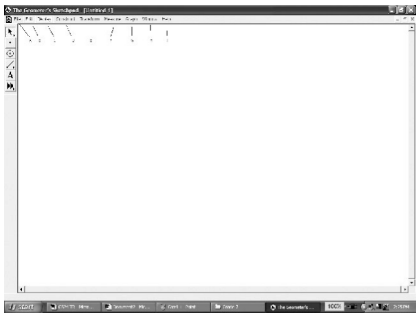
Name: _____ Date: _____

The Geometer's Sketchpad® 4

The Menus



File: Used to open, save, close, and print documents.

Edit: Used to undo and redo actions.

Display: Used to control an object's appearance, and to label/hide/animate objects.

Construct: Used to construct new geometric objects based on selected objects in your sketch.

Transform: Used to apply geometric transformations to selected objects.

Measure: Used to give various measures based on selected objects in a sketch.

Graph: Used to create grids and axes for plotting points.

Window: Used to manipulate windows within *The Geometer's Sketchpad*®.

Help: Used to access the available help files.

The Toolbox

Selection Arrow Tool: Used to select, move, and transform objects in a sketch.

Point Tool: Used to draw and plot points.

Compass Tool: Used to draw circles.

Straightedge Tool: Used to draw line segments, lines, and rays.

Text Tool: Used to label/unlabel points and lines, and to write text or captions within a sketch.

Custom Tool: Allows you to define and use custom tools.

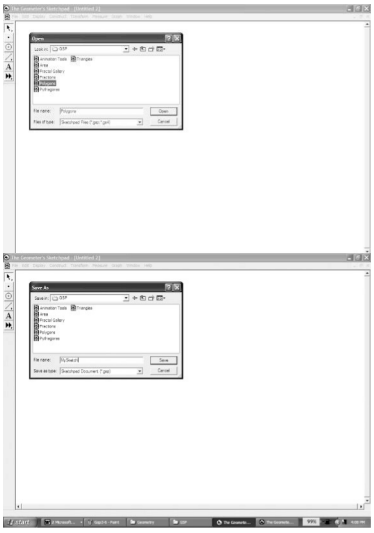
Creating a New Sketch

- To create a new sketch window, from the **File** menu, choose **New Sketch**.

Name: _____ Date: _____

The Geometer's Sketchpad® 4

Opening an Existing Sketch



- From the **File** menu, choose **Open…** .
- Navigate to the directory in which the sketch is saved.
- Click the name of the sketch you wish to open. Click **Open**.

Saving a Sketch

To save a sketch for the first time:

- From the **File** menu, choose **Save**
- Navigate to the directory in which you wish to save the sketch
- *The Geometer's Sketchpad*® 4 will give the sketch a name in the **Filename** text box. To use that one, click **Save**.

OR

- To give the sketch the name you wish, delete the given name, and type the name you want into the **Filename** text box. Click **Save**.

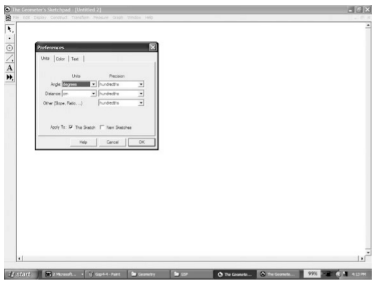
To resave a previously saved sketch:

- From the **File** menu, choose **Save**.

Closing a Sketch Without Exiting *The Geometer's Sketchpad*® 4

- From the **File** menu, choose **Close**.

Exiting *The Geometer's Sketchpad*® 4



- From the **File** menu, choose **Quit**.

Setting Preferences

- From the **Display** menu, choose **Preferences…** .
- Click the **Units** tab.
- Select the desired units and precision for **Angle**, **Distance**, and **Other**.
- If you select **Show Labels Automatically/For All New Points**, *The Geometer's Sketchpad*® 4 will automatically label points as you create them.
- If you select **Show Labels Automatically/As Objects Are Measured**, *The Geometer's Sketchpad*® 4 will automatically label measurements you define.

Name: _____ Date: _____

The Geometer's Sketchpad® 4

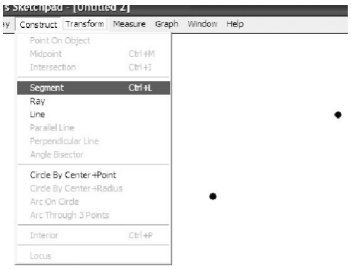
By clicking the appropriate box(es) next to **Apply To:**, you can also choose whether your selected preferences for **Units/Text** will apply to only this sketch, or to this sketch as well as all new sketches.

Selecting Points and Segments

- Click the **Selection Arrow Tool**. The cursor appears as an arrow.
- Move the cursor to the point or segment you wish to select. When the cursor becomes a horizontal arrow, click the point, and it will be selected.
- To select more than one point or segment, repeat the above step for each item.

Deselecting

- To deselect a single point or segment, move the cursor to the point or segment you wish to deselect. When the cursor becomes a horizontal arrow, click and the point or object will be deselected.
- To deselect all selected items, click any white space.

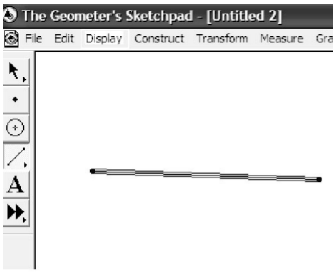


Constructing Line Segments

- Click the **Point Tool**, and create two points in the workspace.
- Click the **Selection Arrow Tool**, and select both points.
- From the **Construct** menu, choose **Line Segment**.

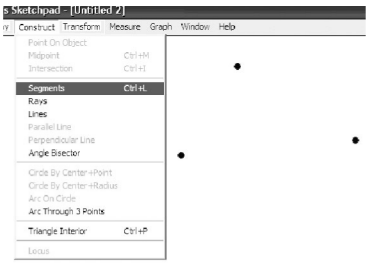
OR

- Click the **Straightedge Tool**.
- Move the cursor to the workspace.
- Click and hold the left mouse button.
- Drag the cursor to form the segment.
- Release the mouse button.



Constructing Triangles

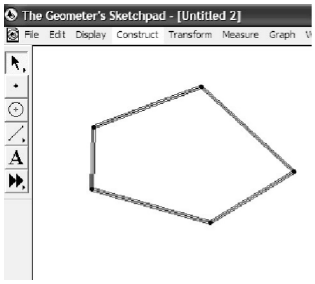
- Click the **Point Tool**, and draw three points in a triangular shape in the workspace.
- Click the **Selection Arrow Tool**, and select the three points.
- From the **Construct** menu, choose **Segment**.



Name: _____ Date: _____

The Geometer's Sketchpad® 4

Constructing Polygons

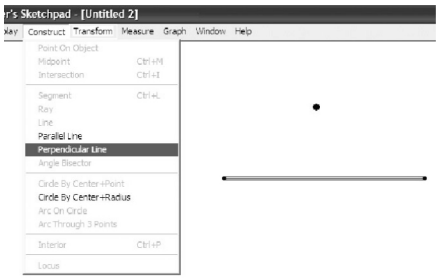


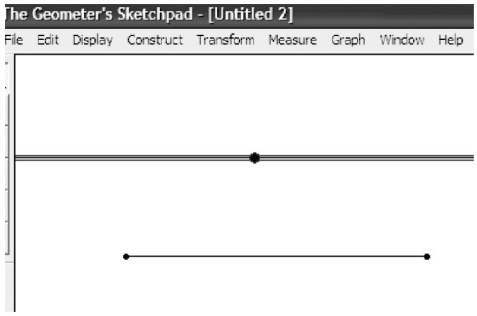
- Click the **Point Tool**. Draw four or more points in the workspace.
- Click the **Selection Arrow Tool**, and select all the points in either clockwise or counterclockwise order.
- From the **Construct** menu, choose **Segment**.

Constructing Parallel Lines

To construct a line parallel to an existing line:

- Click the **Point Tool**, and place a point above or below the existing line
- Click the **Selection Arrow Tool**, and select the point and the line
- From the **Construct** menu, choose **Parallel Line**.

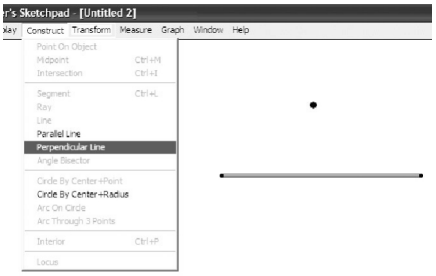


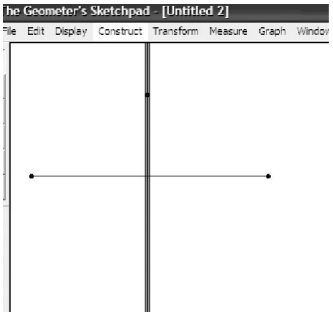


Constructing Perpendicular Lines

To construct a line perpendicular to an existing line:

- Click the **Point Tool**, and place a point above or below the existing line
- Click the **Selection Arrow Tool**, and select the point and the line
- From the **Construct** menu, choose **Perpendicular Line**.

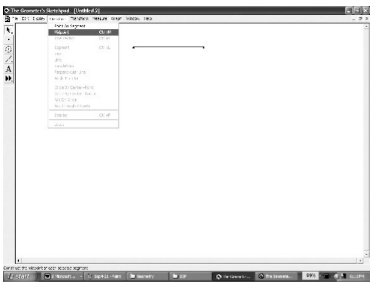




Name: _____ Date: _____

The Geometer's Sketchpad® 4

Constructing a Midpoint



To construct a midpoint on an existing line:

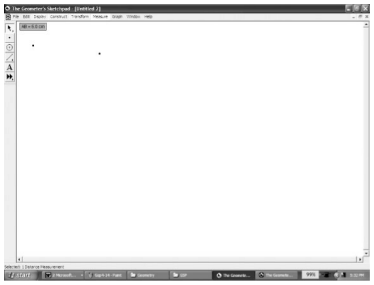
- Click the **Selection Arrow Tool**, and select the line
- From the **Construct** menu, choose **Midpoint**. A point will appear on the line. This point will be fixed at the middle of the line.

Finding Measures

For all measures, *The Geometer's Sketchpad*® 4 will display the desired measure using the units and precision selected in **Preferences…** on the **Edit** menu.

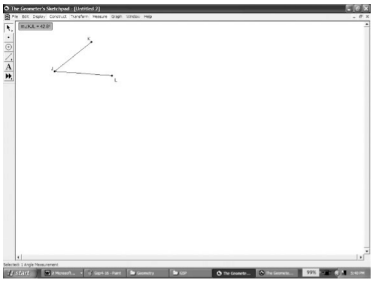
To measure the distance between two points:

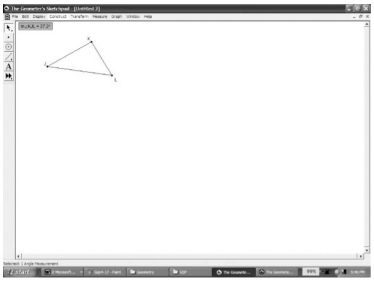
- Ensure nothing is selected
- Select the two points
- From the **Measure** menu, choose **Distance**.



To measure the length of a line segment:

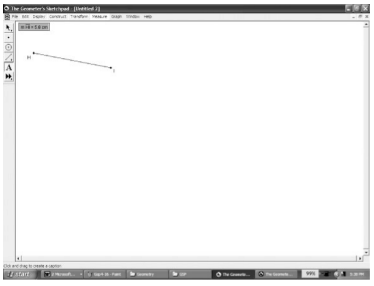
- Ensure nothing is selected
- Select the two points
- From the **Measure** menu, choose **Length**.





To measure an angle:

- Ensure nothing is selected
- Select the three points that form the angle. Make sure that the second point selected is the vertex of the angle.
- From the **Measure** menu, choose **Angle**.

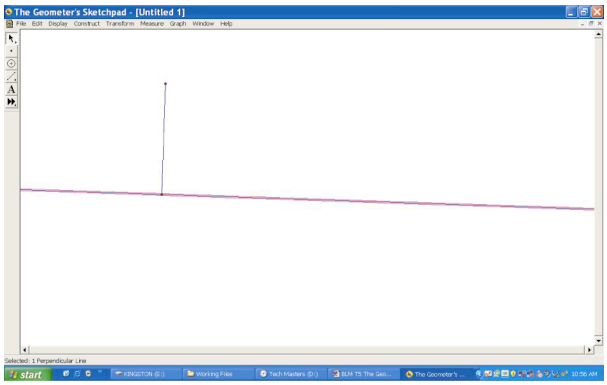


Name: _____ Date: _____

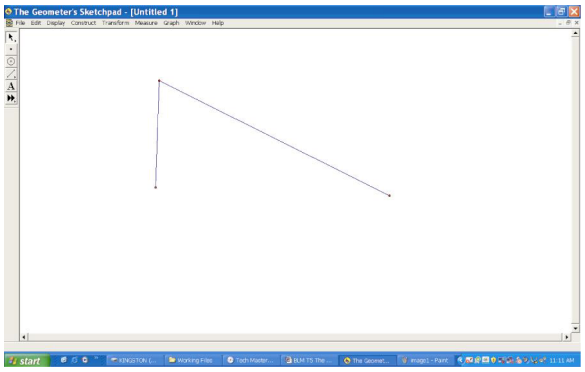
The Geometer's Sketchpad® 4

Constructing Right Triangles

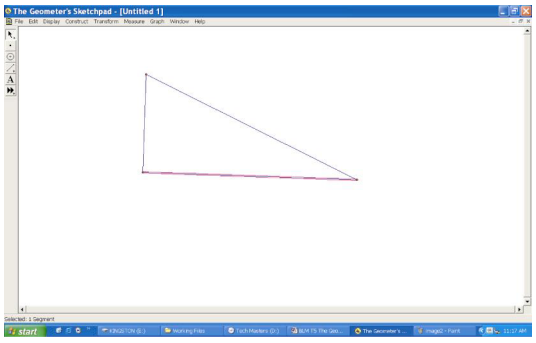
- Click on the **Straightedge Tool** and choose the line segment. Draw a line segment.
- Click on the **Selection Arrow Tool**. Click on an end point.
- From the **Construct** menu, choose **Perpendicular Line**.



- From the **Construct** menu, choose **Point on Perpendicular Line**.
- Select the point and the endpoint of the segment that is not on the perpendicular line.
- From the **Construct** menu, choose **Segment**.
- Deselect the third side of the triangle. Select the perpendicular line.
- From the **Display** menu, choose **Hide Perpendicular Line**.



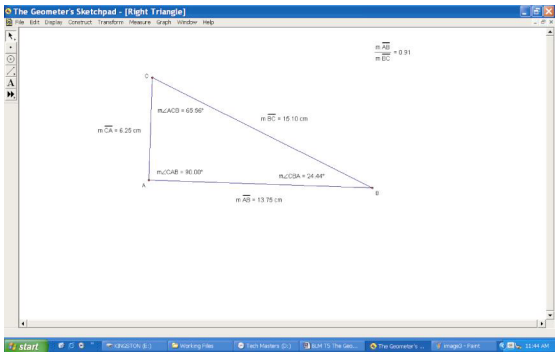
- Select the two end points of the missing side of the triangle.
- From the **Construct** menu, choose **Segment**.



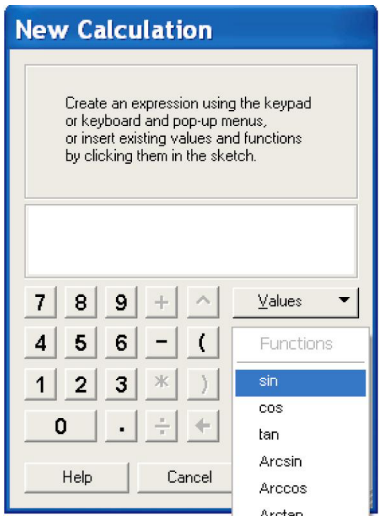
Name: _____ Date: _____

Finding the Trigonometric Ratios

- Construct a right triangle.
- Find the measures of the sides and angles.
- From the **Measure** menu, choose **Calculate**. You may have to drag the pop-up window to another location on the screen.
- To calculate a trigonometric ratio, select the measure of the opposite or adjacent side.
- Deselect the ratio.



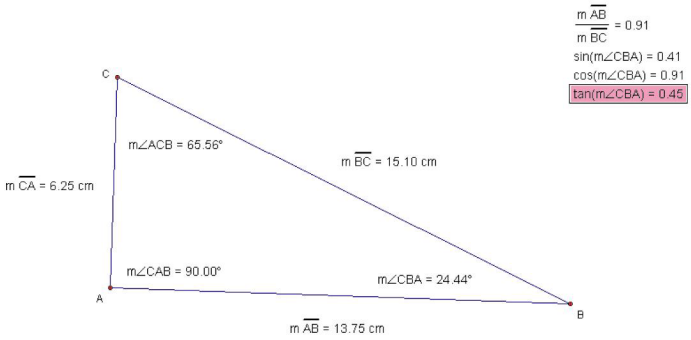
- Choose one of the acute angles and find the sine, cosine and tangent ratios for the angle. From the **Measure** menu, choose **Calculate**.
- Click the **Functions** button on the **New Calculation** pop-up window and choose **sin**.



- Select the measure of the acute angle. Click **OK**.

Name: _____ Date: _____

- Repeat the previous four steps to find the cosine and tangent ratios of the angle.



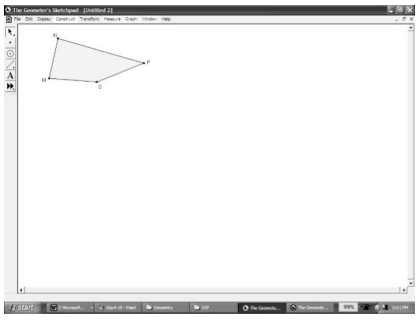
- Click and drag the vertex of the angle you chose. As it moves, notice what happens to the sine, cosine, and tangent ratios.

Constructing and Measuring Polygon Interiors

The Geometer's Sketchpad® 4 will measure the perimeter and area of a polygon. However, you must construct the interior of the polygon first.

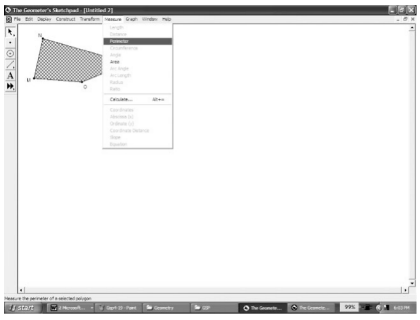
To construct the interior:

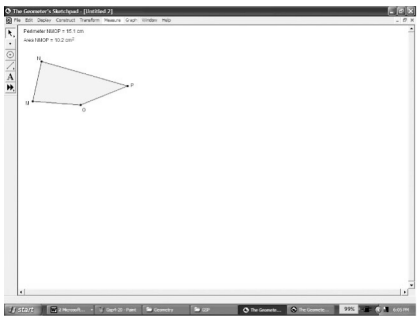
- Select all the points representing the vertices of the polygon. Here we have a quadrilateral, so four points were selected.
- From the **Construct** menu, choose **Quadrilateral Interior**. *The Geometer's Sketchpad*® 4 will call the polygon by its correct name up to five sides, after which it will use **Polygon Interior** in the **Construct** menu.



To measure the perimeter and area:

- Click the polygon's interior
- From the **Measure** menu, choose **Perimeter**
- Click the polygon's interior
- From the **Measure** menu, choose **Area**.

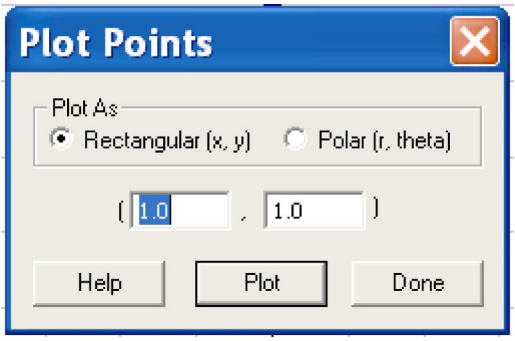




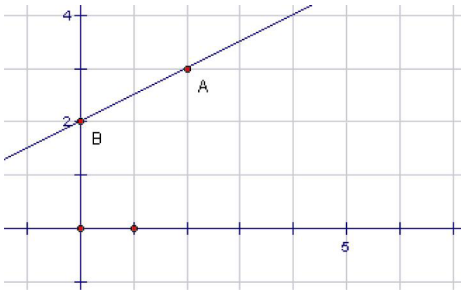
Name: _____ Date: _____

Plotting Points in the Cartesian Plane

- From the **Graph** menu, choose **Define Coordinate System**.
- From the **Graph** menu, choose **Plot Points**.



- Press 0, Tab, 2. Click **Plot**. Press 2, Tab, 3. Click **Plot**. Click **Done**.
- Select the points. From the **Construct** menu, choose **Line**.
- From the **Measure** menu, choose **Equation**.
- From the **Graph** menu, choose **Snap Points**.



Graphing Quadratic Relations

To graph a quadratic relation:

- From the **Graph** menu, choose **Plot New Function**.
- Click the x key, the ^ key, the – key, then the 8 key. Click **OK**.

Graphing Systems of Equations

- From the **Graph** menu, choose **Plot New Function**.
- To plot an equation y or x must be isolated.
  Given $y + 2x = -5$, rearrange the equation to get $y = -2x - 5$.
- Enter the equation and click **OK**.
- Deselect all points and equations.
- From the **Graph** menu, choose **Plot New Function**.
- Enter the equation $y = (2/3)x + 3$. Click **OK**.
- This will allow you to view the intersection point.