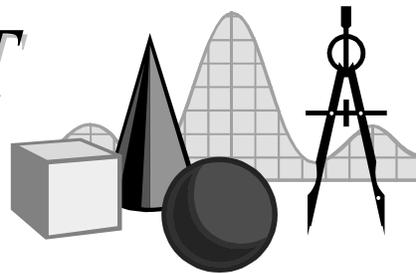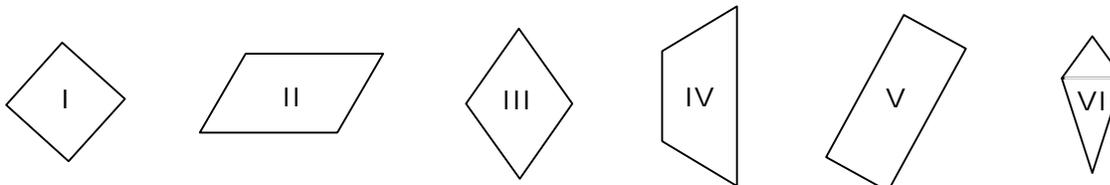# TAKE IT TO THE MAT

A NEWSLETTER ADDRESSING THE FINER POINTS OF MATHEMATICS INSTRUCTION

Math Audit Team
Regional Professional Development Program
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Let's start this issue of *Take It to the MAT* with a little warm-up activity. Classify the following quadrilaterals:.

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
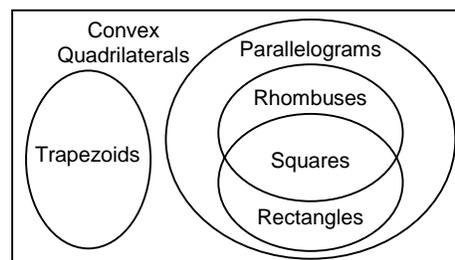
How did you do? Did you recognize that Figure I has four names? Or that Figures III and V have two each?

Very often, we pigeonhole quadrilaterals and students end up getting the impression figures may have only one name. Students lose sight of the fact that rectangles and rhombuses are also parallelograms, or that a square is also a parallelogram as well as a rectangle and a rhombus. 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 would classify Figure VI as a *kite*, but this term is rarely found in mathematics dictionaries.

The classification of quadrilaterals is not without its ambiguities. While the typical definition of trapezoid is given above, some glossaries define it as a quadrilateral with *at least one* pair of parallel sides. Thus, by this alternate interpretation, all parallelograms are trapezoids. It is suggested that the definition provided be used with students.