

Geometry on the TI-92 Plus

The TI-92 Plus calculator includes a geometry program that allows you to perform operations on geometric figures. With TI-92 Plus Geometry, you can draw, move, measure, graph, and alter figures. To access the TI-92 Plus Geometry on your calculator, press **APPS** and select **1**: FlashApps and Geometry Sketchpad will appear. If you press **ENTER**, one of two things will happen: either you will get a New Drawing Area or if the most recent drawing had not been saved, it will appear.

The toolbar is organized into eight menus, which are accessed by pressing the function keys **F1** through **F8**. The list below describes the types of functions on the menu for each key.

Each of the tools in the Toolbox Menu is accessed by first pressing **F8** using the cursor to highlight the appropriate tool and then pressing the **ENTER** key.

Key	Menu Functions
F1	Edit Menu
F2	Display Menu
F3	Construction Menu
F4	Transform Menu
F5	Measure Menu
F6	Graph Menu
F8	Toolbox Menu

Introductory Lesson: Constructing a Triangle

(Adapted from The Geomath Advanced Geometry Short Course

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Instructional Goals and Objectives: G9, G14

Students will apply the Angle Sum Theorem while becoming familiar with the different tools from the TI-92 Plus.

Select the Point tool, (F8, cursor down to the point icon and press **ENTER**. The cursor becomes a cross-hair; use it to select a position for the point and press **ENTER**. Move the Point tool to another position in the Drawing Area and press **ENTER**, a second selected point will appear. Use the Point tool to create a third point, and then put the Point tool away. You have now created three points, press the **ESC** key. We are ready to construct our triangle.

Select all 3 of your vertices by using the Pointer to point to each and then pressing **ENTER**. With all 3 vertices selected, choose **F3** the Construction menu. Select Option 4: Segment. The triangle will appear. Move the Pointer Arrow toward one of the vertices. Press and hold the **LOCK** key (the one with the little hand on it); use the cursor key to drag the vertex of the triangle around the screen. Try it with all 3 vertices and all 3 sides.

To move the triangle to a new location, you must select all 3 sides and then drag the triangle.

Labeling the Triangle: Sketchpad Geometry automatically labels all polygons, but the labels are hidden. To show the labels, Open the Toolbox menu (Press 8) and cursor down to the large letter “A” and press ENTER. The pointer becomes a small hand. Use the cursor to point the finger at a vertex, when the hand becomes black, press ENTER and a dialog box will appear. The highlighted letter is the chosen label for that vertex.

Find the lengths of the sides of a triangle. The length or Distance tools in the F5 Measure Menu can be used to measure the length of an object like a segment or the distance between two points on the screen. Find the length of all 3 sides of your triangle by first selecting one side of your triangle, then press F5 to measure the length of the segment, one at a time. Each time that you measure a segment, you must press ESC before you go on to the other.

We can also use the information obtained about the lengths of the sides of the triangles to perform operations using the CALCULATE tool in **F5**. Select F5 and a calculation line, indicated by a black square appears at the bottom of your screen. You will notice that a new set of menus appears. Press F1: Values, and you will see all of the numerical values that you have created while working on this figure. Calculate the sum of the lengths of the sides of your triangle, by choosing a side from F1: Values Menu and pressing ENTER. That side will appear in the calculation line. Press the addition sign. Choose a second side and repeat the procedure; do the same with the third side, and the sum of the lengths of the three sides will appear on the screen. Place the pointer on any of the 3 vertices of the triangle to drag the triangle. Notice how the lengths of the sides change as you drag the triangle.

Find the measures of the angles of a triangle. Use the Angle tool of the F5 menu to measure the angles of your triangle. When using the Angle measurement tool, the correct order follows the angle naming convention side-vertex-side. Measure one angle at a time. It is important that you press ESC every time you measure each angle or your tool will remain locked. Find the sum of the measures of the angles of the triangle. Use the Calculate tool to find the sum of these 3 angle measurements.

Drag the vertices of your triangle to investigate what happens to this angle sum.

Day 2: Students will learn to recognize and use distance relationships among points, lines, and planes.

Instructional Goals and Objectives: G.17,G.1

We are going to prove by using the TI-92 Plus that the distance from a line to a point not on the line is the length of the segment perpendicular to the line from the point.

Go to **APS**, press **1 FlashApps**. Open a New Sketchpad Geometry file. Press ENTER. If this is not a new drawing area, press F1 and select option 9:> Sketch. A menu will appear. Select New. This will allow you to open a new Sketchpad Geometry file.

Construct a Line. Select the Point Tool, (F8, cursor down to the point icon and press ENTER). A point will appear in the Drawing Area, press ENTER, move the cursor and select another point by pressing ENTER. Press ESC. Select both points by pressing ENTER. Select F3 and press 6 for line. A line should connect both points.

Construct a perpendicular to a line through a point not on the line.

Select F8 and choose a point, place the cursor any place on the drawing area except on the line. Press ENTER. Select both the line and the point. Go to F3 and select 8 to construct a perpendicular line to the line through the point not on the line.

Select both lines by pressing ENTER. Choose F3 and select 3. This choice will mark the intersection of the lines. Select the point not on the line and one the first two points that were drawn for the construction of the line; press F3 and choose 6 and a line will connect these two points. Do the same with the other point. You should have three lines intersecting the first line that you constructed.

Labeling the points: Select all points and label by selecting F8 and cursor down to the script icon and press enter.

Measuring the lengths of the segments: Select two points, one on the line and the other not on the line. Choose F5, the Measuring Tool; press 2. This will allow you to find the distance between the points. The calculator will display this distance. Press ESC.

Choose another point on the line and the point not on the line. Repeat the procedure and you will have the second distance. Do the same for the last point on the line. The calculator will display the three distances so that they can be compared.

By using the Geometry interactive capabilities of the TI-92 plus, we can drag the point not on the line to show that the shortest distance from a line to a point not on the line is the length of the segment perpendicular to the line from the point.

Websites of interest www.trek-21.wvu.edu/pdsthree/pvilone/html/sketchers.htm
 www.abc.se/~m9847/matre/geometr.html

www.math.yorku.ca/Who/Faculty/Whiteley/geometr/sites.html