

Understanding Math

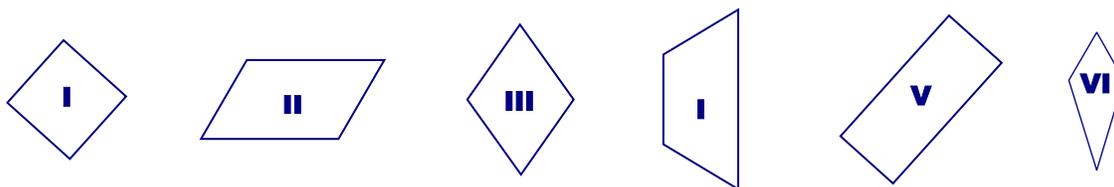
Southern Nevada
Regional Professional Development Program



Classification of Quadrilaterals

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Often pattern blocks are used as a tool in the teaching of spatial relations and geometry. You may recognize some of the shapes below as those found in commonly-used pattern blocks. Within pattern block sets are shapes with four sides—quadrilaterals. Let's start this issue of *Understanding Math* with a little warm-up activity. Classify the following quadrilaterals according to these more specific terms: trapezoids, parallelograms, rhombuses, rectangles, and/or squares:



Before we discuss the answers, let us review the definitions for various convex quadrilaterals.

Trapezoid: A quadrilateral which has exactly two parallel sides.

Parallelogram: A quadrilateral with opposite sides parallel.

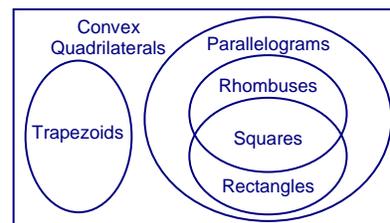
Rectangle: A parallelogram with four right angles.

Rhombus: A parallelogram with four congruent sides.

Square: A rectangle with four congruent sides.

Would you like to change any of your answers from the warm-up? If not, here are the solutions:

- I. Parallelogram, Rectangle, Rhombus, and Square
- II. Parallelogram
- III. Parallelogram and Rhombus
- IV. Trapezoid
- V. Parallelogram and Rectangle
- VI. None of these



How did you do? Did you recognize that Figure I has four names? Or that Figures III and V have two each? Very often, we pigeonhole quadrilaterals using such specified terminology that students get the impression that figures have only one name. A Venn diagram of quadrilaterals is provided, which illustrates the relationships between the convex quadrilaterals.

Another consideration is the frequent classification of rhombuses, like Figures I and III, as *diamonds*. Very few mathematical references define the term *diamond*. While its everyday use is acceptable, students should know the true classification, *rhombus*. Also, some books classify Figure VI as a *kite*, but this term is rarely found in mathematics dictionaries.

Think back to those pattern blocks. How many different quadrilaterals are in a set? Which classifications apply to each of those? As well as being a quadrilateral, the blue block is a parallelogram and a rhombus; the red is a trapezoid; the orange is a square, rectangle, and rhombus; the tan block is a parallelogram and a rhombus. Can you do this with other shapes in the classroom?