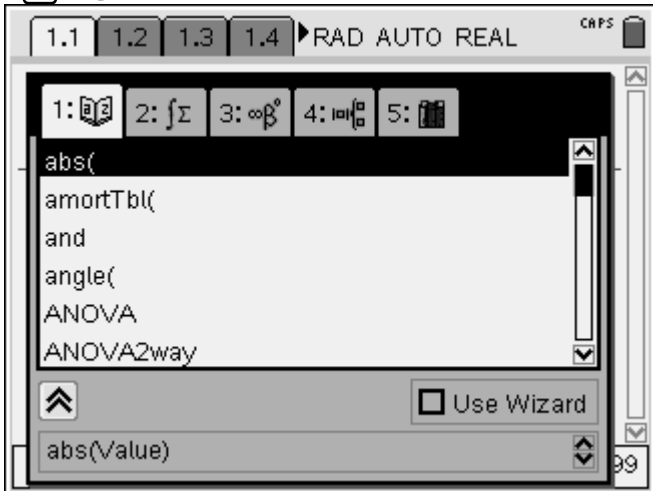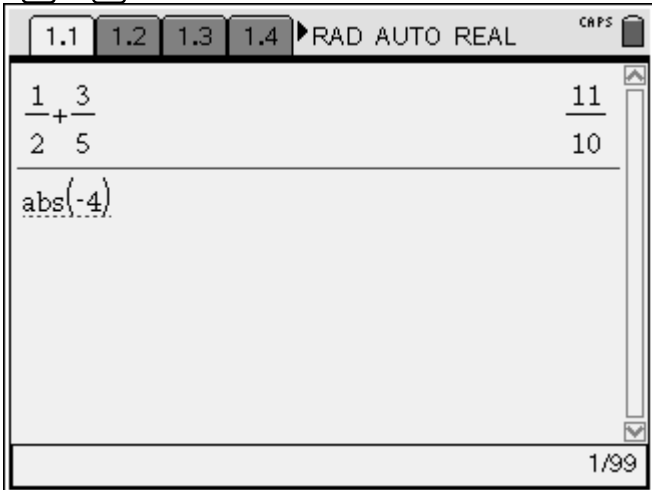
What happens when you press

enter ?

It is a thing of beauty!

$$\dfrac{1}{2}+\dfrac{3}{5} \qquad\qquad \dfrac{11}{10}$$

$$|-4| \qquad\qquad 4$$

2/99

How about some logarithms?

Does this look like MathType?

Let's have some fun … pick any three digits and enter them on your screen repeat the digits to form a 6 digit number with a repeated block of 3.
Such as:

521521

0/99

Now divide by 7 then divide by 11 and divide by 13

$$\dfrac{521521}{7} \qquad\qquad 74503$$

$$\dfrac{74503}{11} \qquad\qquad 6773$$

$$\dfrac{6773}{13} \qquad\qquad 521$$

3/99

Well that is curious? It begs the question .. why?

Enter successively the following:	Looking for patterns … the left column is interesting but what about the right side of your screen?
1.1 1.2 1.3 1.4 ▶RAD AUTO REAL CAPS 🔋	Pascal anyone?
11^0 1	
11^1 11	
11^2 121	
11^3 1331	
11^4 14641	
| 8/99	

(menu) ❶ ❶	Let's define f1(x)= $x^3 - 4x$
1.1 1.2 1.3 1.4 ▶RAD AUTO REAL CAPS 🔋	**1.1 1.2 1.3 1.4 ▶RAD AUTO REAL** 🔋
Define	Define $f1(x)=x^3-4{\cdot}x$ Done
0/99	1/99

(ctrl) ▶ (to a Graphs & Geometry page) ▲	(≈ enter)
1.1 1.2 RAD AUTO REAL 🔋	**1.1 1.2** RAD AUTO REAL 🔋
$f1(x)=x^3-4{\cdot}x$	$f1(x)=x^3-4{\cdot}x$ $f2(x)=$

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ctrl G (control gone)
You have now removed the entry line.
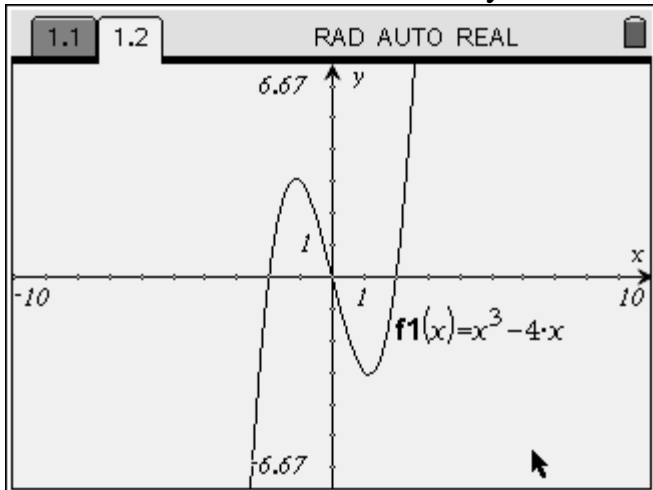
Press menu 4 1 for Window Settings
Enter ans (–) 6 tab
Enter 6 tab then tab again
Enter ans (–) 1 0 tab
Enter 1 0 tab enter ≈
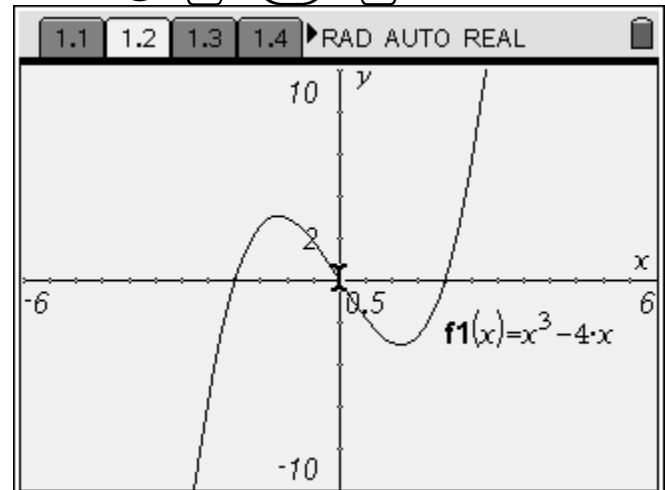
We now have a closer look at our function sacrificing aspect ratio.

Trace on the function f1(x)
Find the zeroes

(menu) (5) ❶

f1(x) = x³ − 4·x
10, y, 2, −6, 0.5, (0,0), 6, −10

Press ❷

1.1 1.2 1.3 1.4 ▶RAD AUTO REAL
10, y, 2, f1(x) = x³ − 4·x, −6, 0.5, (0,0), 6, −10

Now press (enter)

1.1 1.2 1.3 1.4 ▶RAD AUTO REAL
10, y, 2, f1(x) = x³ − 4·x, −6, 0.5, (2,0), 6, −10
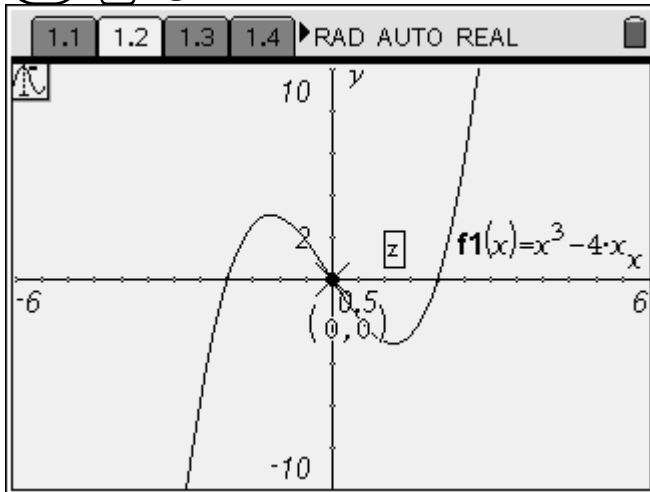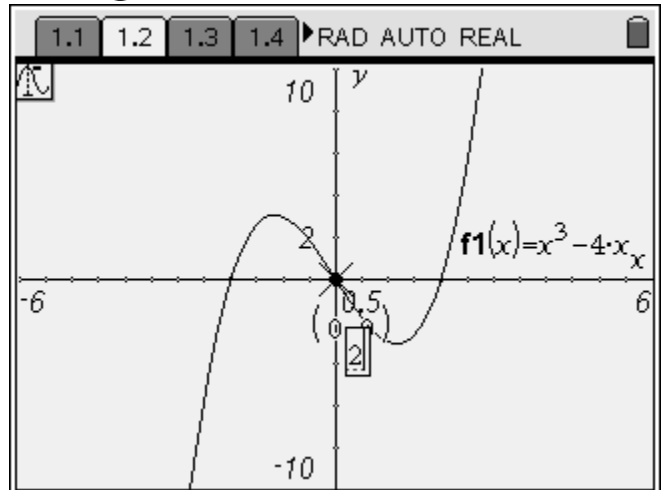
Move to the right, off the point (2,0) and then move back left to the point:

1.1 1.2 1.3 1.4 ▶RAD AUTO REAL
10, y, f1(x) = x³ − 4·x, 2, −6, 0.5, (2,0), 6, x, −10
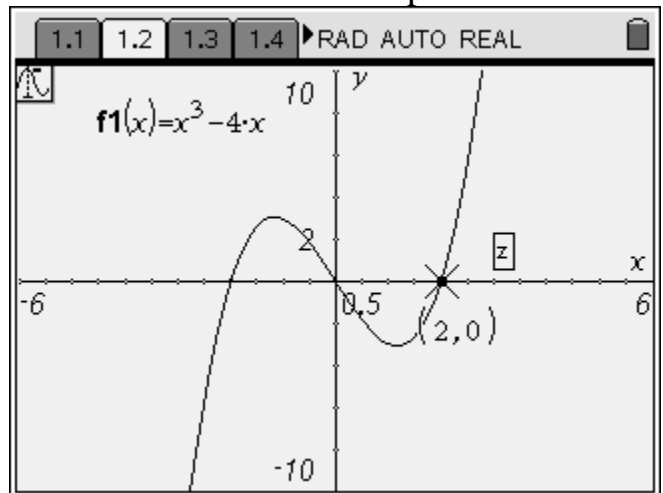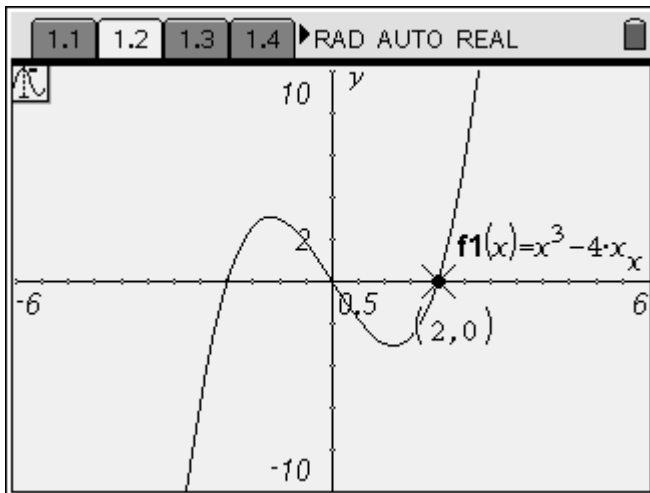
Now that "z" for zero has appeared
Repeat for -2

1.1 1.2 1.3 1.4 ▶RAD AUTO REAL
10, y, f1(x) = x³ − 4·x, 2, −6, 0.5, (−2,0), 6, x, −10
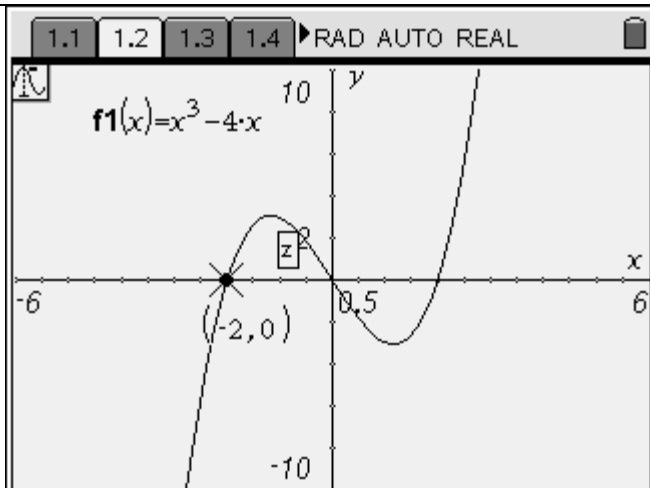
Are there any other important points on this curve?
Scroll toward the apparent relative maximum by using the right arrow on your Nav Pad.
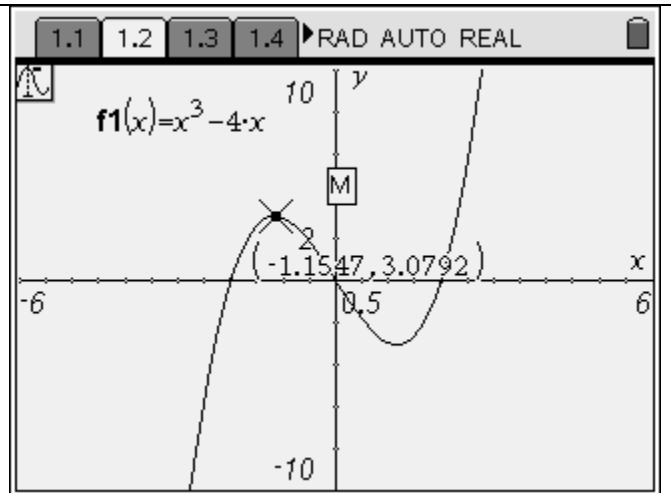
	Notice the capital M.

Since our function is symmetric about the origin if the abscissa of the Max is -1.1547 then abscissa of the Min must be 1.1547

Now press (enter)

Scroll off and then back to the point whose abscissa is 1.1547

Notice the lower case m.

Clear f1(x) and return to a standard window (menu) **4** **5**
(ctrl)(G) to remove entry line
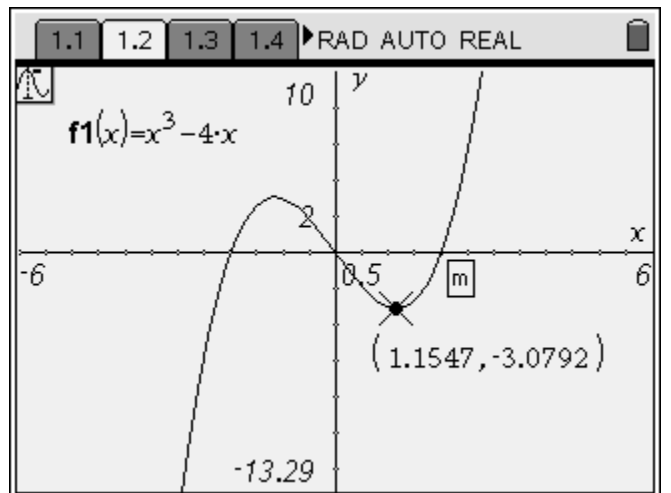
(menu)**1** **6** for Text.
Now move the cursor into an "open" area and press (enter)
In this text box enter the expression $(x-1)^2 + 3$ and press (enter)
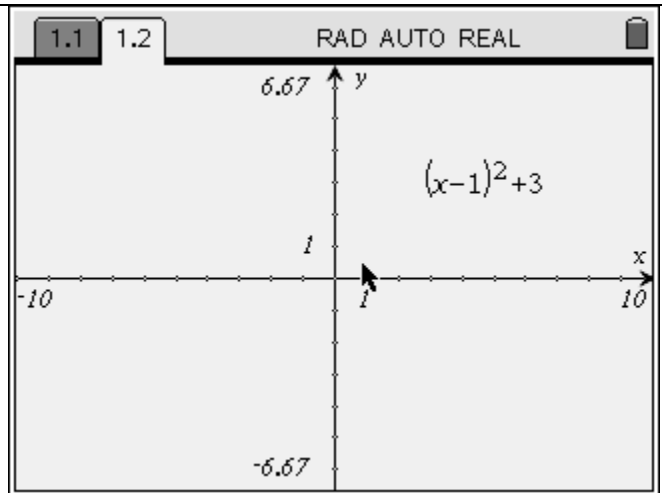
	1.1 1.2 RAD AUTO REAL $(x-1)^2+3$
	Note the text box tool in the upper left corner of your viewing window Press (esc) to exit the tool
Move the cursor over the expression and press (ctrl)(✵) and drag the expression to either axis	
1.1 1.2 RAD AUTO REAL $y=(x-1)^2+3$ $(x-1)^2+3$	**1.1** 1.2 RAD AUTO REAL $y=(x-1)^2+3$
Press (enter) and drag the equation to an open area	Now position the cursor at an extremity of the graph
1.1 1.2 RAD AUTO REAL $y=(x-1)^2+3$ graph	**1.1** 1.2 RAD AUTO REAL $y=-0.11\cdot(x-1)^2+3$
© Vince Doty 2008	
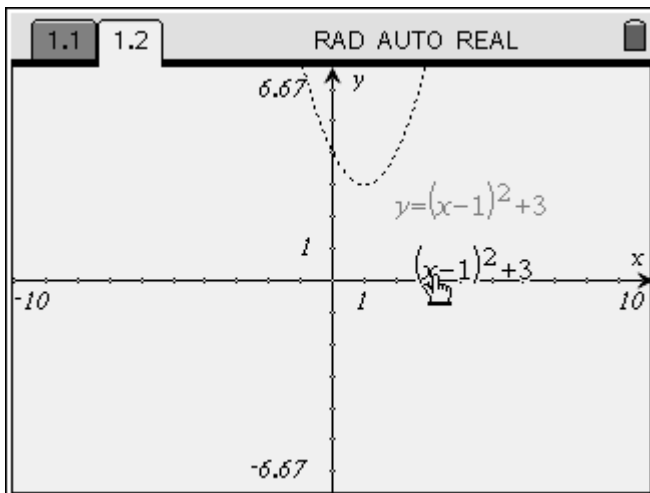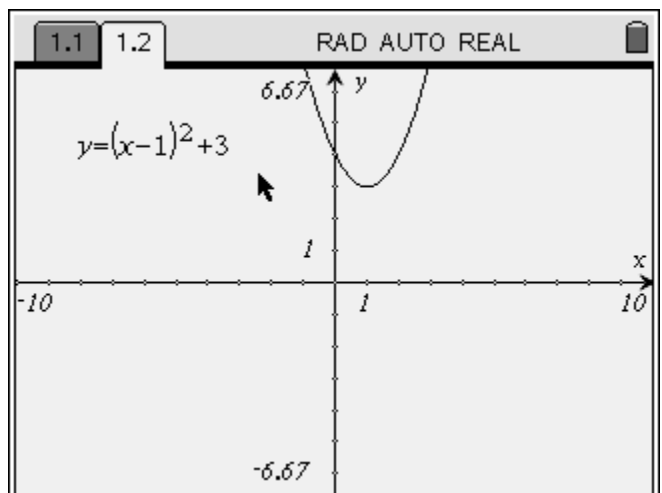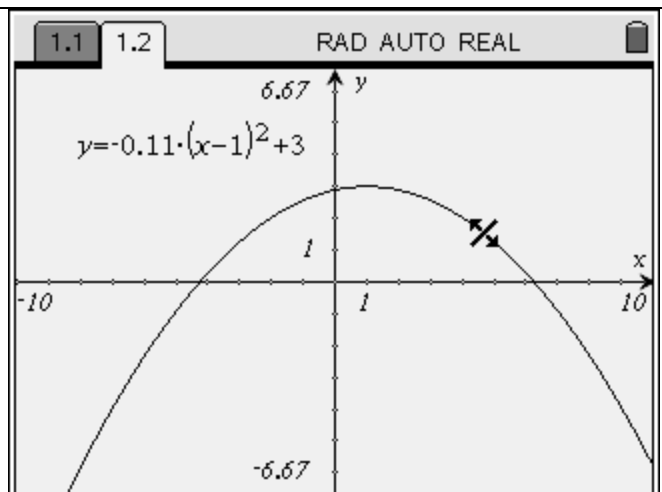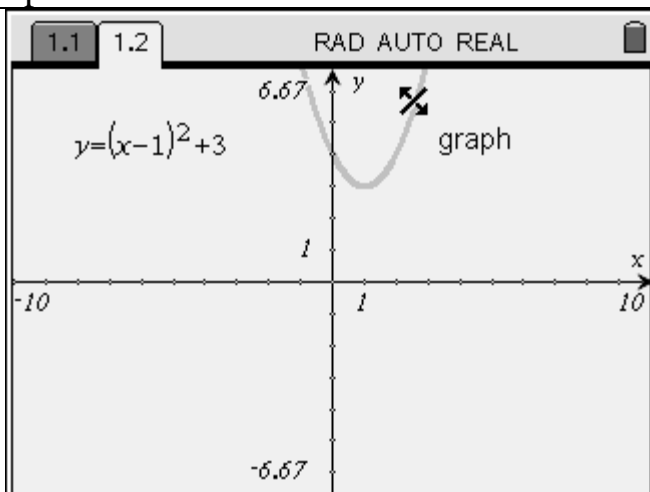
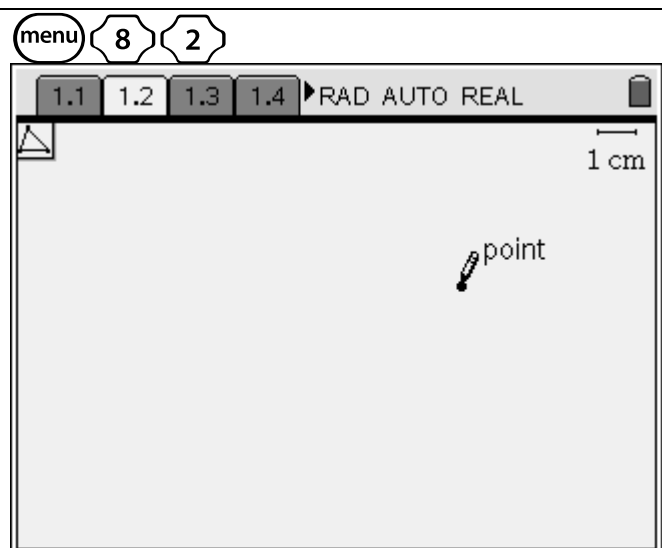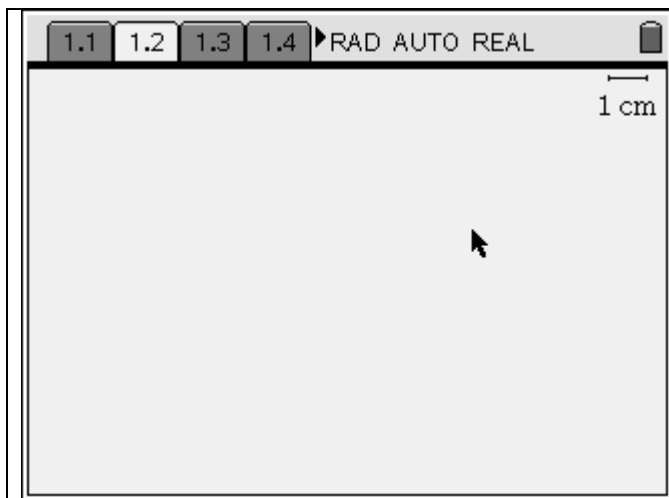| Note the new look cursor Press ⌃ctrl ⌖ to grab the graph now move the cursor and watch the dynamic on the screen	What changes? What remains the same? Press (esc) now move the cursor closer to the turning point and take note of the new look for the cursor.
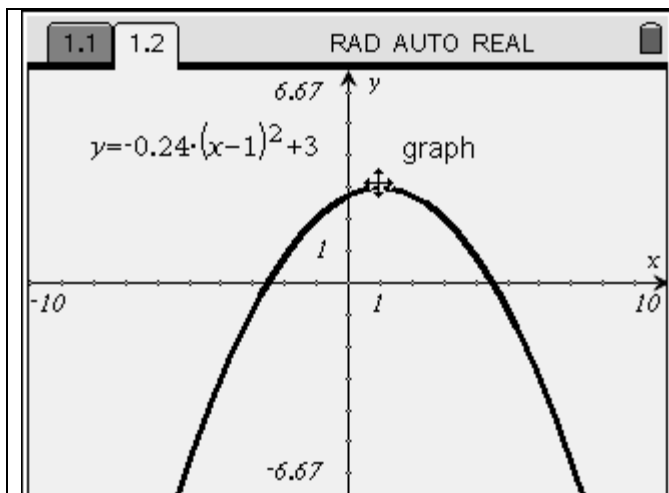
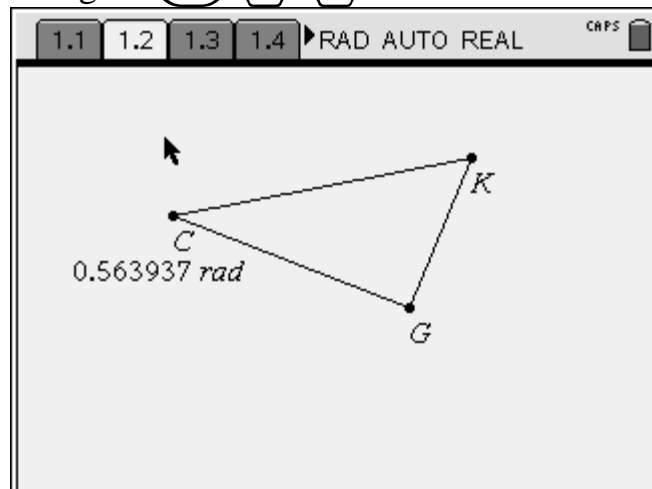|	
 1.1 1.2 RAD AUTO REAL $y=-0.24\cdot(x-1)^2+3$ graph 	 1.1 1.2 RAD AUTO REAL $y=-0.24\cdot(x-4.4)^2+2.45$
Now when we grab the curve a translation will take place.	What changes? What remains the same?
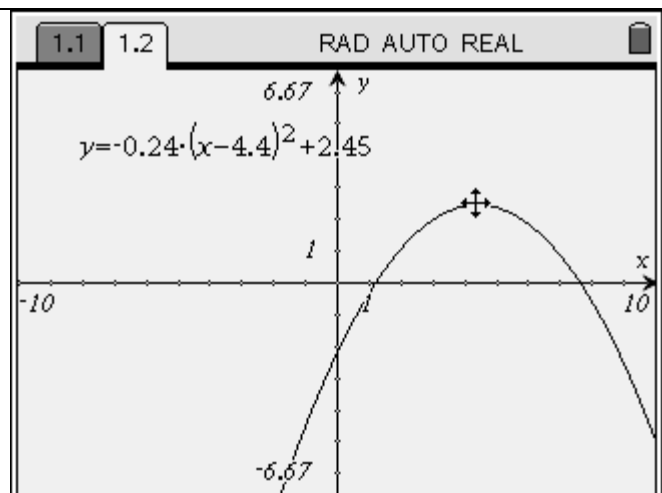
Working in a Plane Geometry View … press (menu) ⟨2⟩⟨2⟩

 1.1 1.2 1.3 1.4 ▶RAD AUTO REAL 1 cm 	(menu) ⟨8⟩⟨2⟩ 1.1 1.2 1.3 1.4 ▶RAD AUTO REAL 1 cm point
	Draw the triangle with vertices K, G, C.
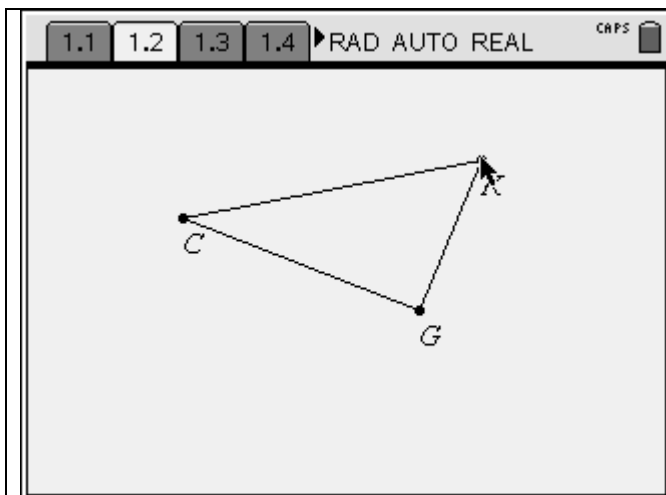
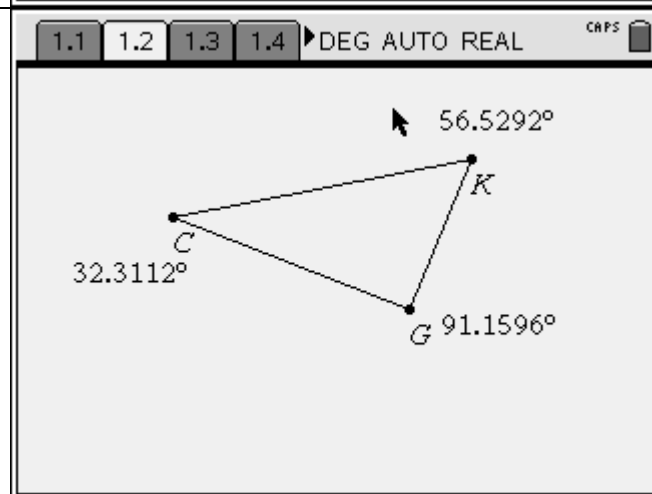|	
1.1 1.2 1.3 1.4 ▶RAD AUTO REAL CAPS 🔋	Now measure the three angles of the triangle. (menu) 7 4
(triangle with vertices C, K, G)	1.1 1.2 1.3 1.4 ▶RAD AUTO REAL CAPS 🔋
You may need to reposition a label. Click and drag to a desired placement.	(triangle with vertices C, K, G) 0.563937 *rad*
	Oops radians we need to change the document settings to degrees
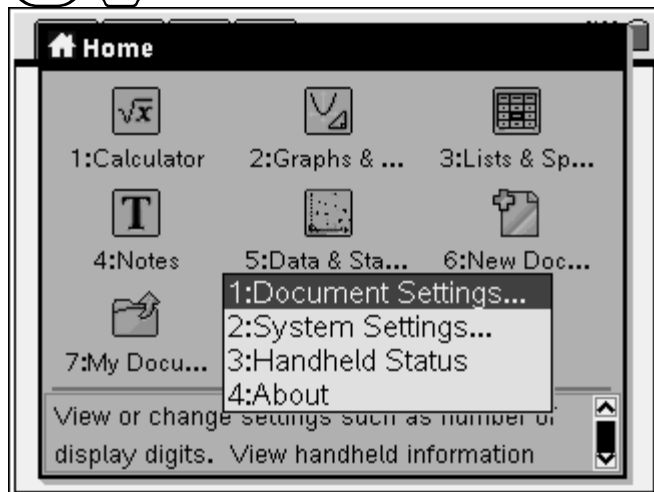
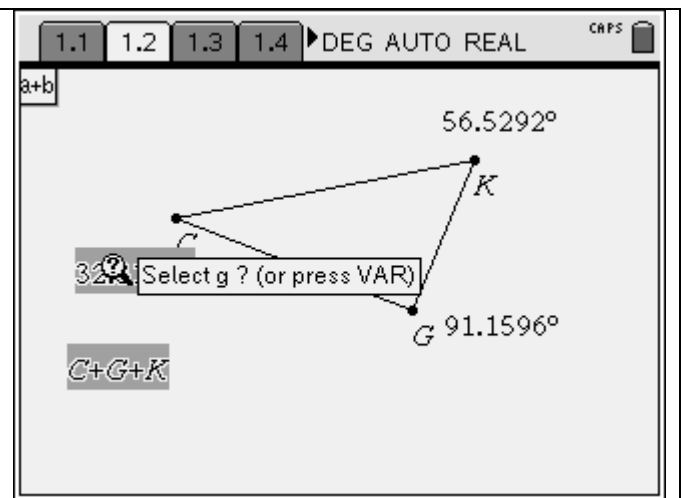| (🏠) 8	Open the document settings and change to degrees.
🏠 Home √x 1:Calculator 2:Graphs & ... 3:Lists & Sp... T 4:Notes 5:Data & Sta... 6:New Doc... 1:Document Settings... 7:My Docu... 2:System Settings... 3:Handheld Status 4:About View or change settings such as number of display digits. View handheld information	**Document Settings...** Display Digits: Float 6 ▽ Angle: Degree ▽ Radian Exponential Format: Degree ▽ Real or Complex: Gradian ▽ Auto or Approx.: Auto ▽ Apply to System OK Cancel

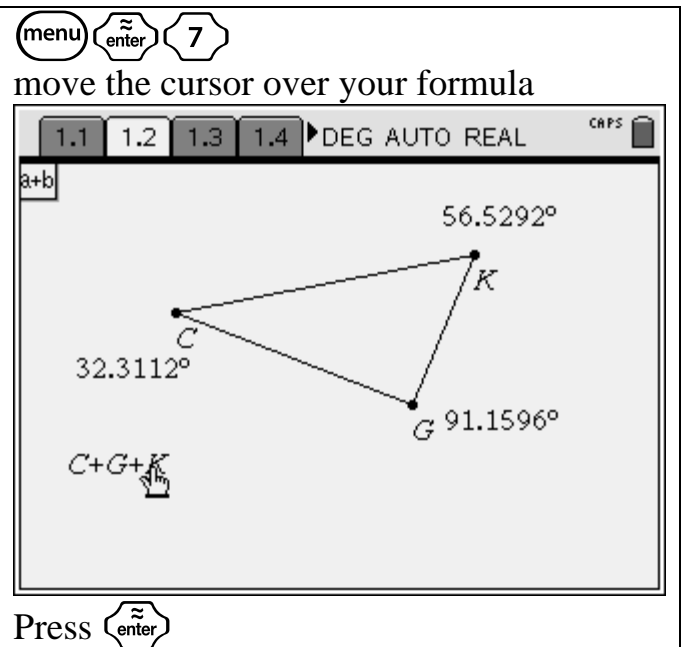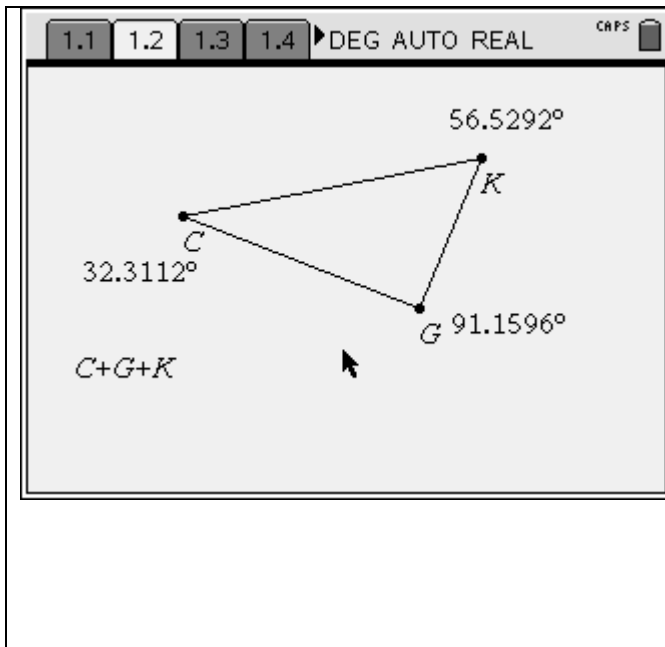| 1.1 1.2 1.3 1.4 ▶DEG AUTO REAL CAPS 🔋	1.1 1.2 1.3 1.4 ▶DEG AUTO REAL CAPS 🔋
(triangle with vertices C, K, G) 32.3112°	(triangle with vertices C, K, G) 56.5292° 32.3112° G 91.1596°
Now continue to find the measures of the remaining angles	Now open a text box and create a formula for the sum of the angles

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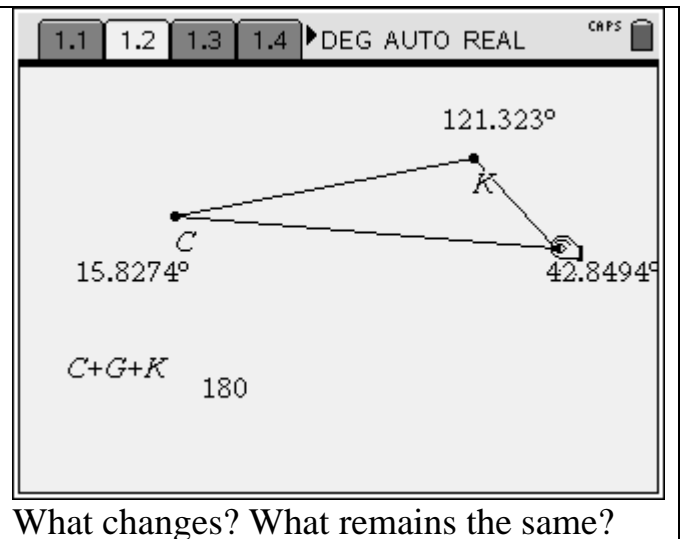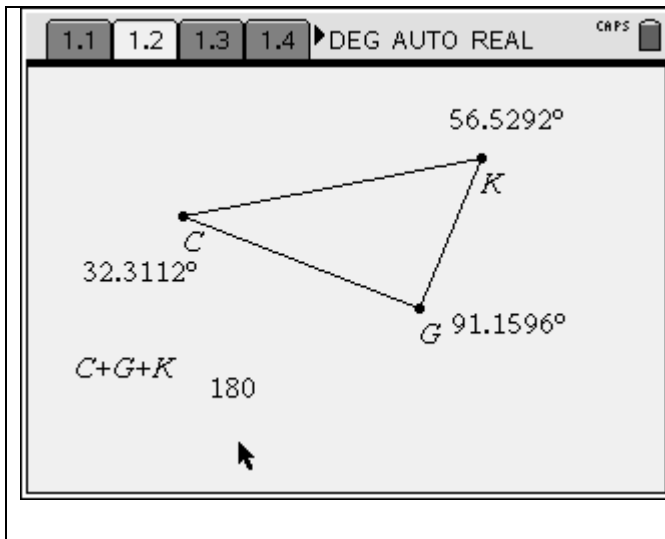
56.5292°

K

C

32.3112°

G 91.1596°

C+G+K

(menu) (≈ enter) (7)

move the cursor over your formula

56.5292°

K

C

32.3112°

G 91.1596°

C+G+K

Press (≈ enter)

56.5292°

K

C

32.3112°

G 91.1596°

C+G+K   Select c ? (or press VAR)
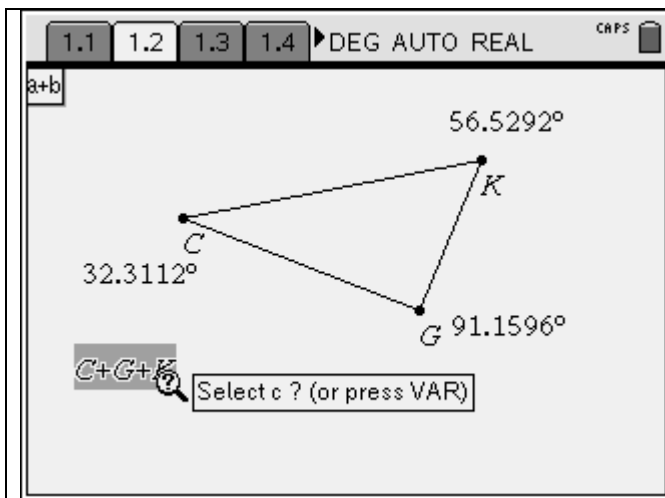
Note that you are to select C, move the cursor to the number associated with C and press enter

Once you have selected every variable in your formula the formula will be calculated. Now drag the result to an appropriate placement on your screen.

56.5292°

K

32   Select g ? (or press VAR)

G 91.1596°

C+G+K

Note that you are now asked for the number associated with G. Cursor over this value and continue for the final value

Select any vertex and drag the figure to investigate many different triangles

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| 1.1 | 1.2 | 1.3 | 1.4 ▶ DEG AUTO REAL   CAPS 🔋 |

56.5292°

K

C
32.3112°

G 91.1596°

C+G+K
180

| 1.1 | 1.2 | 1.3 | 1.4 ▶ DEG AUTO REAL   CAPS 🔋 |

121.323°

K

C
15.8274°

42.8494°

C+G+K
180

What changes? What remains the same?