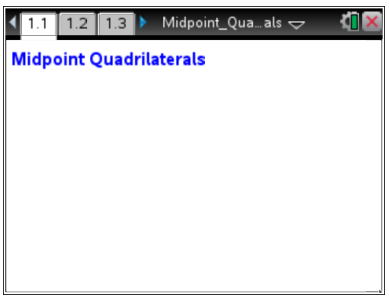
Creating: Midpoint Quadrilaterals
MATH NSPIRED

Activity Overview:

In this activity, you will use the construction tools in the Graphs *application to construct a midpoint quadrilateral.*



Materials

- *Technology needed (TI-Nspire™ handheld, computer software)*

Step 1: Preparing the document

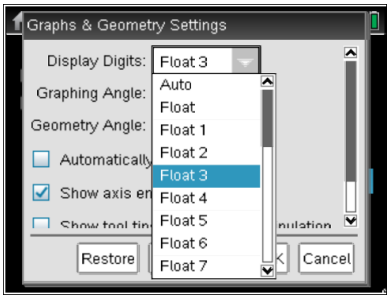
1. Open a new document by clicking [on] **> New Document > Add Notes**.
2. Type: Midpoint Quadrilaterals.

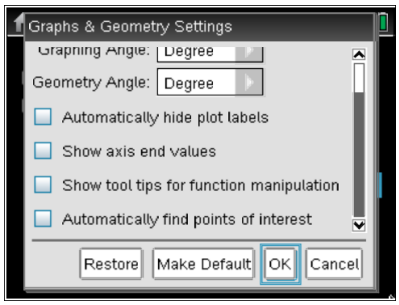
Note: To obtain capital letters, press the [shift] key, then the letter.

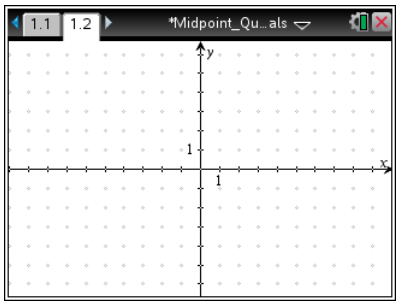
3. Press [doc] **> File > Save As ….**
   Type: Midpoint_Quadrilaterals.
   Tab to [save] and press [enter].

Note: To obtain the underscore, press [ctrl] [⎵].

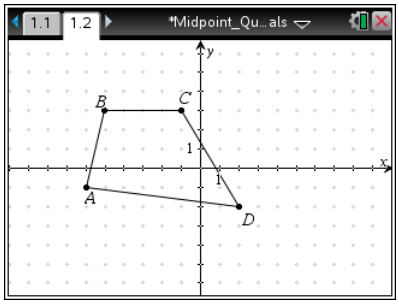
4. Add a new page by pressing [ctrl] [doc] **> Add Graphs**.
5. Press **Menu > Settings**. Select “Float 3” for Display Digits. Tab to Graphing Angle. Select “Degree.” Then press [tab] to move from one field to the next and press [ ] to uncheck all the boxes. Tab to OK and press [ ] or [enter].
6. Press **Menu > View > Grid > Dot Grid**.
7. Press **Menu > View > Hide Entry Line**.





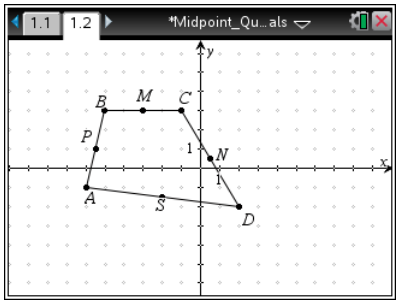


Step 2: Creating a quadrilateral



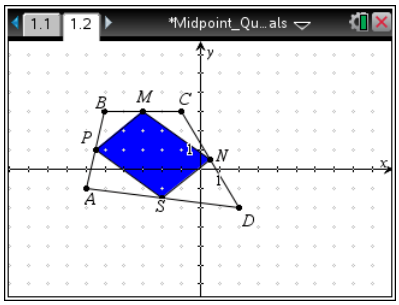
1. Press **Menu > Geometry > Shapes > Polygon**.
2. Move the cursor to a grid point until the words *point on* appear. Then press enter to set the first vertex of the quadrilateral. Immediately label the point by pressing shift A. Move the cursor to three other grid points, press enter, and label these points *B*, *C*, and *D*. After you label point *D*, press enter or to complete the quadrilateral.
3. Press esc to exit the **Polygon** tool.

Step 3: Constructing midpoints



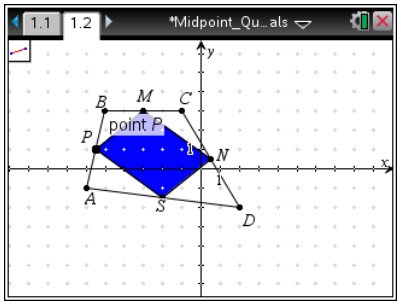
1. Press **Menu > Geometry > Construction > Midpoint**.
2. Move the cursor to each side to create a midpoint. Immediately label the midpoints *P*, *M*, *N*, and *S* as shown in the screen shot to the right.
3. Press esc to exit the **Midpoint** tool.
4. To move a label to a more desired location, move the cursor to the label until "label" appears and the hand appears. To close the hand, press ctrl . Move the label to the new location and press esc.

Step 4: Creating the midpoint quadrilateral



1. Press **Menu > Geometry > Shapes > Polygon**.
2. Click on each midpoint. After you reach the last midpoint, press enter or to complete the quadrilateral.
3. Press esc to exit the **Polygon** tool.
4. Move the cursor to a side of polygon *MNSP* until the words *polygon MNSP* appear. To shade this polygon, press ctrl menu **> Color > Fill Color.** Then use the ▶ or ▼ on the Touchpad or Clickpad to choose the desired color and press enter.

Step 5: Overlaying segments on top of sides

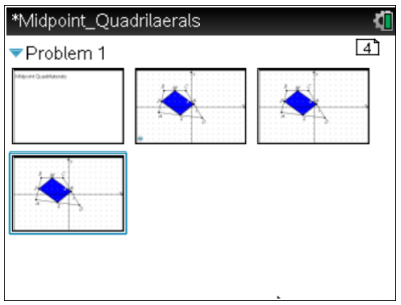


1. Press **Menu > Geometry > Points & Lines > Segment**.
2. Press enter or on point *P* and then drag to point *M* and press enter or for segment *PM*.

   Press enter or for point *M* and then drag to point *N* and press enter or for segment *MN*.

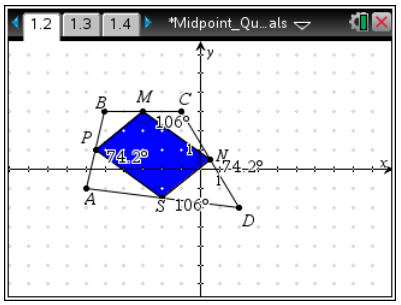
   Repeat for segments *NS* and *SP*. Then press esc to exit.

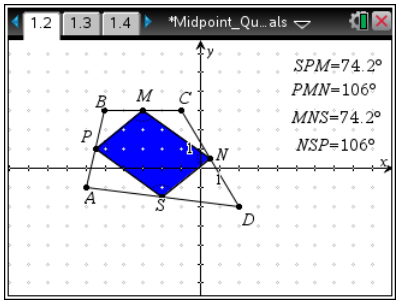
Step 6: Copying a page



1. Press ctrl ▲ to open the page sorter.
2. While the current page is selected, press ctrl C to copy the page.
3. Press ctrl V two times to paste two new copies of the screen.
4. Press enter. Page 1.4 will be the active page. Move back to page 1.2.

Step 7: Finding angle measurements

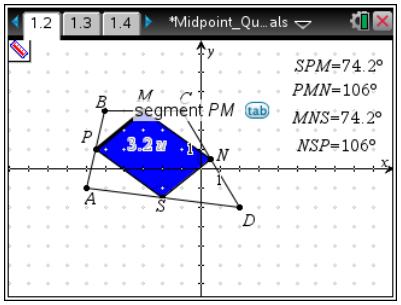




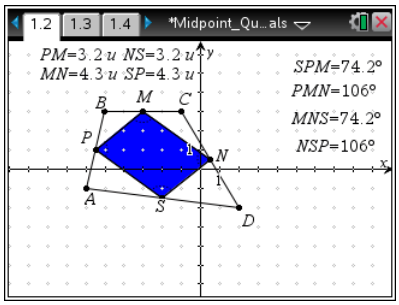
1. Press **Menu > Geometry > Measurement > Angle**.
2. To measure ∠*SPM*, move cursor to point *S*, press enter or , move to point *P*, repeat, and finally to point *M*, repeat. After the third point has been selected, an angle arc and measurement will appear. Angle measurements will temporarily be near the vertex of the angle.
3. Repeat for the other three inner quadrilateral angles: ∠*PMN*, ∠*MNS*, ∠*NSP*. Press esc.
4. Beginning with angle *SPM*, grab each measurement and move to the upper-right corner, keeping track of where the angle measurements go.
5. To label each measurement, move the cursor to the measurement (should say *text*) and press twice. Left arrow to the beginning of the text box and type **SPM=.** Press enter.
6. Repeat for other angles.

Note: You may want to grab the measurements and move them so that you can read them more easily.

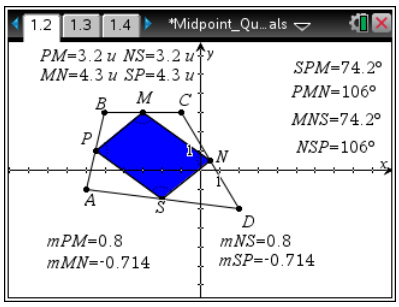
Step 8: Finding side measurements of quadrilateral *PMNS*



1. Press **Menu > Geometry > Measurement > Length**.
2. Press ⬚ on a segment. You may need to tab until the words *segment PM* appear. Use arrows to drag the measurement to the upper-left corner. Press ⬚.
3. Repeat for the other inner segments. Press esc.
4. Then label as before (explained in part 5 of **Step 7** above).



Step 9: Finding the slope of the sides of *PMNS*



1. Press **Menu > Geometry > Measurement > Slope**.
2. Press ⬚ on each side of *PMNS*. Drag the slope (*m*) measurement to the bottom of the page. Press ⬚.
3. Repeat for each side. Press esc then label as before. (For example, ***m*PM=** …)

Step 10: Saving the document

1. Press ctrl **S**.