

Appendix A

Geometer's Sketchpad Commands

Selection

- To select one object, click on the object with the Select arrow.
- To select multiple objects, hold down the Shift key while clicking on the objects.
- To select multiple objects using a marquee, press down on mouse button in a blank area of the sketch, drag to define a rectangular area of selection (marquee), release to select all objects in, or partially in, the selection marquee.
- To deselect one or more objects from a group, hold down the Shift key while selecting the objects to be deselected.
- To deselect all objects, click in a blank area of the sketch.

File

- To create a new sketch, select “New Sketch” from under the **File** menu.
- To create a new script, select “New Script” from under the **File** menu.
- To open a saved sketch or script, select “Open...” from under the **File** menu.
- To save changes to an active script or sketch, select “Save” from under the **File** menu.
- To save an active script or sketch with a new name, select “Save As...” from under the **File** menu.
- To close an active window, click in the upper left-hand box located in the drag bar or select “Close” from under the **File** menu.
- To print an active sketch or script, select “Print” from under the **File** menu.
- To leave Sketchpad, select “Quit” from under the **File** menu.

Edit

- To correct an error, select “Undo” from the **Edit** menu (unlimited).
- To redo the last undo step in the sketch, select “Redo” from the **Edit** menu (unlimited).

- To clear selected objects and their descendants, either press delete or select “Clear” from the **Edit** menu.
- Action Buttons

Action button tip: When a sketch is saved with an action button selected, that button will play automatically when the sketch is next opened. Use action buttons to prepare ready-to-go presentations.

 - To create an action button to move the first selected point to a second selected point, select *Movement...* from within “Action Button” from the **Edit** menu.
 - To create a button to animate selected points on a selected segment or circle paths, select *Animation...* from within “Action Button” from the **Edit** menu.
 - To create two buttons: one which hides selected objects, and the other to show the same selected objects, select *Hide/Show* from within “Action Button” from the **Edit** menu.

Display

- To change to a different type of line weight, select “Line Weight” from the **Display** menu. This will change the weight of any selected straight objects or circles as well as new objects with thick, thin, or dashed lines.
- To change to a different color, select “Color” from the **Display** menu. This will change the color of any selected object as well as any new objects with color.
- To change to a different shade weight, select “Shade” from the **Display** menu. This will change the shade weight of any selected polygon or circle interiors as well as new interiors with shading.
- To change text style or size for selected caption or selected objects’ labels, select “Text Style” from the **Display** menu.
- To change font for selected caption or selected objects’ labels, select “Text Font” from the **Display** menu.
- To hide an object from view, select the object(s) to be hidden, then **Display** “Hide.”

- Show all previously hidden objects, select “Show All Hidden” from the **Display** menu. If just a few objects are needed, then show all hidden, while holding down the Shift key, deselect the desired objects to be viewed, then hide the remaining objects.
- To leave a trace of selected objects when dragged, select the desired objects, then “Trace Locus” from the **Display** menu.
- To animate selected points on selected segment or circle paths, select “Animate...” from the **Display** menu.

Preferences - Select “Preferences...” from the Display menu to change your preferences. You can now do the following.

- Choose the units and precision for displayed measurements.
- Choose fonts and sizes for various types of text.
- Set the Script Tool directory. Choose the speed to play scripts.
- Set the number of samples in a newly constructed locus object.

Construct – Hint: Use the Information tool menu to verify that you have the proper selections for a given construction.

“Point On Object”	Select One or more straight objects or circles.
“Point At Intersection”	Select two objects: straight objects or circles. To construct a point at an intersection of only two objects, click at the intersection point with the arrow tool. To construct a point at an intersection of more than two objects, select two of the objects, then Construct “Point At Intersection.”
“Point At Midpoint”	Select one or more segments.
“Segment”	Select two or more point (Switches to Ray or Line according to current straight object tool.)
“Perpendicular Line”	Select one straight object and one or more points (or vice versa.)
“Parallel Line”	Select one straight object and one or more points (or vice versa.)
“Angle Bisector”	Select three point (point, vertex, point), in order.
“Circle By Center+Point”	Select two points (center and radius endpoint), in order.

- “Circle By Center+Radius” Select one point (defining center) and one segment (defining radius.)
- “Polygon Interior” Select three to thirty points (vertices), in order.
- “Circle Interior” Select one or more circles.

Transform

Marked vectors, angles, and ratios allow one to perform transformations based on dynamic objects within the sketch. Angles are marked clockwise (negative) and counter-clockwise (positive) order: point, vertex, point. Ratios are marked in scale factor order: numerator over denominator. Select a shorter then longer segment to mark a ratio that shrinks objects.

- “Translate...” Translate selected objects by either a fixed polar or Cartesian vector, or by dynamic marked vector.
- “Rotate...” Rotate selected objects by a fixed angle or dynamic marked angle around a point marked as the center.
- “Dilate...” Shrink or stretch selected objects by a fixed ratio or a dynamic marked ratio about a point marked as the center.
- “Reflect” Reflect selection across line, ray, or segment marked as a mirror.
- “Mark Vector” Mark the last two selected points as the initial and terminal points for dynamic translation vector.
- “Mark Angle” Mark the last three selected points as angle for dynamic rotation.
- “Mark Ratio” Mark the last two selected segments ratio for dynamic dilation.
- “Mark Mirror” Mark the last selected segment, ray, or line as mirror for reflection.
- “Mark Center” Mark the last selected point as the center for rotation or dilation.
- “Define Transformation” Defines a multi-step custom transformation that created selected image from selected pre-image. Custom transformations are added to the bottom of the **Transform** menu.

Measure

“Distance”	Select two points, or one point and one straight object.
“Length”	Select a segment.
“Slope”	Select a straight object.
“Radius”	Select a circle or circle interior.
“Circumference”	Select a circle or circle interior.
“Area”	Select polygon interior, circle interior, or circle.
“Angle”	Select three points (point, vertex, point).
“Arc Angle”	Select one circle and two points.
“Arc Length”	Select one circle and two points.
“Ratio”	Select two segments.
“Calculate”	Select one or more measures.

The Calculator

- To invoke the calculator choose “Calculate” from under the **Measure** menu.
- The display area shows the expression being built. You can enter a numerical value or click on a measurement from your sketch. Click Remove to remove an unwanted quantity or operator or click OK when the expression is as desired.
- Next to the word “Value” is a pop-up menu that lists selected measures, π , and other functions.
- The keypad has numbers to be used by clicking on the mouse button, or type from the keyboard. The next column has operators for addition (+), subtraction (−), multiplication (*), and division(/). The next column contains parentheses, up caret (^) for raising to a power, and \pm for changing sign.

Appendix B

Bibliography

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