M302B – Developing Knowledge about Quadrilaterals

Note: This series of activities is intended to bring forth and utilize students’ prior knowledge about quadrilaterals. Instruction/review of definitions of quadrilaterals and characteristics of quadrilaterals is not necessary and may, in fact, be counterproductive to the goals of these activities.

Lesson Goals:

1) Students will increase the accuracy and power of their internal representations of various quadrilaterals
2) Students will develop knowledge of the characteristics of various quadrilateral (square, rectangle, rhombus, kite, parallelogram, isosceles trapezoid, trapezoid) including side, angle, diagonal, and symmetry relationships
3) Students will develop their powers of investigation
   a. students will develop their ability to utilize The Geometer’s Sketchpad to measure side lengths, slopes, and angles
   b. students will develop their ability to make and test conjectures
4) Students will examine the necessary and sufficient conditions for defining quadrilaterals
5) Students will develop understanding of class inclusion within the quadrilateral family

Before Activity 1:

Use a computer screen projection to demonstrate how to open the sketch and use the arrow tool to point and drag a shape.

Before Activity 3:

Use a computer screen projection to show students how to measure lengths and angles, and how to draw diagonals in shapes.

After Activity 6:

Lead the class in developing a list of the characteristics of each of the seven quadrilaterals based on their work from Activity #3-5. Next, help students select defining characteristics from among those listed. Finally, engage students in examining the relationships among characteristics and across shapes – in particular, the way that some quadrilaterals are “special cases” of others – that is, the special cases share all the characteristics of the more general quadrilateral, plus have additional characteristics as well.

Activity 7 can be used for homework before and/or after the whole-class discussion.

Anticipated Timeline:

Computer lab time: 2 ½ to 3 hours
Whole-class discussion: At least 50 minutes