**Properties of quadrilaterals**

Start by investigating properties of quadrilaterals. Fill in the box with yes/no or always/not always. "Yes" or "always" means that this property is always true of this kind of shape--it is true for every example you could make of the shape. "No" or "not always" means that this property is not always true of this shape: you can make some examples of the shape where this property is not true). Start by recording the properties you figured out in class. For other properties you don’t know about yet, you should see what you can find out from the pictures or by experimenting with the Geogebra shapes.

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| 1. Properties | Kite | Parallelogram | Rectangle | Rhombus | Trapezoid | Square |
| a. Both sets of opposite sides are parallel |  |  |  |  |  |  |
| b. One set of opposite sides are parallel |  |  |  |  |  |  |
| c. Two sets of opposite sides are congruent |  |  |  |  |  |  |
| d. Two sets of adjacent sides are congruent |  |  |  |  |  |  |
| e. The diagonals are the same length |  |  |  |  |  |  |
| f. The diagonals cross at their midpoints |  |  |  |  |  |  |
| g. The diagonals are perpendicular where they meet (if the diagonals don’t cross, extend one of the diagonals so they do meet) |  |  |  |  |  |  |
| h. The diagonals bisect the angles of the quadrilateral (cut the angle exactly in half) |  |  |  |  |  |  |
| i. Both sets of opposite angles are congruent |  |  |  |  |  |  |
| j. One set of opposite angles are congruent |  |  |  |  |  |  |
| k. All angles are 90˚ |  |  |  |  |  |  |
| l. Each pair of adjacent angles is supplementary |  |  |  |  |  |  |
| m. Two pairs of adjacent angles are supplementary |  |  |  |  |  |  |

Try to do these things with the Geogebra quadrilaterals. Copy your pictures in here, using the “Graphics View To Clipboard” option or by using a screen capture tool like Snipping Tool (Windows) or Grab (Mac).

2. Copy a parallelogram, and put the two parallelograms together side-by-side so that a side matches. How do the angles fit together? Do they look congruent? Do they look supplementary?

3. Copy a trapezoid, and put the two trapezoids together so that the “bottom” parallel side of one trapezoid lines up with the “top” parallel side of the copy, and the vertices (O and Q or R and P) land on top of one another. How do the angles fit together? Do they look congruent? Do they look supplementary?

4. Take each of the special quadrilaterals, and try to make an example where one side is not parallel to its opposite side. This will be impossible for some of the quadrilaterals (both pairs are parallel in a parallelogram, for instance—that’s the definition). Which quadrilaterals were you able to make a pair of opposite non-parallel sides with?

5. Try to make a trapezoid that looks like it has 3 equal length sides.

6. Try to make a kite that has (or looks like it has) 3 obtuse angles.

7. Try to make a kite that has a pair of parallel sides.

8. Draw in the diagonals on the kite. Try to make a kite where one of the diagonals cuts the angle of the kite into two un-equal angles.

9. Draw in the diagonals on the parallelogram and the rectangle. Try to make a parallelogram where one of the diagonals cuts the angle of the parallelogram or rectangle into two un-equal angles.

10. Go back to page 1, and see if there are any answers you should change after making these Geogebra examples.

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| kites | parallelograms | rectangles |
| rhombi | trapezoids  | squares |