

Exploring Mathematics with the Geometer's Sketchpad

Getting to Know the Geometer's Sketchpad

As the Geometer's Sketchpad (GSP) starts up, you will see a box of the words "The Geometer's Sketchpad" in the center of the screen. Click once anywhere to clear the box.

Now you shall see The *Sketchpad document window* as shown in Figure 1. The document window displays one page at a time. Each document window consists of Title Bar, Menu Bar; Minimize and Maximize Boxes; Close Box, GSP layout, called a **sketch**; Page Tabs; Scroll Bars; and Resizes area.

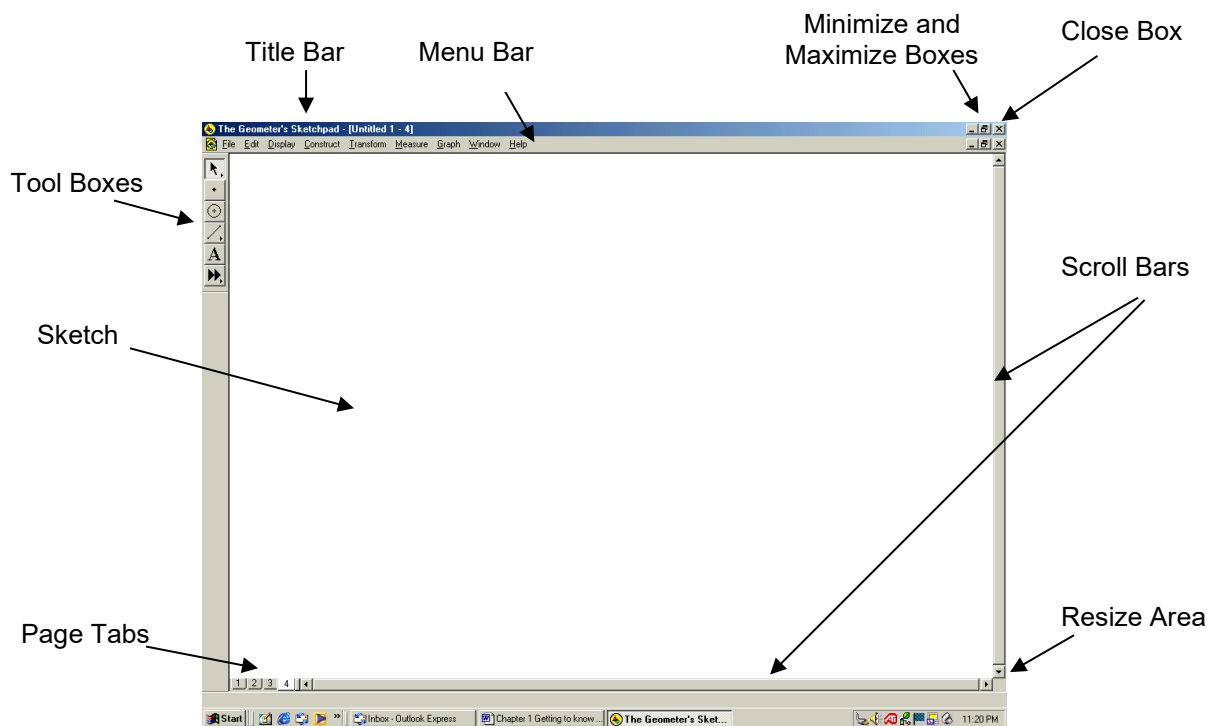


Figure 1 Sketchpad Document Window

On the left side of your sketch, you will see Sketchpad's toolbox, as shown in Figure 2. The Sketchpad's toolbox consists of 6 tools, namely:

1. The Selection Arrow Tools;
2. The Point Tool;
3. The Compass Tool;
4. The Straightedge Tools;
5. The Text Tool; and
6. The Custom Tools

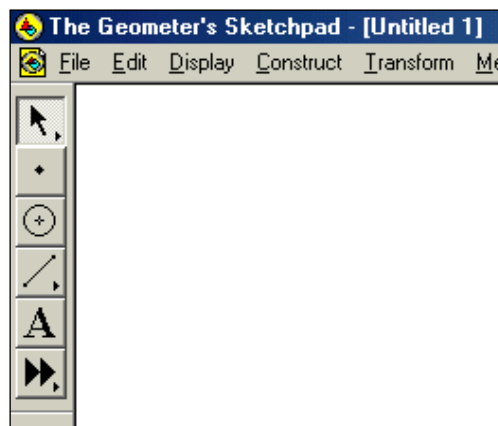







Figure 2 Sketchpad's Toolbox

Selection Arrow Tools



The **Selection Arrow Tool** is an important tool of Sketchpad's Dynamic Geometry capabilities. It is the tool you use to select or deselect objects and to move or drag objects in your sketch. The selection Arrow tools include of three variations tools as follows:

- Translate 
- Rotate 
- Dilate 

When Sketchpad starts, the active Selection Arrow Tool is the *Translate Arrow Tool* . Choose a different Arrow Tool by pressing and holding on the arrow tool icon in the Toolbox. When you press and hold, a menu  pops out and you can choose one of the three arrow tools.

The Point Tool



The **Point Tool** is used to construct points in your sketch. When the point tool is active, you can:

- Click in any empty area of your sketch to create an independent point;
- Click on a path object such as a segment, a circle, or the edge of a polygon interior to construct a point on the path; and
- Click at the intersection of two path objects.

The Compass Tool



The **Compass Tool** is used to construct circles in your sketch. Construct a circle by using the Compass Tool:

- Choose the Compass tool,
- Press the mouse button at the center point, drag and release the button at the radius point.

The Straightedge Tools



The Straightedge Tool is used to construct straight objects: segments, rays and lines in your sketch. The Straightedge Tools include segment tool, ray tool and line tool.




The *Segment Tool* is used to construct a segment between its two endpoints.



The *Ray Tool* is used to construct a ray from one endpoint through another point.



The *Line Tool* is used to construct a line through two points.

When Sketchpad starts, the active Straightedge Tool is the *segment tool*. Choose a different Straightedge tool by pressing and holding on the Straightedge tool icon in the Toolbox. When you press and hold, a menu  pops out and you can choose any of the three tools.

The Text Tool



The Text tool is used to create, show, hide and edit labels, to add text to your sketch, and to change the text displayed with measurements, calculations and parameters.

Text Palette

You can use Text Palette (Figure 3) to format the font, size, style and colour of labels, captions, measurements and other text. Normally the Text Palette appears attached to the bottom of the sketchpad application window automatically when you edit a caption.

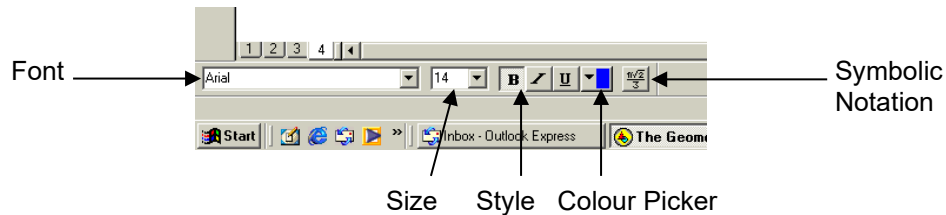


Figure 3 Text Palette

You can also use the text palette to insert mathematical symbols and formatting into captions. Press the Symbolic Notation button in the Text Palette to displays additional notation tools as show in Figure 4 below.

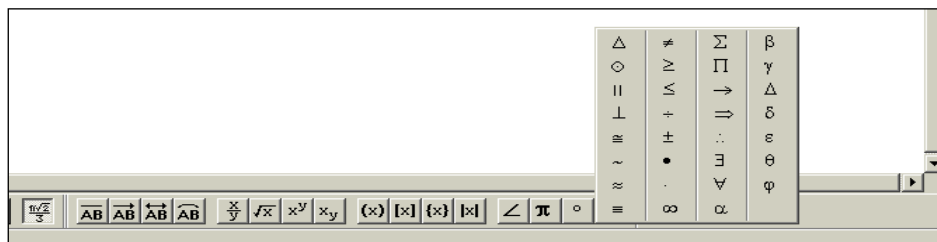


Figure 4 Mathematical Symbols

The Custom Tool



The custom Tool is used to create and use new tools that extend Sketchpad' s build in construction capabilities.

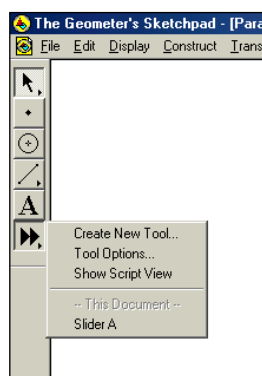



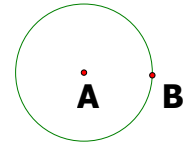
Figure 5 Custom Tool

When you press the Custom Tool icon in the Toolbox, Sketchpad displays the Custom Tool menu. This menu has several parts, such as Create New Tool, Tool Options, Show Script View and other Document.

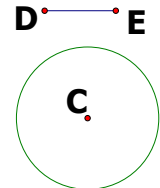
Constructions:

There are two ways to construct things with GSP. The first is to draw objects free-hand by using the basic tools in the toolbox. The second method is to use the **Construct** menu and all its possible choices. The second method is more accurate and should be used whenever possible. Let's try a few constructions. We will begin by playing with the **circle**.

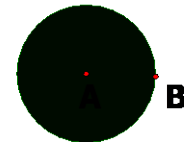
- 1) Construct circle by using the Compass tool  to construct a circle. Two points define the circle.
 - Choose the Text tool and click on each point to show point labels. You can change them as you like.
 - Choose the Selection arrow tool and drag each point.



- 2) Construct circle by point and radius:
 - Draw point C and a short segment DE
 - Select point C and the segment DE, then in the construct menu choose **Circle By Center + radius**



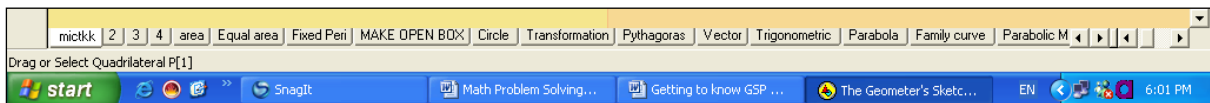
- 3) Highlight the circle and choose "Circle Interior" under the **Construct** menu. Change the colour of the interior to green or any colour by looking under the Display menu for the choice of colour
- 4) Select the interior under the measure menu choose "Area" and select the interior again and choose "Circumference" from measure menu.



Area $\odot AB = 5.73 \text{ cm}^2$
Circumference $\odot AB = 8.48 \text{ cm}$

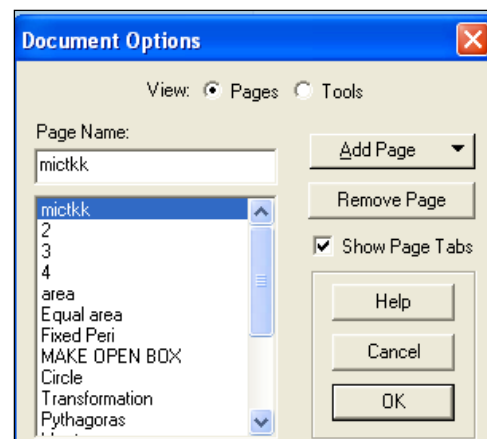
Adding Multiple Pages in GSP

At any time, you can add multiple pages to a GSP V.4 document which can be accessed via tabs at the bottom of the page like in the figure below.



In order to add page, under the **File** menu select **Document Options**. You will get a menu similar to the figure on your right.

- Go to File menu;
- Choose **Document Option**
- Clicking on **Add Page** will allow you to add a **Blank Page** to the document, or a **Duplicate** of an existing page.



You can also remove a page, or turn off the tabs at the bottom of the screen.

