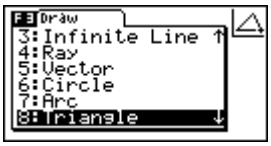
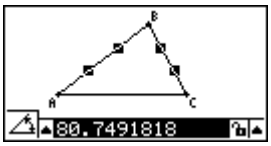
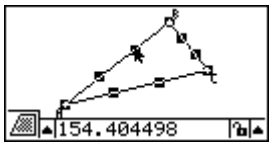
fxNEWS
Support for all Casio fx-9860G models

Getting Started with Geometry

The Geometry Add-In is a free download from the Casio Educational service at **http://edu.casio.com/dl/**. You will need to register at this site to access the free download section. Don't forget to download the Geometry Guide at the same time – it is a handy reference.







Once downloaded, the ***Geometry.g1a*** file is installed in your calculator using the FA-124 software (see 'Using The FA-124 Software – Basics' on this CD).

Geometry is a constraint-based interactive system. One of the features of this is the ability of the user to 'constrain' certain features of a line or figure and the software then re-works the rest of the figure to fit this constraint.

In this introduction to Geometry, we will use the software to

- draw a right-triangle and measure the lengths of all sides, size of all angles, perimeter and area
- draw a line segment and determine its length, midpoint, gradient and Cartesian equation

Once familiarity has been obtained with the various menus, tools and shortcuts through these activities, students and teachers will quickly realise the potential for further exploration and applications of the Geometry Add-In.

Reference Section

Moving around the Geometry screen

Use cursor keys for fine control.

Holding down cursor key gives accelerated movement.

To jump directly into areas of the screen use keys 1-9 as shown at right.

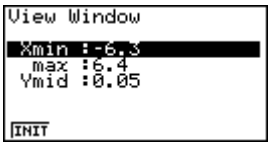
'Jump to' hot keys

7	8	9
4	5	6
1	2	3

Displaying axes, the integer grid and scales

[SHIFT] then [MENU] gives the Axes and Integer Grid options. Scale will show scale on axes. When drawing with Integer grid, points will snap to the nearest grid point.

[SHIFT] [F3] accesses the View Window. x-range can be set from which y-range is calculated in the ratio 2:1 (to avoid distortion of figures).



See User Guide for more on View Window, though it's easiest to use Auto scale hot key (next section).

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Reference Section (Cont.)

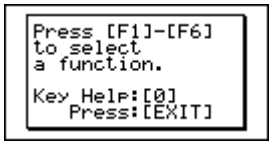
Quick zoom

The following hot keys allow for instant zooming.

[+] = Zoom In
[-] = Zoom Out
[(-)] = Auto scale - fit figure to window

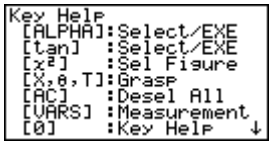
Menus

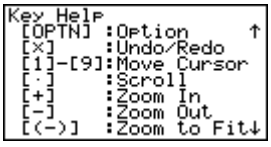
Starting Geometry for the first time, this screen shows.



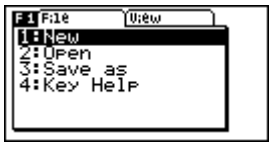
Use [EXIT] to hide function screens.

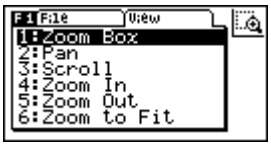
Use the [0] key to access key help screens.





[F1] functions and file and zoom related.

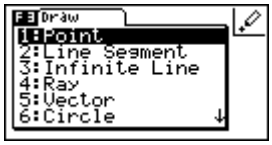




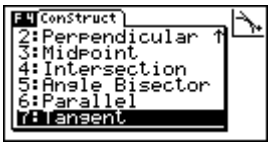
Tap cursor right for View tab and again to move to next function screen.

[F2] functions are selection choices.

[F3] functions are drawing tools. The icon at top right gives clues.



[F4] functions are for constructions.



[F5] functions are for transformations

[F6] functions are for creating animations.

[OPTN] for miscellaneous options.

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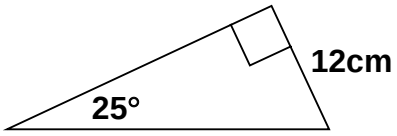
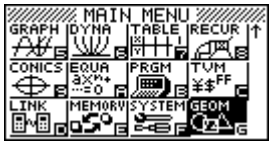
Example 1

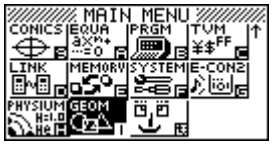
Find all sides, perimeter and area of the triangle shown in this sketch.



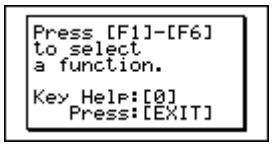
Start the Geometry application from the Main Menu.

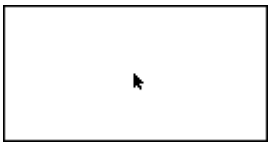


The Geometry icon may be in another position if you have other Add-Ins such as Physium loaded.

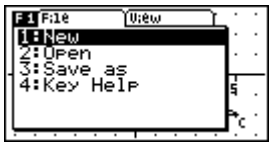


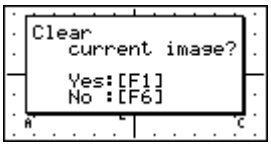
First time in Geometry? This is the welcome screen. Tap [EXIT].

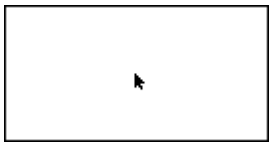




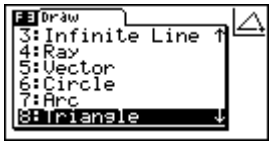
If not, start a new file using [F1] and then [1]. Tap [F1] to clear current image.

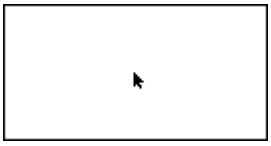






Ready to start! Tap [F3] and use the cursor to select 8:Triangle.



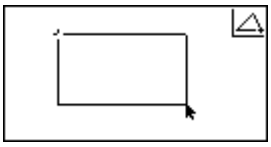


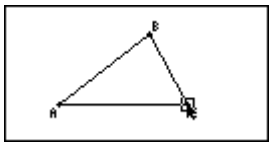
Move the cursor to the left and up, tap [EXE].

A point is plotted.

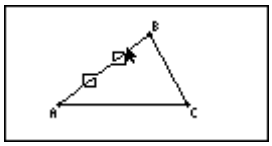
Now move the cursor down and right to draw a box and tap [EXE].

A triangle is drawn.





Move the cursor over side AB and two empty boxes appear.

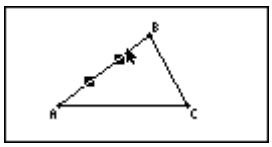


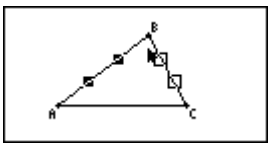
Empty boxes indicate selection of that part of figure is now possible.

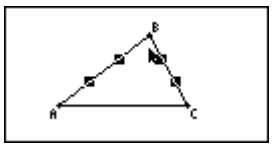
Solid boxes indicate that part of figure is now selected.

Tap [EXE] to select side AB.

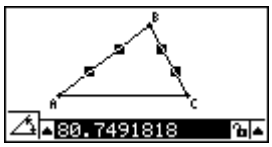
Repeat for side BC.







Now tap the [VARS] key.



The [VARS] key displays the measurement toolbar.

Angle B in this example is close to 81°.

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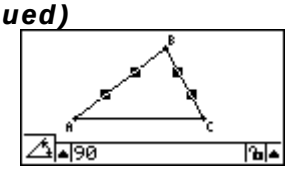
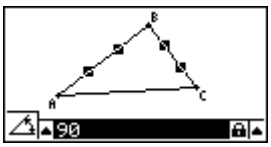
Example 1 (continued)

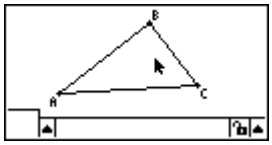
The problem requires angle B to be 90°. Type 90 and tap [EXE].





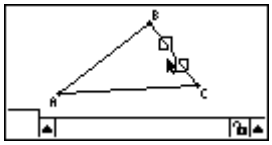
This is an example of a constraint on our figure. Notice the lock icon has closed – the 90° angle is locked in.

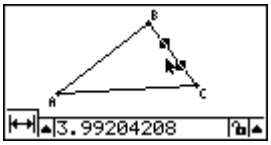
Tap [EXIT] then [AC] to deselect all.

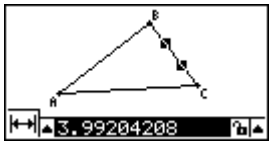


How to unlock a locked measurement is explained at the end of this document.

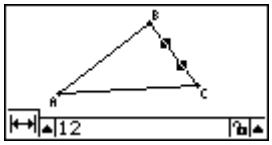
Now to lock in length BC as 12cm. Select side BC and tap [VARS].

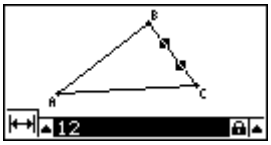


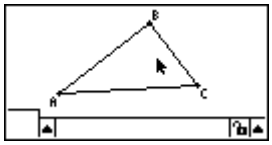




Type 12, [EXE], [EXIT] and [AC].

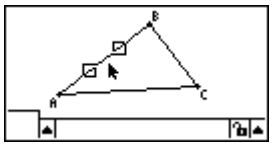


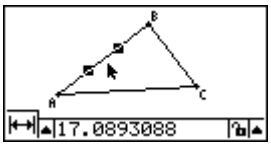


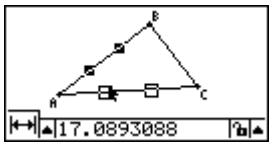


The last constraint is angle A = 25°.

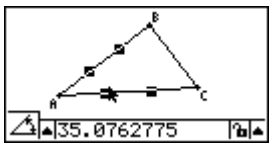
Select side AB then side AC.

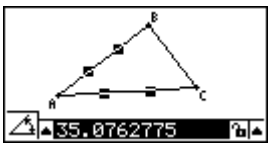


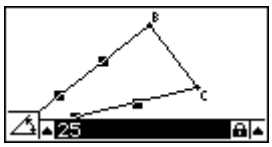




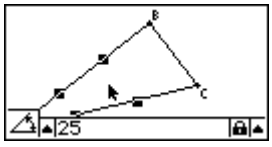
Tap [VARS], type 25, [EXE] to lock in the 25° angle.



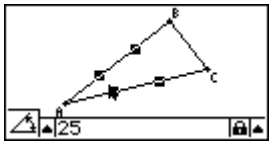




Next tap [EXIT] to leave the measurement tool.

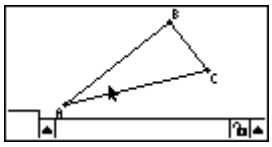


If your figure is partly off screen, use the hot key [(-)] to re-size.



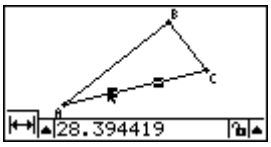
The zoom hot keys are
[+] IN
[-] OUT
[(-)] FIT TO SCREEN

Tap [AC] to deselect all.
Our 3 constraints are in place.



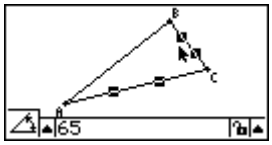
Now we'll use the measurement tool to find the required values.

Select side AC.



Remember to tap [VARS] to bring up the measurement tool at any time.

Also select side BC.



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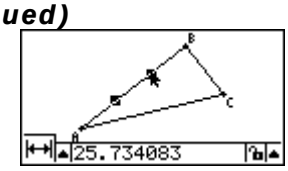
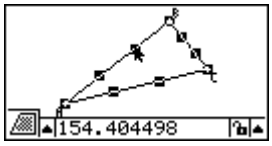
Example 1 (continued)

Deselect all and select side AB.



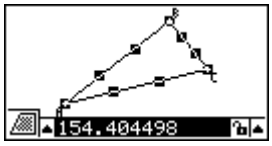
With AB still selected tap the [x^2] key to select the whole figure.



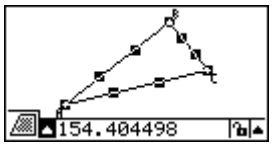
Part of the figure must be selected for the [x^2] key to select all of it.

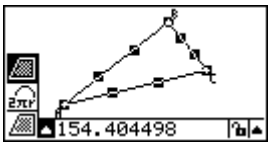
The area of the triangle is displayed as approximately 154cm^2.

Tap [VARS] to activate the measurement tool.

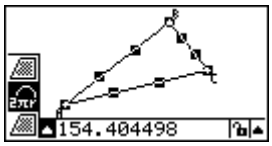


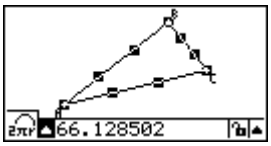
Tap the left cursor followed by the up cursor to get more options.





Now tap the down cursor to choose perimeter rather than area and tap [EXE].

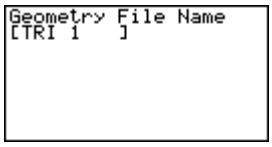




The perimeter of the triangle is displayed as approximately 66cm.

Want to save your first Geometry work? Tap [F1] then [3].

Enter a filename followed by [EXE].



Geometry files are saved in Main Memory in the <@GEOM> folder. Remember to save a backup copy of this folder to Storage Memory (and onto your computer) at regular intervals.

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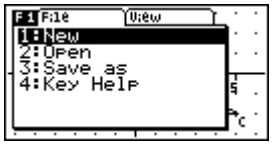
Example 2

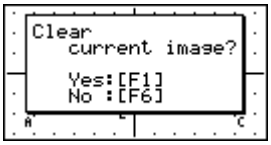
Given the two points A(-3, 2) and B(3, 1), find the distance AB, the midpoint of AB, the gradient and equation of line through AB.

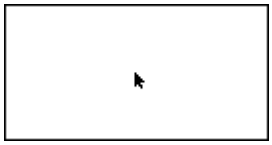
In this example use will be made of the integer grid (locks points and figures to the nearest integer coordinates).

Some proficiency is also assumed from Example 1 in moving around the screen and in selecting figures.

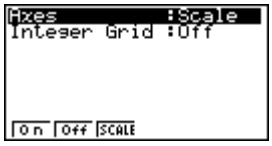
Start by creating a new file.





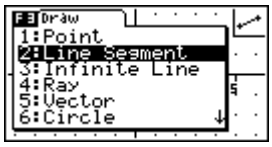


Enter Set-up with [SHIFT] then [MENU] and set the options shown.



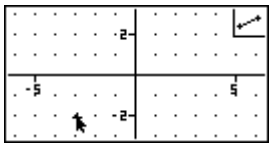
Tap [EXIT] to leave Set-up.

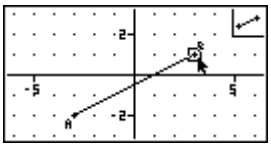
From the Draw menu [F3] choose Line Segment.



Note the icon for each drawing tool appears in the top right of the screen when it is selected.

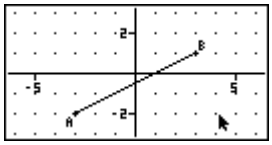
Move close to the point (-3, -2), tap [EXE] and then to (3, 1) and [EXE].





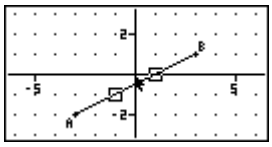
When the second end of the line is selected, both ends snap to the nearest integer coordinates.

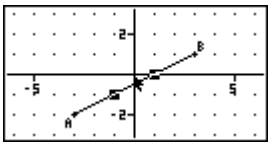
Tap [EXIT] to release the Line Segment tool.



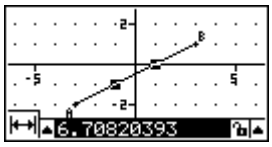
When a tool is released its icon will disappear from the top right corner of the screen.

Move the cursor so that the whole line can be selected and tap [EXE].

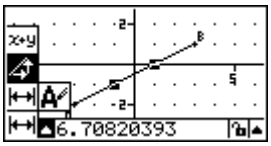




Tap [VARS]. The line is 6.71 units long.



Tap the cursor left and up and use the cursor then [EXE] to choose the gradient option.



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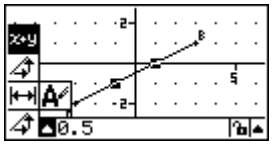
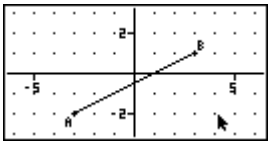
Example 2 continued

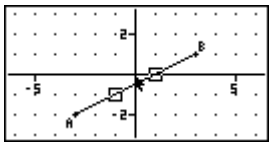
Repeat the previous step to choose the equation option.

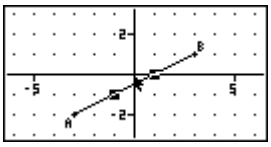


Tap [EXIT] twice to leave and hide the measurement tool and then [AC] to deselect all. If you haven't yet discovered the jump keys 1-9 try them now. Simply tap the numbers 1 to 9 and the cursor jumps to the corresponding area of the screen.

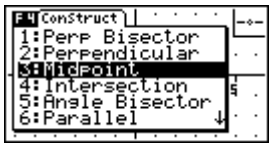


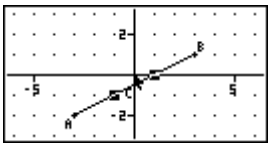
Now to find the midpoint.
Move and select the line segment again.



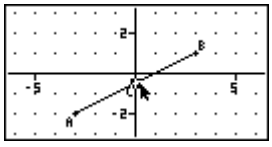


With AB selected, tap [F4] then [3] for the midpoint.

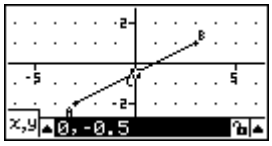




Deselect all, then move near C and select the point C (midpoint).

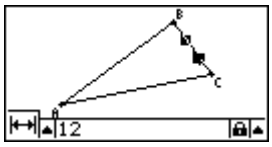


Tap [VARS] and the coordinates of the midpoint are shown as (0, -0.5).

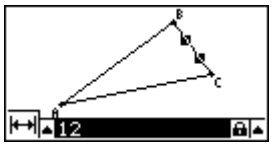


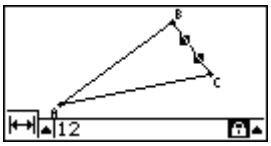
Unlocking constraints.

In this screen side BC has been constrained to 12cm.

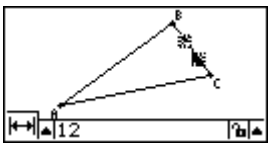


Activate the measurement tool with [VARS] and tap the right cursor





Now tap [EXE] to unlock and [EXIT] to return to the drawing screen.



To unlock all constraints, use [OPTN] then [4].

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