Basic TI-Nspire™ CX Functionality

| Key Name	Function
Click Key (See Figures 1 and 2.)	Selects an object on the screen. ctrl + grabs an object on the screen.
TouchPad	Slide or Press the arrow keys to move the cursor/pointer.
esc Escape Key	Removes menus or dialog boxes from the screen.
Scratch Pad	Provides a temporary application (i.e. calculator)
tab Tab Key	Moves to the next entry field.
The Big Three	
on Home Key	Displays the home menu.
doc▾ Document Key	Controls document structure
menu Menu Key	Displays application or context menu.

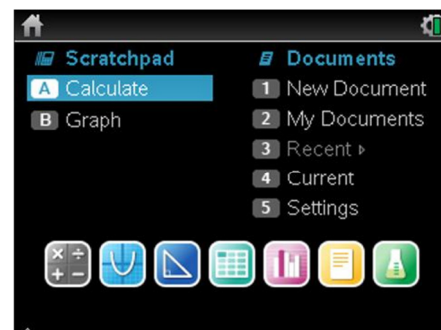**Touchpad Cursor Controls**
Figures 1 & 2

Figure 3

The Document Model

1. The TI-Nspire ™ handheld is "*document based and menu driven"*. This simply means that everything you do must be done in a *document* much like on a computer, and the tools for every application can be found in its *menus*.

   - Turn on your TI-Nspire ™. If the screen shown in Figure 3 is not displayed, press on for Home.

     Open a new document by selecting 1: New Document and 1: Add Calculator to add a new Calculator application page (Figure 4).

Figure 4

Basic TI-Nspire™ CX Functionality

The Calculator Application

1. Page 1.1 is a calculator page. (Figure 4).

2. Perform the operations shown in Figures 6 to 13:

Note: To select a menu option, you can highlight the option and press [enter] or [🔍]. Alternately, you can press the number key for that option.

Figure 4(Again)

- To find the gcd of two numbers, press ***Menu, Number, Greatest Common Divisor.*** (Keystrokes: [menu] [2] [5]) (Figures 5 and 6).
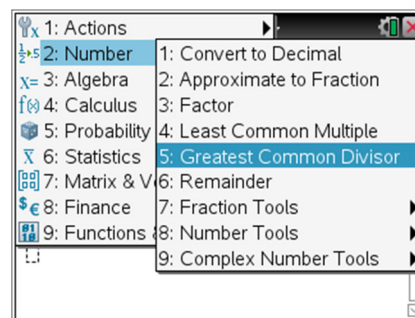
Figure 5

- To enter a fraction, type the division key or use the fraction template by selecting [ctrl] [÷] (the right side of the [×] [÷] toggle.
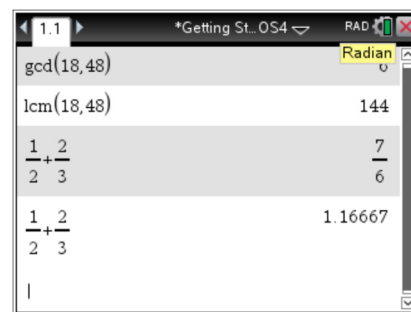
Figure 6

- For an approximate value, press [ctrl] [enter] (Figure7).

Note: To clear the calculator screen, press for ***Menu, Actions, Clear History*** (Keystrokes [menu] [1] [5]).
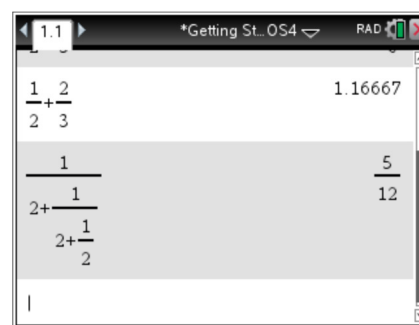
Figure 7

✦ Basic TI-Nspire™ CX Functionality

- To convert a decimal to an approximate fraction press *Menu, Number, Approximate to Fraction*. (Keystrokes: menu [2][2]). (Figure 8).
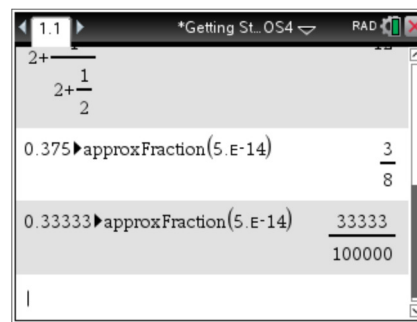

Figure 8

- To factor a number, press *Menu, Number, Factor.* (Keystrokes: menu [2][3]). (Figure 9).

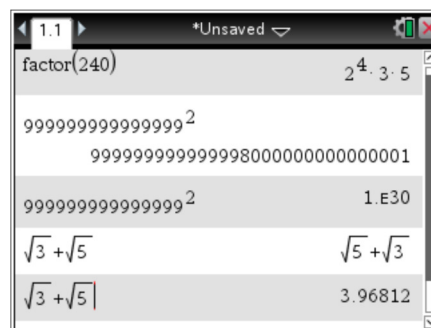- To access square root command, press [ctrl] [x²] or press [⊞] (the left side of the [⊞][▦] toggle, or type **sqrt(**.   (Figure 9).

Figure 9

- To access the absolute value command, press [⊞] (the left side of the [⊞][▦] toggle), and choose the absolute value template or type **abs(**   (Figure 10).
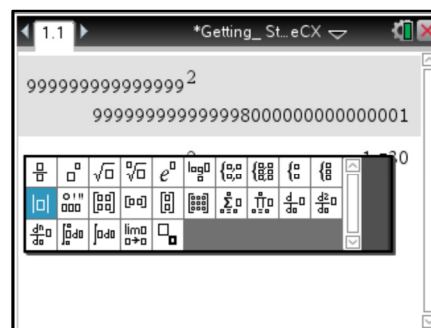
Figure 10

- To raise a number to a power, enter the base, press [⊞], and select the template shown in Figure 11. Enter the power, and press [enter]. (Figure 12.)

Figure 11

![TI logo] Basic TI-Nspire™ CX Functionality

Figure 12

- To access the degree symbol, press ⌈ctrl⌉ ⌈📖⌉ for the symbols menu (Figure 13).

- Move the cursor to the right, and select the
  ° (degree) symbol and press ⌈enter⌉.

Figure 13

- To access the factorial symbol, press *Menu, Probability, Factorial.* (Keystrokes: ⌈menu⌉⌈4⌉⌈1⌉) OR use the symbols menu described above. (Figure 14).

Figure 14

- To access the templates for matrices, press ⌈▦⌉ (the left side of the ⌈▦⌉⌈📖⌉ toggle). (Figure 15).

Figure 15

Basic TI-Nspire™ CX Functionality

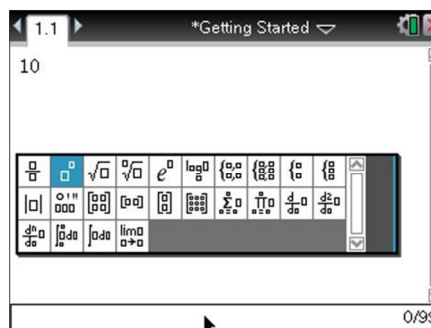- Define function $f1(x) = x^2$. (Keystrokes: Press, 📖, select Define and type $f1(x) = x^2$) OR simply type the word Define followed by $f1(x) = x^2$.
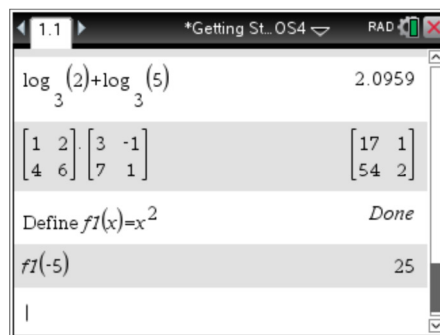
- Evaluate $f1(-5)$ (Figure 16).

Figure 16

The Graphs Application

Basic Graphing

Insert a New Page.

- Add a new page. (Keystrokes: doc▾ 4:Insert, 2: Page) and then select Add Graphs (Figure 1).

  Shortcuts: Press ctrl doc▾ or Press 🏠on 🦌.

  The Graphs application is now page 1.2 of the document.

  Note: The graphing window shown is the default window setting with a screen aspect ratio of one.

1. The function notation f2(x) is shown in the entry line. Explain why. (Figure 2).

2. To see and graph f1(x), Press ▲ and enter (Figure 3).

   Note: The **Entry line** is now hidden. To **recall the Entry Line**, Press ctrl G.

   Note: To **edit a function**, recall the Entry line and edit OR double "click" on the equation showing on the screen and edit.

Figure 1

Figure 2

Figure 3

![TI logo] Basic TI-Nspire™ CX Functionality

Modifying the Window

- *Method 1:* Press ***Menu, Window, Window Settings***
  (Keystrokes: [menu] [4] [1]) and enter appropriate values
  for xmax, xmin, etc. (Figure 4).

- *Method 2:* Double "click" on the each of the end
  values of the axes and edit appropriately.

Note: These methods will rescale the axes and may ***not*** maintain
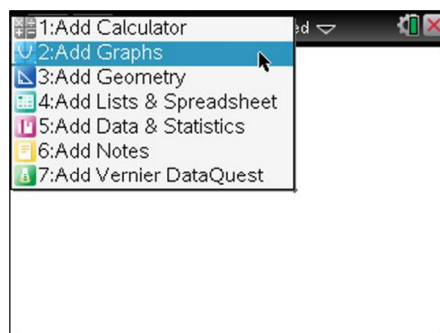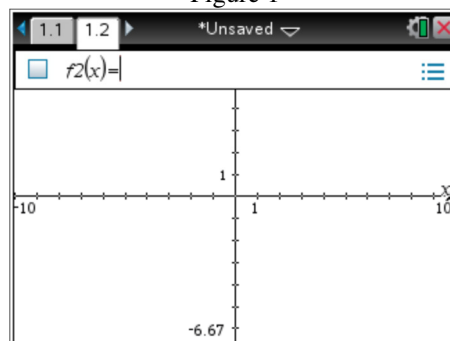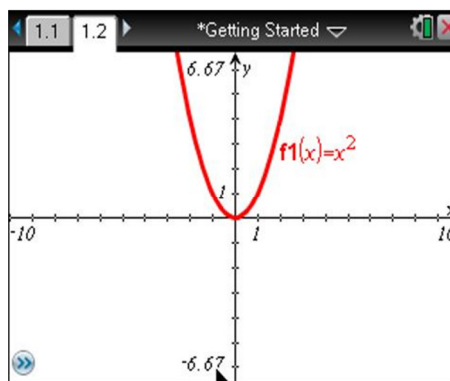the 1 to 1 aspect ratio.
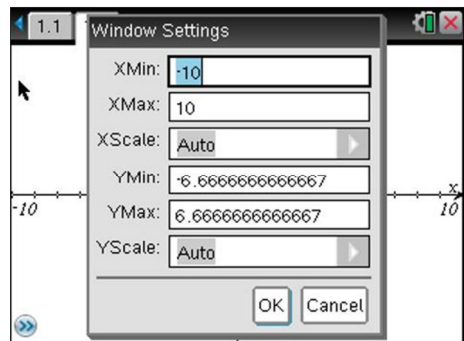
Figure 4

Tracing a function

- Press ***Menu, Trace, Graph Trace*** (Keystrokes:
  [menu] [5] [1]). Use the Touchpad to move the cursor
  (*spider*) left or right to trace the function. Press [⊙] or
  [enter] to permanently fasten a point and its coordinates on
  the graph. (Figure 5).

Figure 5

Figure 6

Note: The x or y coordinate of the point may be edited by double
"clicking" on the entry, typing in a new value and pressing [⊙]
or [enter]. (Figures 6 and 7).

Figure 7

Basic TI-Nspire™ CX Functionality

Actively Manipulating Functions

1. Use the Touchpad arrow keys to move the graph on the screen.

   As you move the pointer close to the graph of a function, one of two different types of cursors will appear.

   - The *two-directional arrow* stretches the function (Figure 8). Notice the word graph also appears.
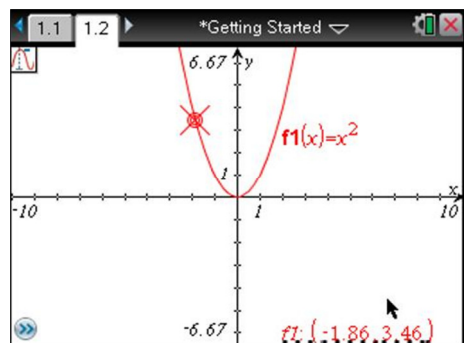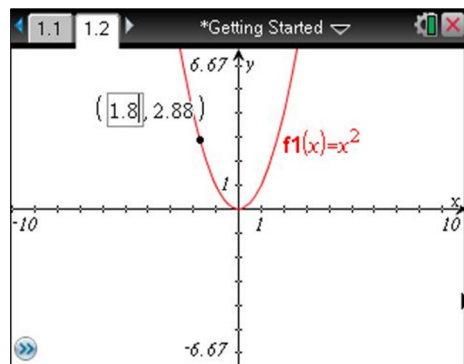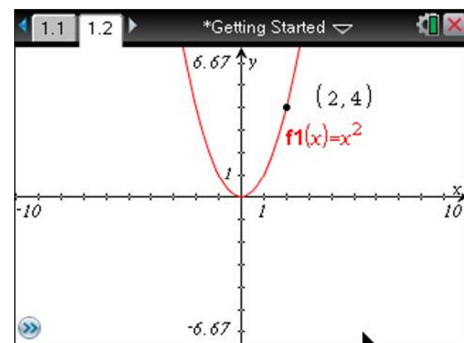
   - The *four-directional arrow* translates the function (Figure 9).

2. Place the pointer near the graph until the two-directional arrow appears.

3. Press ⌈ctrl⌉ ⌈🖉⌉, and use the Touchpad arrow keys to stretch or translate the function.
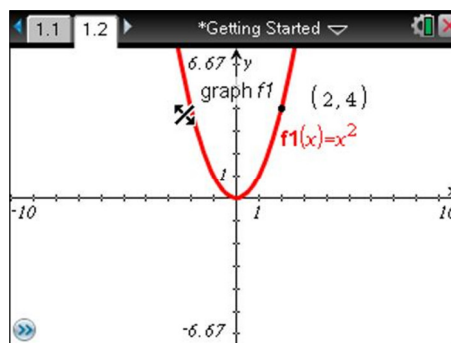
Figure 8
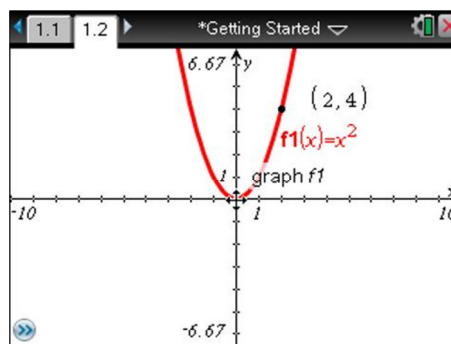
Figure 9

Moving Between Pages in a document

1. Press ⌈ctrl⌉ ◄ (on the TouchPad) to move back one page

2. To view all of the pages of the problem, press ⌈ctrl⌉ ▲ (on the TouchPad) (Figure 10).

Note: This screen allows you to move from one page to another. To open the page that you wish to view, highlight the page by moving left or right with the Touchpad .When the appropriate page is highlighted, press ⌈enter⌉.

Note: To change the order of the pages, highlight the page by moving left or right with the Touchpad, and hold the ⌈🖉⌉ until the hand closes. Then use the NavPad cursor ◄ or ▶ move the page to the desired place, and press ⌈enter⌉.

Figure10

Figure 11

![TI logo] Basic TI-Nspire™ CX Functionality

Creating a New Folder

1. Press *Home, My Documents*. (Keystrokes: $\boxed{\text{⌂ on}}$ $\boxed{2}$).

2. Highlight the folder in which you would like to create your new folder.

3. Press *Menu, New Folder*. (Keystrokes: $\boxed{\text{menu}}$ $\boxed{1}$), type the name of the new folder and press $\boxed{\text{enter}}$. (Figures 11 and 12).
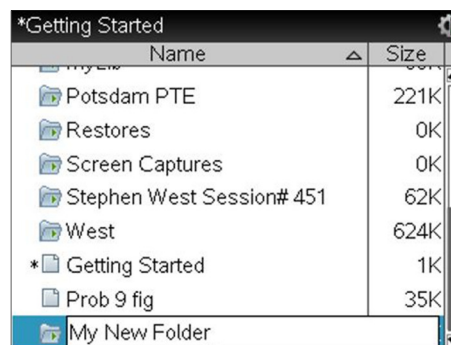
Figure 12

Saving a Document

1. To save the current document, press $\boxed{\text{doc}\blacktriangledown}$, File, Save (or Save As…) (Keystrokes: $\boxed{\text{doc}\blacktriangledown}$, $\boxed{1}$, $\boxed{2}$)(Figure 1).
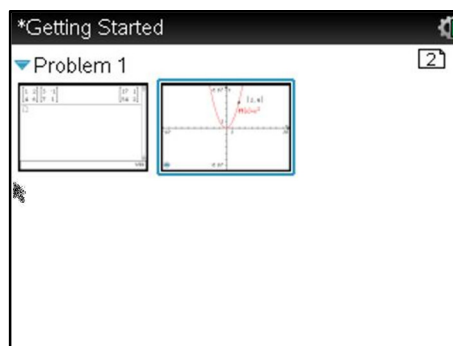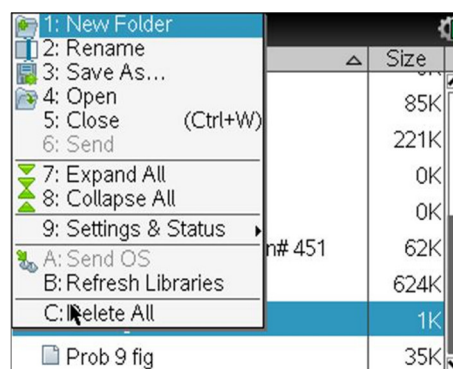
2. The Save As…: dialog box appears and will be highlighted, enter your file name (Figure 2).

3. Recall that TI-Nspire behaves like a computer and that the Touchpad behaves like a computer touchpad or a mouse.

   - If the folder, that you wish to save the file in is highlighted, then press $\boxed{\text{enter}}$.

   - However, if the folder that is highlighted is not the correct one, use the Touchpad to slide the cursor to the correct folder press click followed by $\boxed{\text{enter}}$.
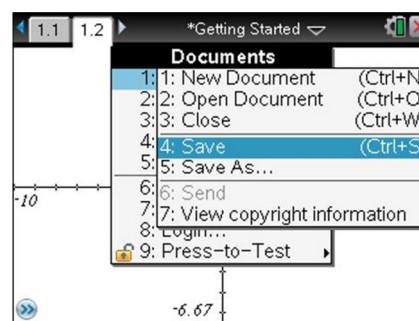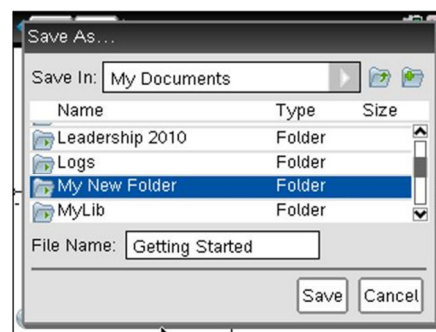
Figure 1

Figure 2

Note: Folders on TI-Nspire can be nested like those on a computer. Use the Touchpad to navigate the folders much in the same way as on your computer.

4. To check to see if your document has been saved. Press $\boxed{\text{⌂ on}}$ $\boxed{2}$ for Home 2: My Documents. The folder will appear showing the document that you have just saved.

   Shortcut: To save the current document, press $\boxed{\text{ctrl}}$ $\boxed{\text{▦}}$ for ⌈**save**⌋.

![TI] Basic TI-Nspire™ CX Functionality

Graphing in 3D

The 3D Graphing view lets you enter functions of the form z(x,y) and view and explore them in three-dimensional space.

While you are in the 3D Graphing view, you can define, rotate, resize, and trace 3D graphs. You can set the colors and other visual attributes of a selected graph, and you can customize the 3D viewing environment.

1. Insert a New Page and select Add Graphs.

2. In the **View** Menu select 3D Graphing (Figure 1.)

3. In the entry line enter a function for example:

    $z1(x, y) = \dfrac{x^2 - y^2}{3}$ and press Enter. (Figure 2).

Range Settings

The **Range Settings** function (Figure 3 and 4) in the same way as in two dimensional graphing with the following exceptions:
*   eye θ: Rotation in degrees around the z-axis clockwise from positive x-axis
*   eye ϕ: Rotation in degrees clockwise around a line through the origin and parallel to the screen midline
*   eye distance: the distance (a number between 1 and 100) from the viewing eye to the graph.

Rotating the 3D view

Press any of the four arrow keys to rotate the graph.

Note: A legend displaying orientation of the axes appears in the upper right hand corner.

To rotate automatically:
*   Auto rotation is equivalent to holding down the right arrow key.
*   From the **Actions** menu, select **Auto Rotation**. The Auto Rotation icon appears, and the graph rotates.
*   (Optional) Use the up and down arrow keys to explore the rotating graph.
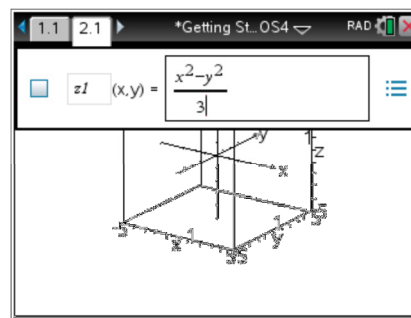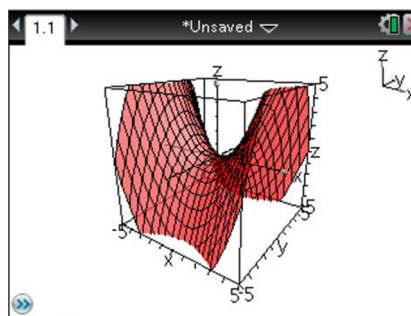*   To stop the rotation and return to the Pointer tool, press ESC.
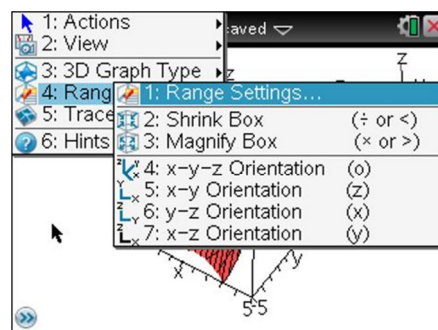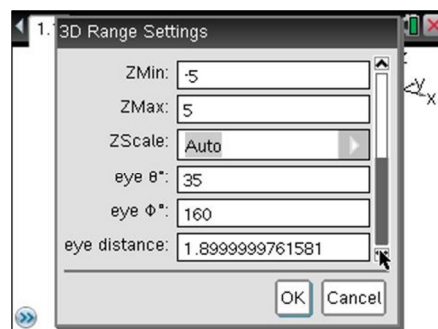

Figure 1

Figure 2

Figure 3

Figure 4

![TI logo] Basic TI-Nspire™ CX Functionality

To view from specific orientations:

- Press **Z**, **Y**, or **X** to view along the z, y, or x axis.

- Press letter **O** to view from the default orientation.

Tracing in the 3D view

1. From the **Trace** menu, select **z Trace**.

   The z Trace icon and the trace plane appear, along with a text line showing the current "z=" trace value. (Figure 5.)

2. To move the trace, hold down **Shift** and press the up or down arrow key. The "z=" text is updated as you move.(Figure 6.)

3. (Optional) Use the four arrow keys to rotate the view and see how the trace plane and the graph intersect.

4. To stop tracing and return to the Pointer tool, press ESC

To set custom plot colors:

Custom plot colors can make it easier to see the shape characteristics of the graph. You can assign different colors to its top and bottom surfaces or choose to have the graph colored automatically, based on height or steepness. You can also set the wire color.

1. Display the graph's context menu, and then select **Color > Custom Plot Color**.

2. Select one of the three Surface color options: **Top/bottom color**, **Vary color by height**, or **Vary color by steepness**.

- If you choose Top/bottom color, click the color swatches to select colors for the top and bottom surfaces.
- If you choose to vary color by height or steepness, colors are determined automatically. Figure 7.)

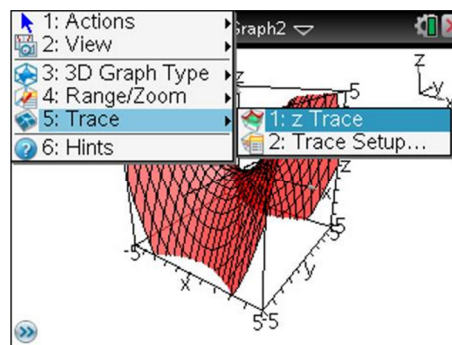3. To set the Wire color, click the color swatch and select a color
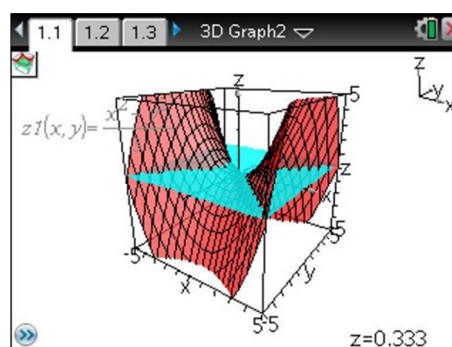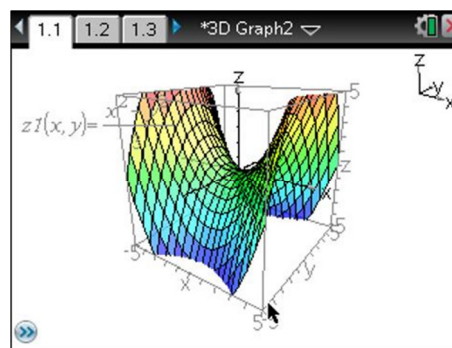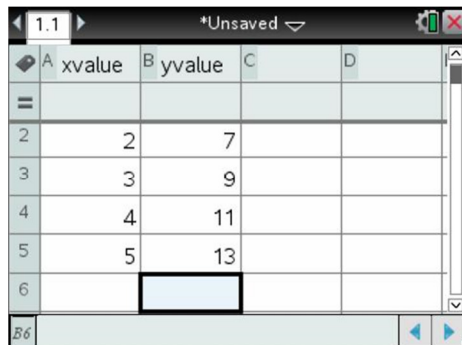

Figure 5

Figure 6

Figure 7

Basic TI-Nspire™ CX Functionality

The List & Spreadsheet Application

1. Open a New Document and add a List & Spreadsheet page.

   - Move to the top of column A and label the column as "*xvalue*"

   - Insert data {1,2,3,4,5} into cells A1-A5.

   - Move to the top of column B and label the column as "*yvalue*"

   - Insert data {5,7,9,11,13} into cells B1-B5. (Figure 1).

     Note: The Lists and Spreadsheet application works much like a computer spreadsheet.

Figure 1

2. **Create a Scatter Plot.**

   - Insert a Graphs page.

   - Press, *Menu, Graph Type, Scatter Plot*. (Keystrokes: menu 3 4). (Figure 2).

   - Press var , select "*xvalue*" as the input variable and press enter . (Figure 3).

   - Press tab , var ▼ select "*yvalue*" as the output variable.

   - Select an appropriate window to view the data. (Figure 4).
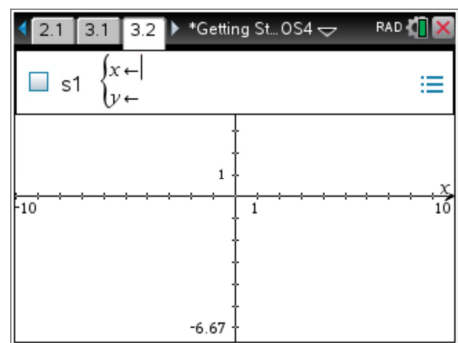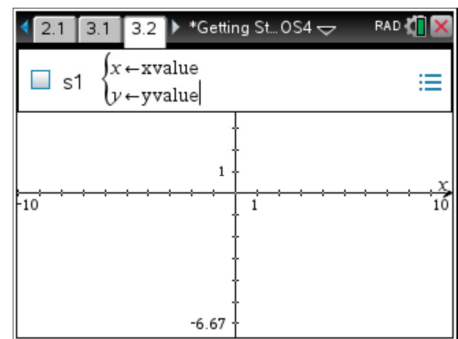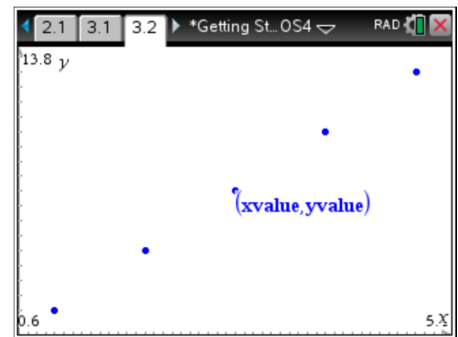

Figure 2

Figure 3

Figure 4

🤠 Basic TI-Nspire™ CX Functionality

3. **Create a Quick Graph.**

   - Go back to Page 1.1

   - Press the Touchpad ▲ until the entire column A is highlighted.

   - Hold down ⇧shift and press the Touchpad ▶ to highlight column B also.

   - Press for *Menu, Data, Quick Graph,* (Keystrokes: menu 3 6) then press enter (Figures 5 and 6).
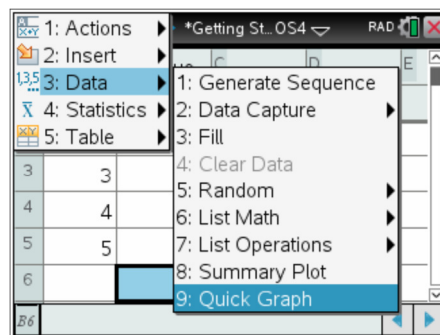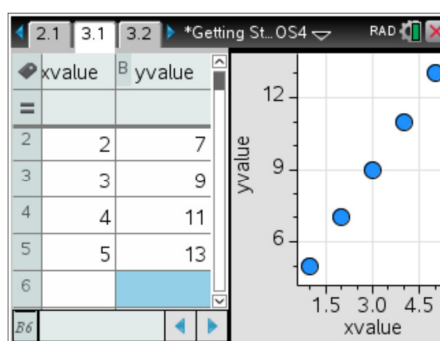
Figure 5

Figure 6

The Data and Statistics Application

1. **Create a Scatter Plot**
   - Insert a New Page and add a Data and Statistics application. (Figure 7).

   - Move the cursor to the words "click to add variable" at the bottom of the page and press 🖱 on the rectangle.

   - Use the Touchpad ▲ to select "xvalue" as the input variable and press enter. (Figure 8).

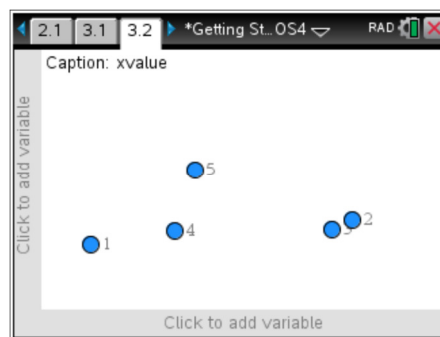   - Move the cursor to the left side of the page and press 🖱 when the words "Click to add variable" appear.

Figure 7

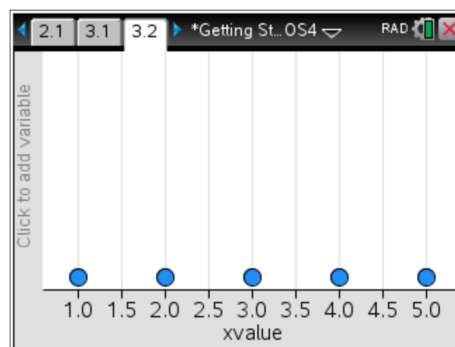Figure 8

Basic TI-Nspire™ CX Functionality

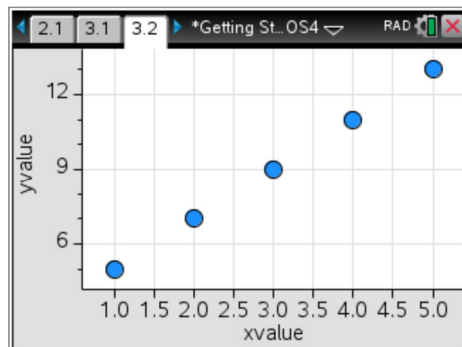- Use the Touchpad ▾ to select "yvalue" as the output variable and press ⌜enter⌝. (Figure 9).

Figure 9

2. **Add a Movable Line**

- Press *Menu, Analyze, Add Movable Line*. (Keystrokes: ⌜menu⌝⌜4⌝⌜2⌝). (Figure 10).

- Move the cursor close to one end of the line and the ⟲ cursor will appear (Figure 11).

- Grab the line and drag it until it "fits" the data. (Figure 12.)

    Note: You may have to move the ⟲ cursor from one end of the line to the other end several times to achieve a good approximation to the data.
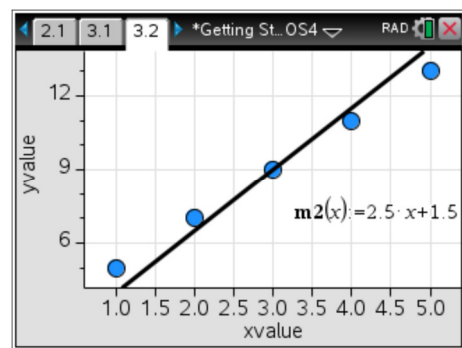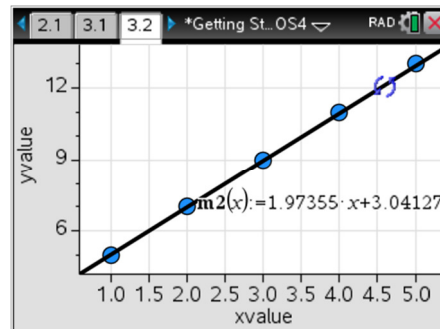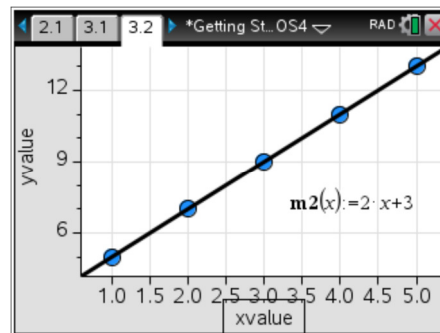

Figure 10

Figure 11

Figure 12

🤠 Basic TI-Nspire™ CX Functionality

The Geometry Application

1. Start a new document, by pressing ***Home, New Document***
   (Keystrokes: 🏠on 1). (Figure 1).

   Note: If a Save option appears, select Yes or No
   to save the document that was open when the
   TI-Nspire™ handheld was last used.

2. Press 3 for 3:Add Geometry. (Figure 2).

   Note: You could also press 🏠on and select the
   Geometry icon 📐 - this will add a Geometry
   page to the currently open document.
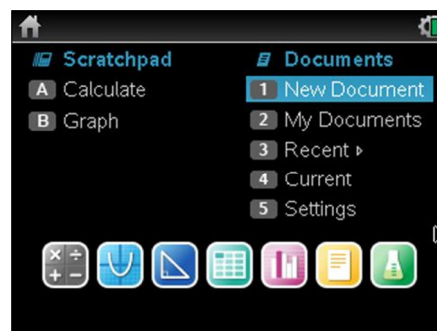
Figure 1
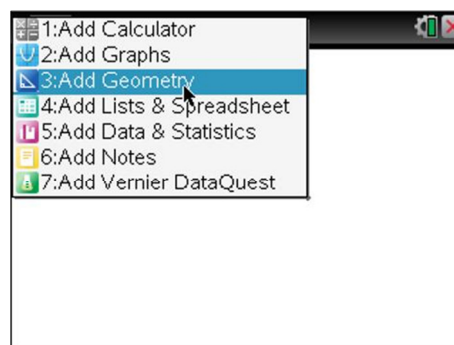
Figure 2

Explore the Page

1. Use the Touchpad to explore moving around on the page.
   (Figure 3).

2. Press menu , and look at the options in the following
   submenus (Figure 4):

   Menu 7:Points & Lines

   Menu 8:Measurement

   Menu 9:Shapes

   Menu A:Construction

   Menu B:Transformation

3. After pressing the ▶ key to investigate submenu options in a
   particular menu selection, press the esc key to exit that
   list of menu options.

4. Press esc a second time to exit the Menu structure
   entirely.

Figure 3

Figure 4

★ Basic TI-Nspire™ CX Functionality

Investigation: Interior Angles of a Triangle

Draw a triangle, ΔABC.

1. Choose the Triangle tool by pressing ***Menu, Shapes, Triangle***. (Keystrokes: menu 9 2) (Figure 5).
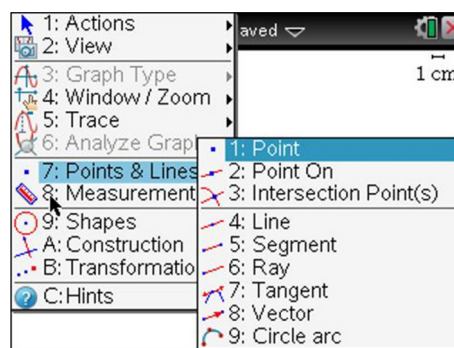
2. Using the Touchpad, position the pointer to construct a triangle near the center of the screen.

3. Press the [🔘] or enter to place the first vertex on the screen.
   - One way to label vertices and points is to type the label immediately after creating the point. *Note: The point will be flashing.*
   - For capital letters, press the ⇧shift key before pressing the letter key (Figure 6).

4. Using the Touchpad again, move the cursor to a second location for the next vertex.

5. Press [🔘] or enter to place the second vertex.

6. Type the label immediately.

7. Repeat these steps to create a third non-collinear location for the third vertex, and type its label.

8. Move away from the label, and press the esc key to deselect the triangle tool.
   - If you didn't label one or more of the vertices when constructing the triangle (as shown in Figure 7), you can label the vertex using the Text tool.
   - Press for ***Menu, Actions, Text***. (Keystrokes: menu 1 6).
   - Use the Touchpad to move close to the vertex.
   - The vertex should blink. Be sure that the entire triangle does not blink.
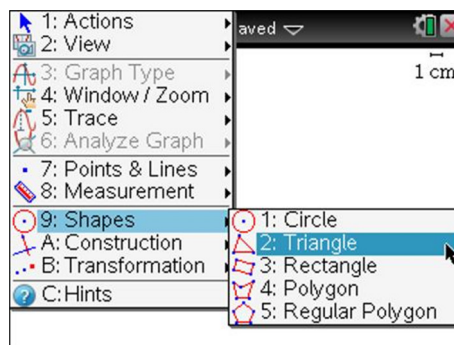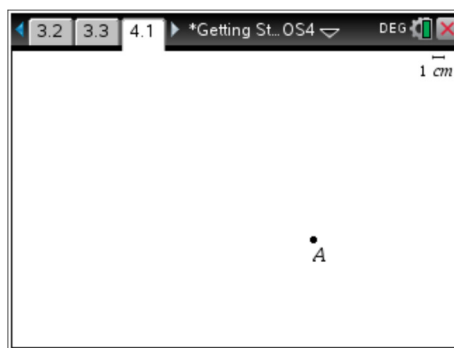   - Press [🔘] or enter to open a text box. (Figure 8).
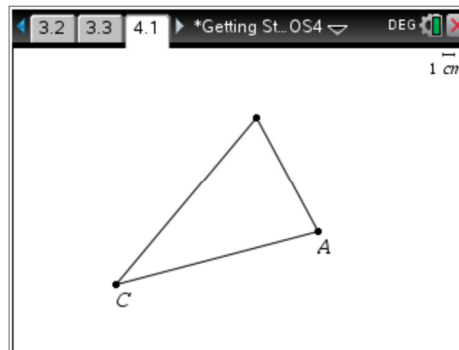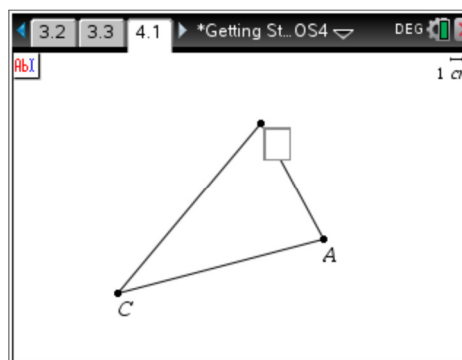

Figure 5

Figure 6

Figure 7

Figure 8

![TI logo] Basic TI-Nspire™ CX Functionality

- Press the appropriate letter key, and then press
  [enter] to close the text box.

- Press the [esc] key to deselect the Text tool.
  (Figure 9).

Figure 9

Measuring the Three Interior Angles

1. Press ***Menu, Measurement, Angle***. (Keystrokes: [menu]
   [8] [4]). (Figure 10).

2. Move the cursor with the Touchpad to select each
   vertex.

   Note: To select a vertex, use the Touchpad to move close to
   a vertex. The cursor will indicate a point and its label. When
   the "pencil" shape on the screen changes to a "hand" shape,
   press [enter] or [🖰] to select the vertex. (Figure 11).

Figure 10

- The vertices must be selected in either a clockwise
  or counter-clockwise direction, just as angles are
  named.

  Note: Regardless of direction, the vertex of the angle to
  be measured must be selected second. Not only is the angle
  drawn, but the angle being measured is marked.

Figure 11

3. After pressing [enter] or [🖰] at the third vertex, the angle
   value is located near the vertex of the measured angle.
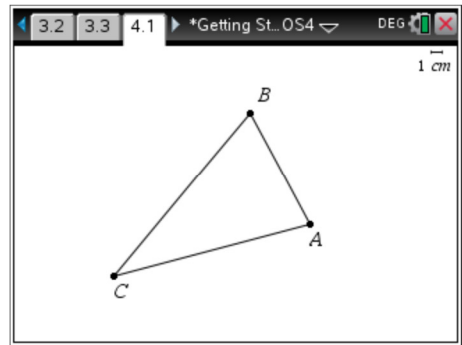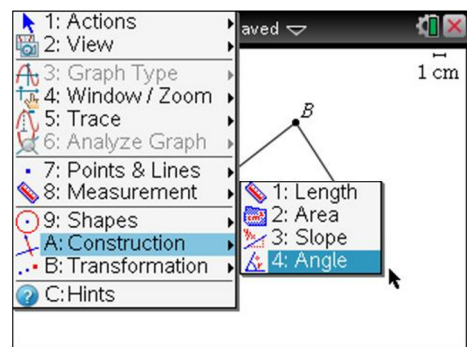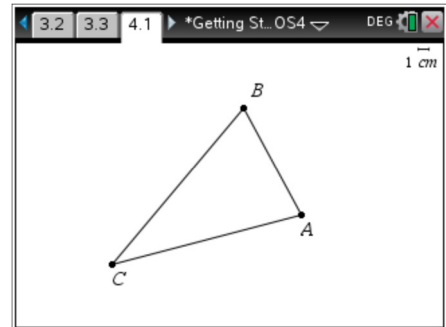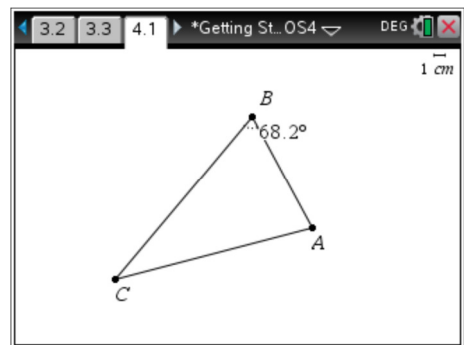   (Figure 12).

Figure 12

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                   west@geneseo.edu

4. Repeat to measure the other two angles (Figure 13).

5. If necessary, drag the measurements to an appropriate
   location.

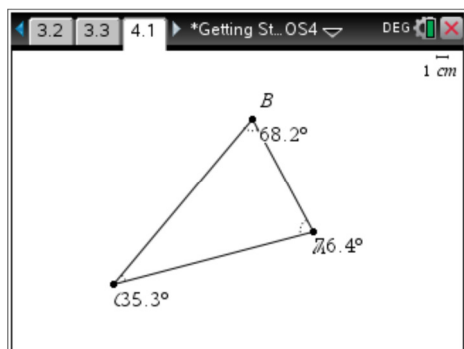*Note:* You may wish to save your file before moving on.

Figure 13

Calculating the Sum of the Three Angles

For a calculation, an expression or statement of that
calculation must first be entered on the page.

1. Press for *Menu, Actions, Text*. (Keystrokes: menu 1 6).

2. Position the pointer in an empty location on the screen.

3. Press enter or 🖱 to open the text box (Figure 14).

4. Type the statement s = A + B + C on the screen using the
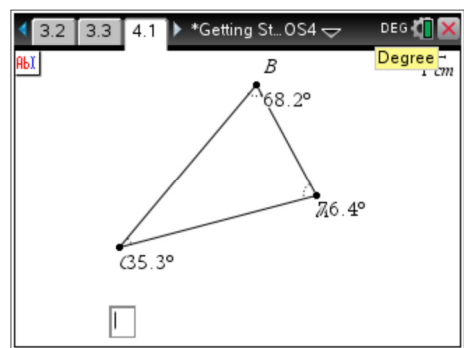   keypad, and press enter to close the text box (Figure 15).

Note: You cannot put an equals sign at the end of this type of
statement, but you can start with a word or letter like 's' as long as it
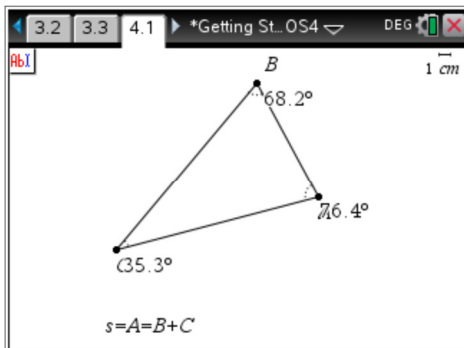is not a reserved word like *cos*.

Figure 14

Figure 15

5. Press *Menu, Actions, Calculate* to select the Calculation
   tool (Keystrokes: menu 1 8).

6. Point at the statement s = A + B + C. Press enter or 🖱 to
   select this calculation rule.

7. As you move away from the calculation rule, a box will
   appear with a message asking for the first variable in the
   calculation. In this example, the message is "Select a ? (or
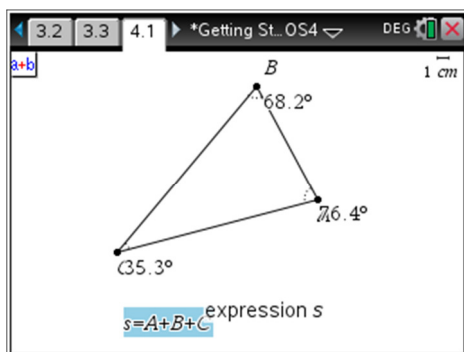   press VAR)" (Figure 16).

Figure 16

8. Move near the first measurement.

9. When a "hand" appears, select the angle measurement by pressing **enter** or [🖰] (Figure 17).

10. When you move away from the first angle measurement, the second variable value is requested.

11. Move to the second angle measurement and, when the hand appears, select it by pressing **enter** or [🖰].

12. Repeat this procedure to select the remaining angle measurement.

13. A sum will appear on the screen as you move away from the last measurement selected. Drag the sum to a convenient location on the screen, and press **enter** to affix it (Figure 18).

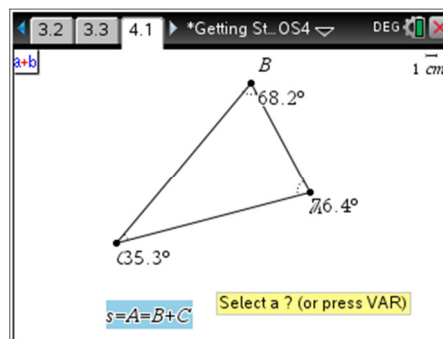   *Note:* If desired, use the Text tool to label this numerical result 's='. (Figure 19).

Figure 17

Figure 18

Figure 19

- Drag one or more of the vertices, and make a conjecture about the sum of the interior angles of a triangle. (Figure 20).

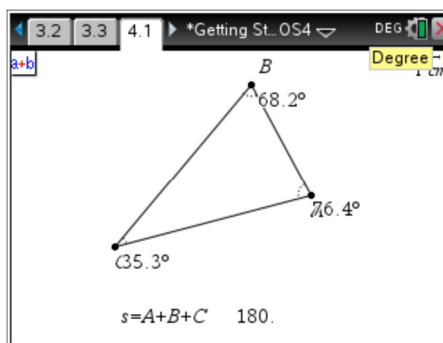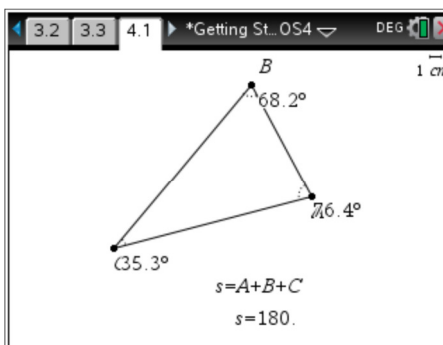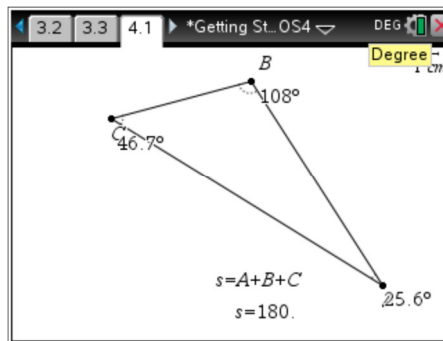Does your conjecture hold for any type of triangle? Explain your reasoning.

Figure 20

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Measuring Objects

1. Insert a new Geometry page.

2. Draw a Quadrilateral, $\Delta PQRS$.

   Note: When using the polygon tool you must return to the initial point (in this case P) and press 🖉 or [enter] to complete your polygon.

3. Measure the perimeter of the quadrilateral. Press **Menu, Measurement, Length**, (Keystrokes: [menu] [7] [1]) and use the Touchpad to move to a side of the polygon and press [enter]. (Figure 21).

   Note: When you move the cursor to the polygon a text box reads polygon PQRS and the measurement tool produces the perimeter. If you wish to measure the length of a side of the polygon you must select each of its endpoints.
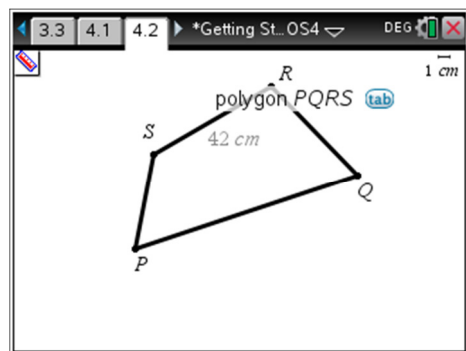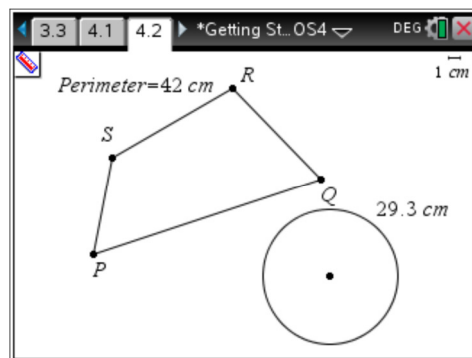

Figure 21

Figure 22

4. Draw a circle and measure its circumference. (Figure 22).

The Interactive Notes Page Application

1. Open a New Document and add a Notes Page.
   - An Interactive Notes Page can be used to take notes, write directions, ask questions, or to interact with other applications. The Format Menu can be used to **Bold Face,** *Italicize*, Subscript and Superscript entries. (Figure 1).
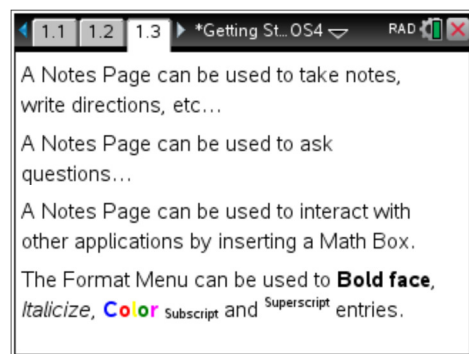

Figure 1

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2. Insert a new Notes page. The Templates Menu can be used to create a Question and Answer page or a Proof page. (Figure 2 and 3).
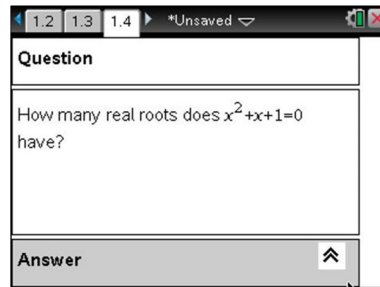
Figure 2

3. Insert a new Notes page. This notes page will be used to interact with a Calculator Page and a Graphs page. Insert a Math Box by pressing **Menu, Insert, Math Box** (Keystrokes menu, 3, 1) and use this Math Box to define $g(x) = x^2$. (Figures 4 and 5).
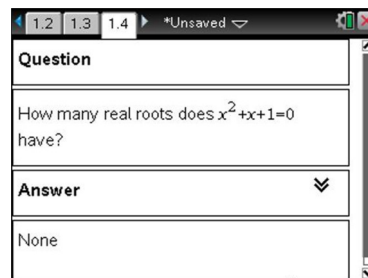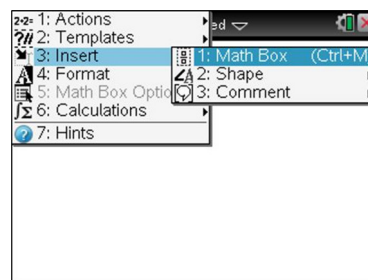
Figure 3

Figure 4

Figure 5

Basic TI-Nspire™ CX Functionality

4. Insert a new Calculator page. Evaluate $g(3)$ and $g(i)$.
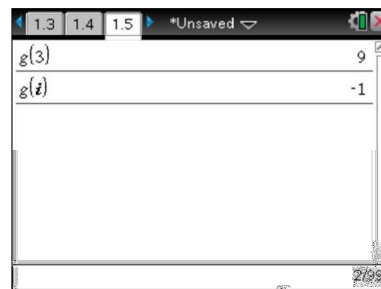
   (Figure 6).

Figure 6

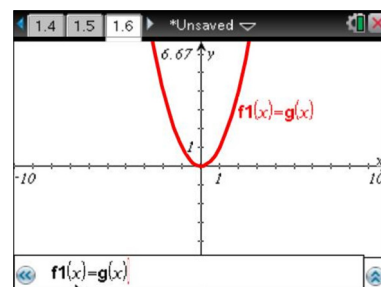5. Insert a new Graphs page. Graph $f1(x) = g(x)$.

   (Figure 7).

Figure 7

Using the Scratchpad

You may create and use a "temporary" Scratchpad to do calculations or view a graph while in a document. To open a Scratchpad:

Figure 8

1. Press *Home,*

   • Press A: Calculate (Figures 8 and 9)

     or

   • Press B: Graph (Figure 10.)
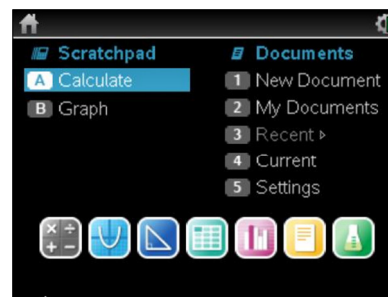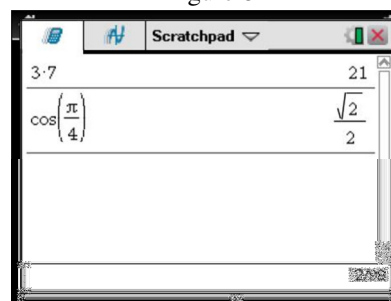
   Note: Shortcut Press [⧉]

Figure 9

![TI logo] Basic TI-Nspire™ CX Functionality

Saving the Scratchpad contents

You can save the Scratchpad Calculate page, the Scratchpad Graph page, or both as a TI-Nspire™ document.

1. Press doc▾, then select **Save to Document** and press enter .

2. The Save to Document dialog box opens.

3. Select the page or pages to save.

4. If a document is open, select either New or Current document and press **Save**.
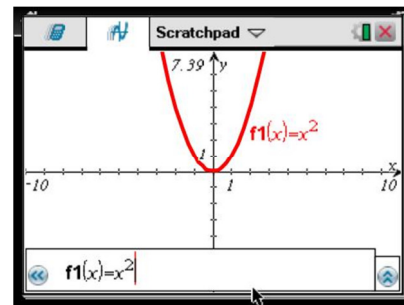

Figure 10

Note: If you selected to save to an open document, the Scratchpad pages are added to the document.

Clearing Scratchpad contents

To delete the calculations and/or graphing work from the Scratchpad application. Press doc▾, then select **Clear Scratchpad**, and press enter .