Algebra/Geometry Institute Summer 2008

Geometric Relationships

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Durant, MS

Grade Level: 7

1. Objective(s):
   Mississippi State Mathematics Framework Competencies
   3 a. Identify, describe, compare and classify polygons.
   3 b. Apply geometric principles to two dimensional figures.

2. Instructional Activities
   - The teacher will set up the overhead projector.
   - The teacher will lay out the large sorting circles, cut-out labeled polygons, and index cards with labels of each circle in the Venn diagram. (See attachment #3: Student Activity Venn diagram)
   - The teacher will begin the lesson with an introductory activity:
     i. The teacher will have students participate in the "polygon hunt" by having the students identify the different polygons in the classroom.
     ii. The teacher will ask the students to name some characteristics of each identified polygon by using the vocabulary terms for the lesson. (See attachment #2: Vocabulary terms)
   - The students will participate in the "polygon hunt".
   - The teacher will use the overhead projector to classify and compare an isosceles triangle, an equilateral triangle, and a scalene triangle according to sides and angles.
   - The teacher will tell the students they will be investigating how polygons are similar and different by classifying and comparing them.
   - The teacher will inform the students that this will be a group activity and they will be grouped randomly by counting off from one to four.
   - The teacher will distribute each group three large sorting circles, a bag of pre-cut out and pre-labeled polygons of different shapes and sizes (see attachment 1). All groups will have the same shapes.
   - The teacher will have the students lay out the sorting circles in a 3-circle Venn diagram. The teacher will draw an example on the board.
   - The students will lay out the sorting circles.
   - The teacher will distribute the identification cards for each circle in the diagram.
   - The teacher will direct the students to label each sorting circle in the Venn diagram with the pre-labeled index cards.
   - The students will use labeled index cards to label the sorting circles.
   - The teacher will write the directions on the board and read them aloud.

i. Directions: Each group must sort the polygons and place them in the correct circle in the Venn diagram. Once each group has finished with the cooperative activity they must transfer their answer to the pre-printed Venn diagram (See attachment #4). The group must also write an explanation of why and how they decided to place the polygons the way they did.

- The teacher informs the student to select a member from the group to write the explanation, but remind them that everyone must have input.
- The teacher will ask the students if they have any questions about the activity they will be doing, if not they may begin.
- The students will open the bag of pre-cut out pre-labeled polygons and sort the polygons according to the labels on each circle of the Venn diagram.
- The teacher will facilitate the learning process through observation.
- The students will work cooperatively to sort the given polygons and place them in the correct circle.
- The teacher will ask students to share their findings by writing how they decided where to place each polygon and read their explanations.
- The teacher will continue to observe the students. Once the teacher is convinced that all groups have completed the activity the teacher will pass out the pre-printed Venn diagram group activity sheet and have students to transfer their answers to it.
- The students will discuss the activity as the teacher walks through the class.
- The students will write down the letters and numbers of the polygons that belong in each circle on the activity sheet.
- The teacher will collect the activity sheets.

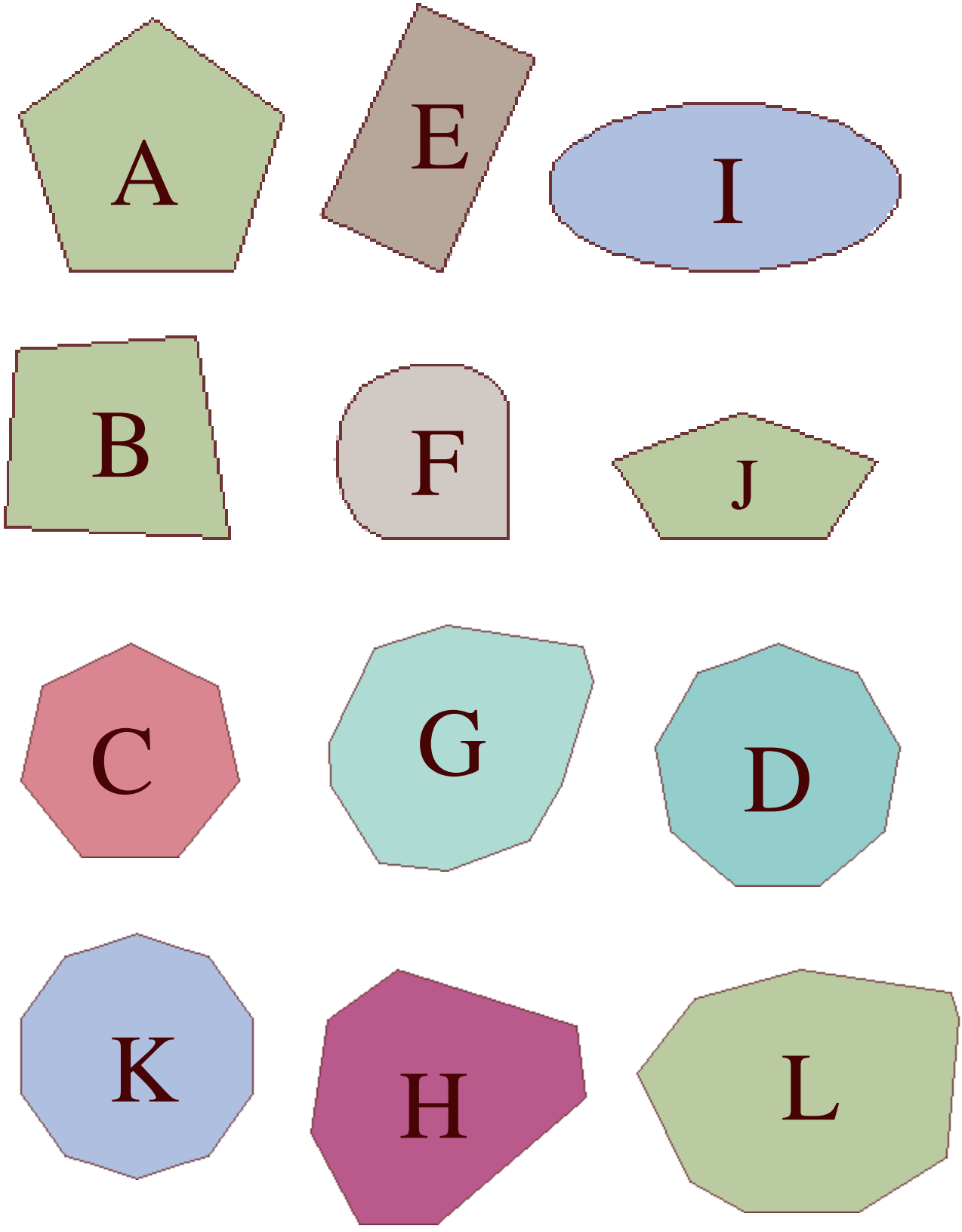
3. Materials and Resources
    - Pugalee, David K., and Frykholm, Jeffery, et.al. Navigating through Geometry in Grades 6-8. Reston, VA: The National Council of Teachers of Mathematics, Inc., 2002
    - Carroll, William. "Polygon Capture". http://Illumination.nctm.org.
    - Overhead projector
    - Sample polygons for illustration (overhead)
    - Pre-labeled polygon cut-outs (attachment #1)
    - Large sorting circles (3 per each group)
    - Pre-labeled index cards (3 per each group)
    - Markers
    - Transparencies
    - Venn diagram activity sheet (attachment #4)

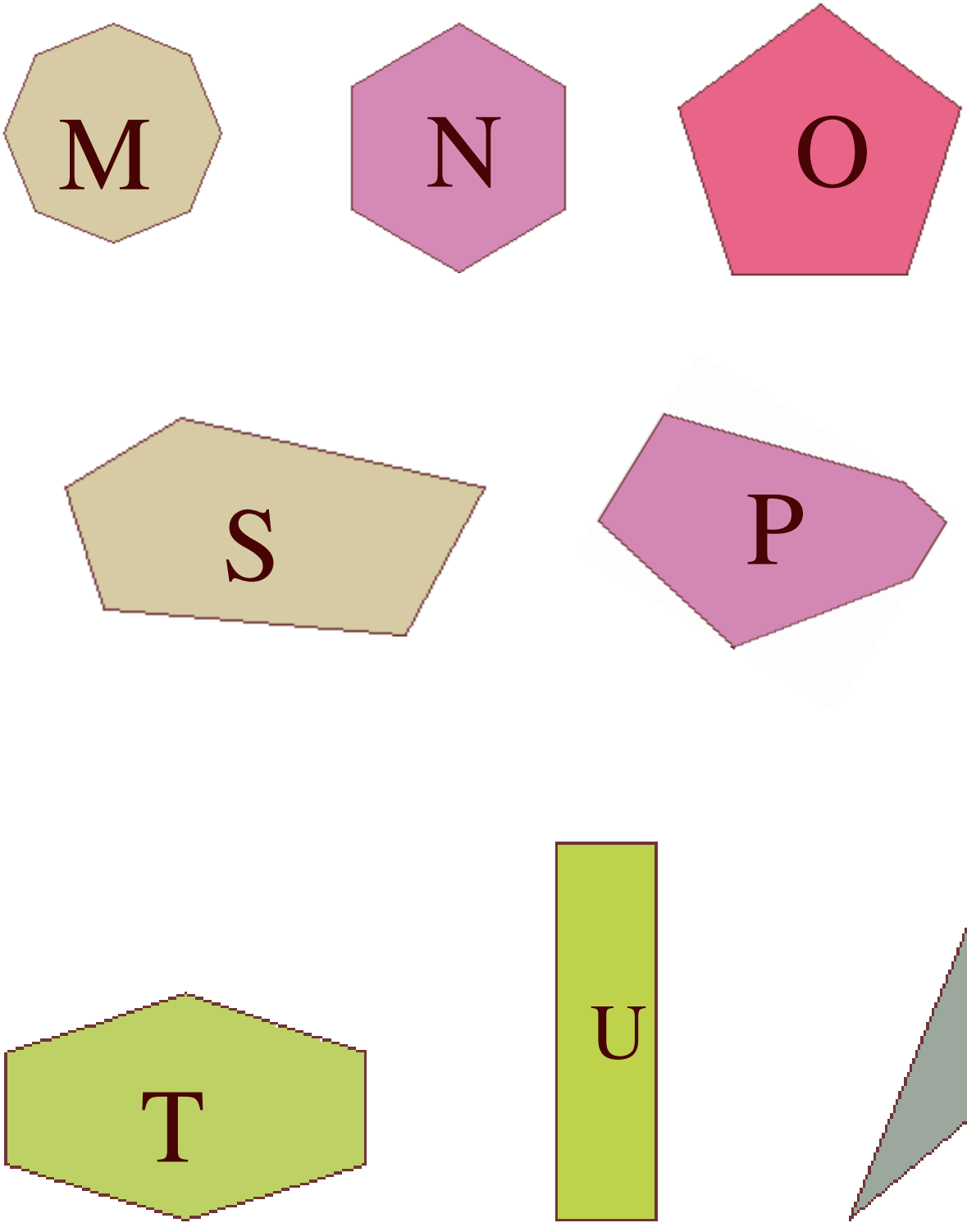
4. Assessment
    - Observation-the teacher will look for strategies being used and listen for how students decide where each polygon is placed.
    - The teacher will evaluate each group understanding by grading their activity sheet.

- Ask students what set they would change to include more of the polygonal shapes.

5. Enrichment (Optional)
    - Students may try to sort three-dimensional figures

Attachment #1 two-dimensional figures

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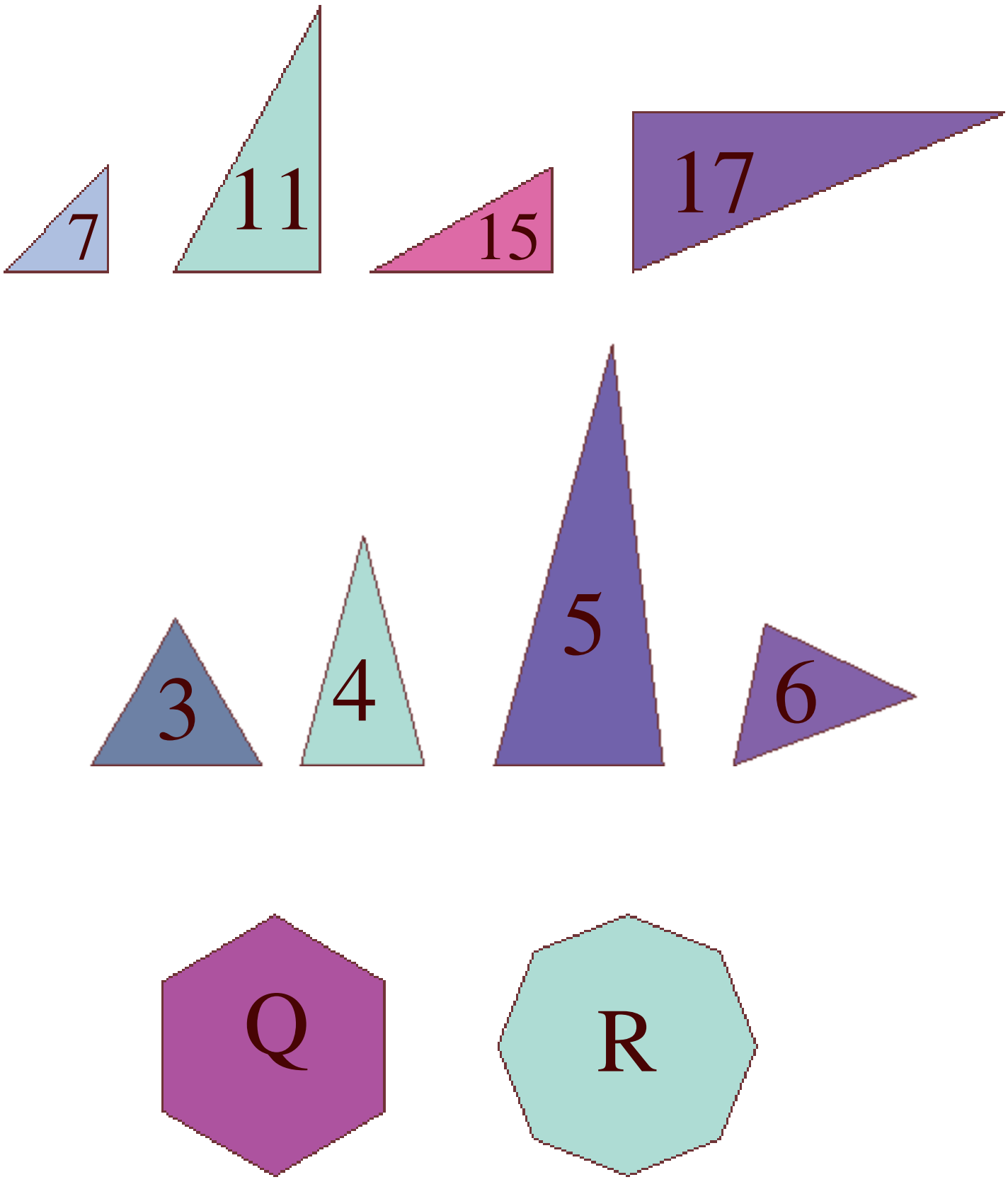
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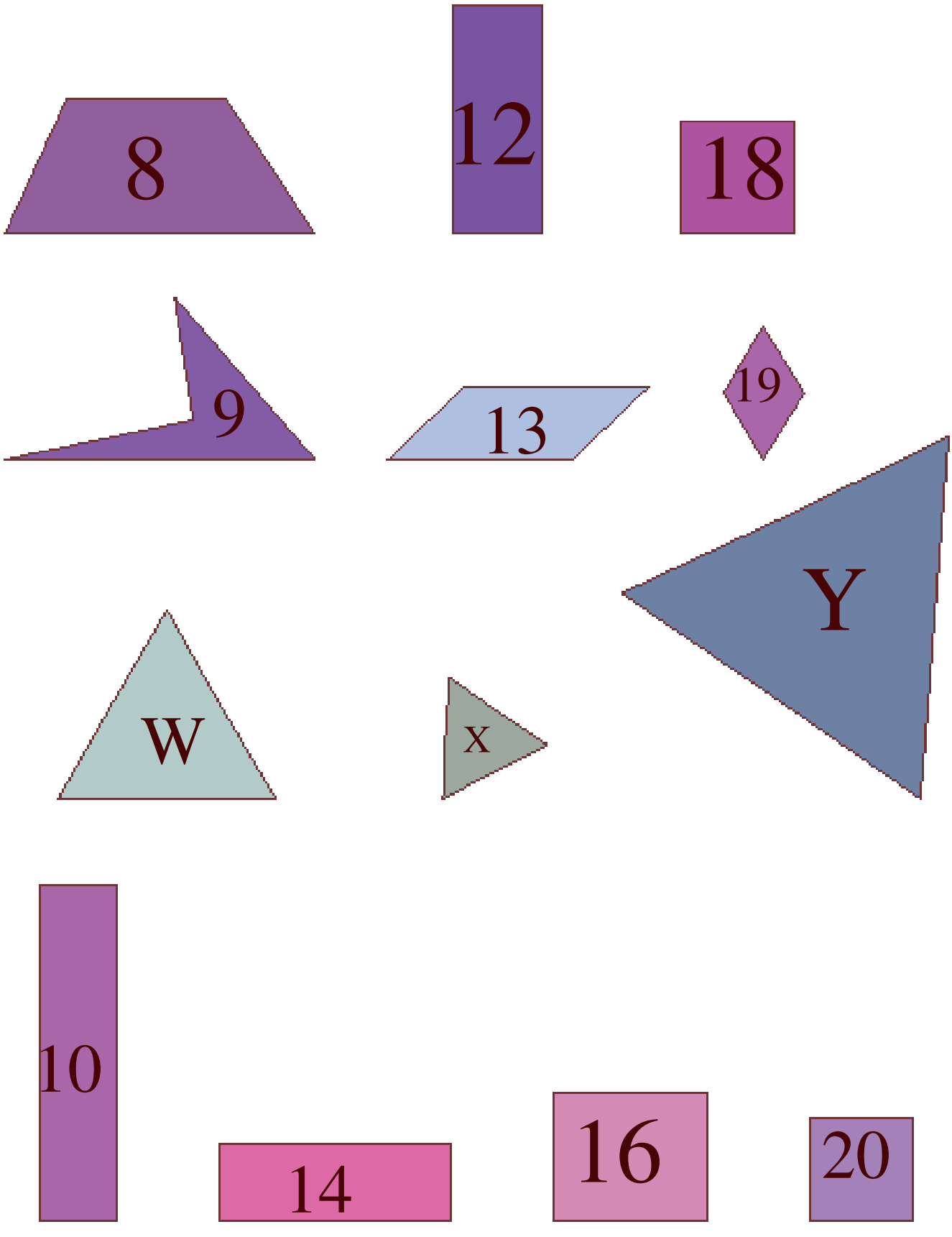
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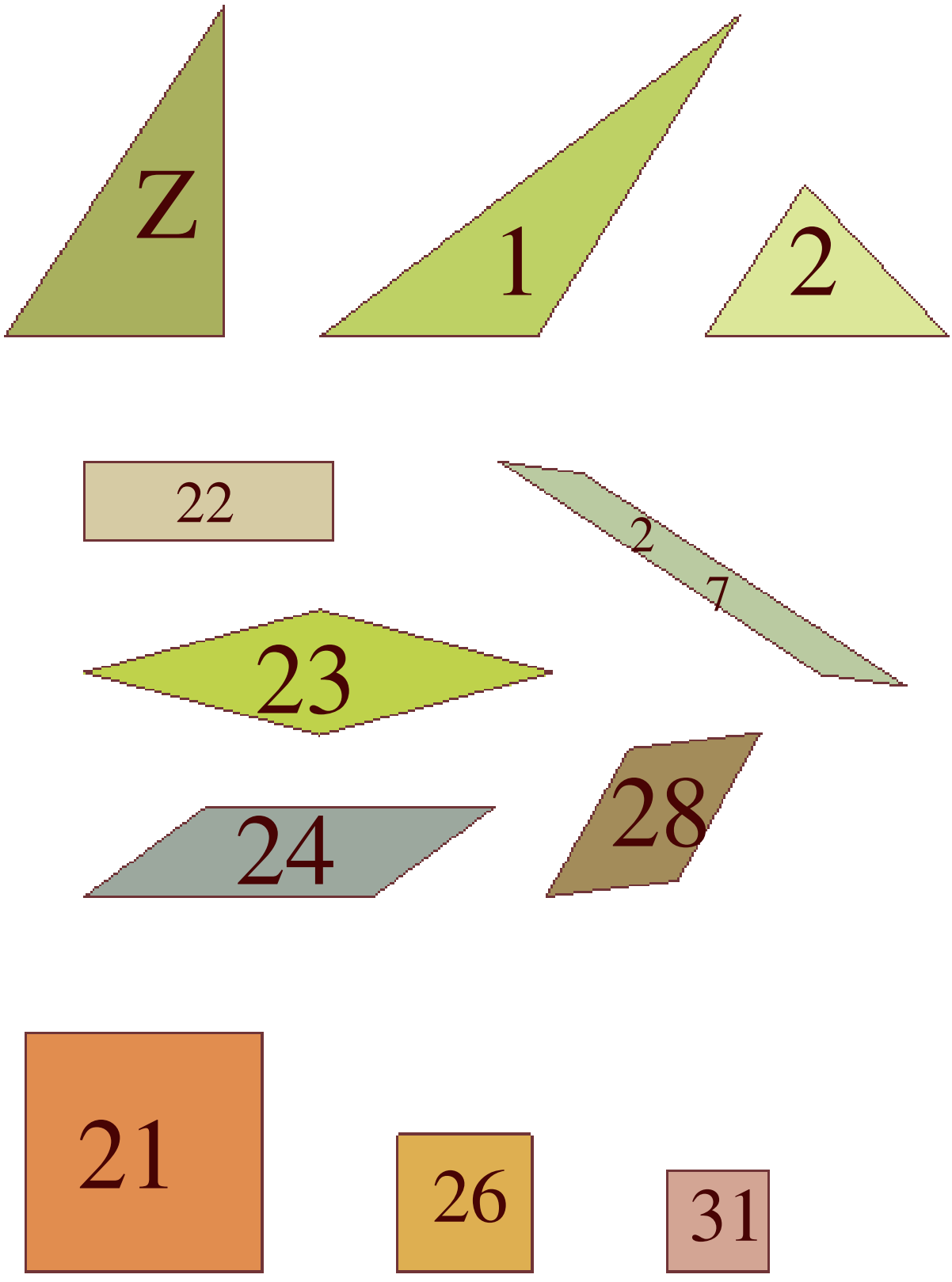
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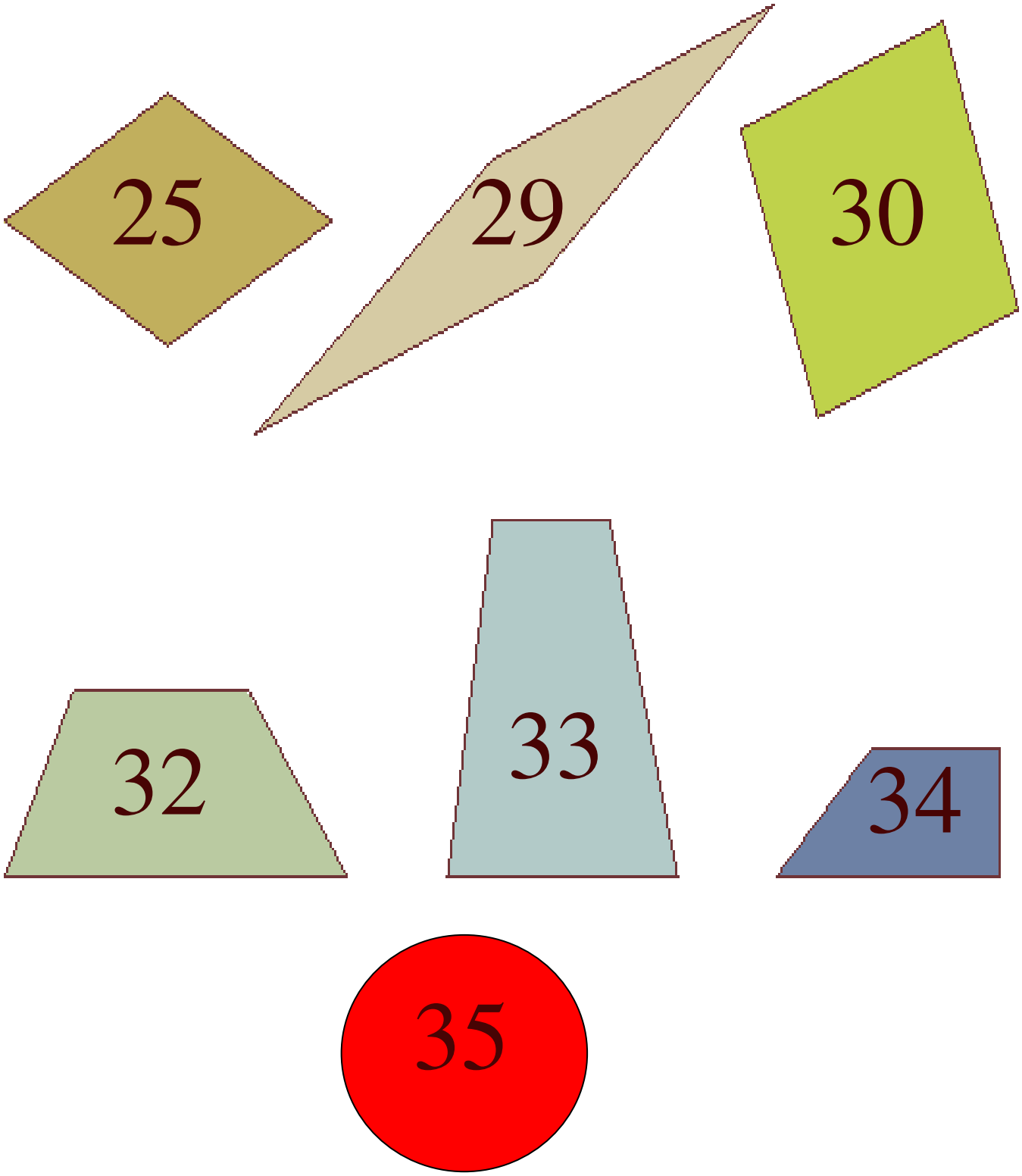
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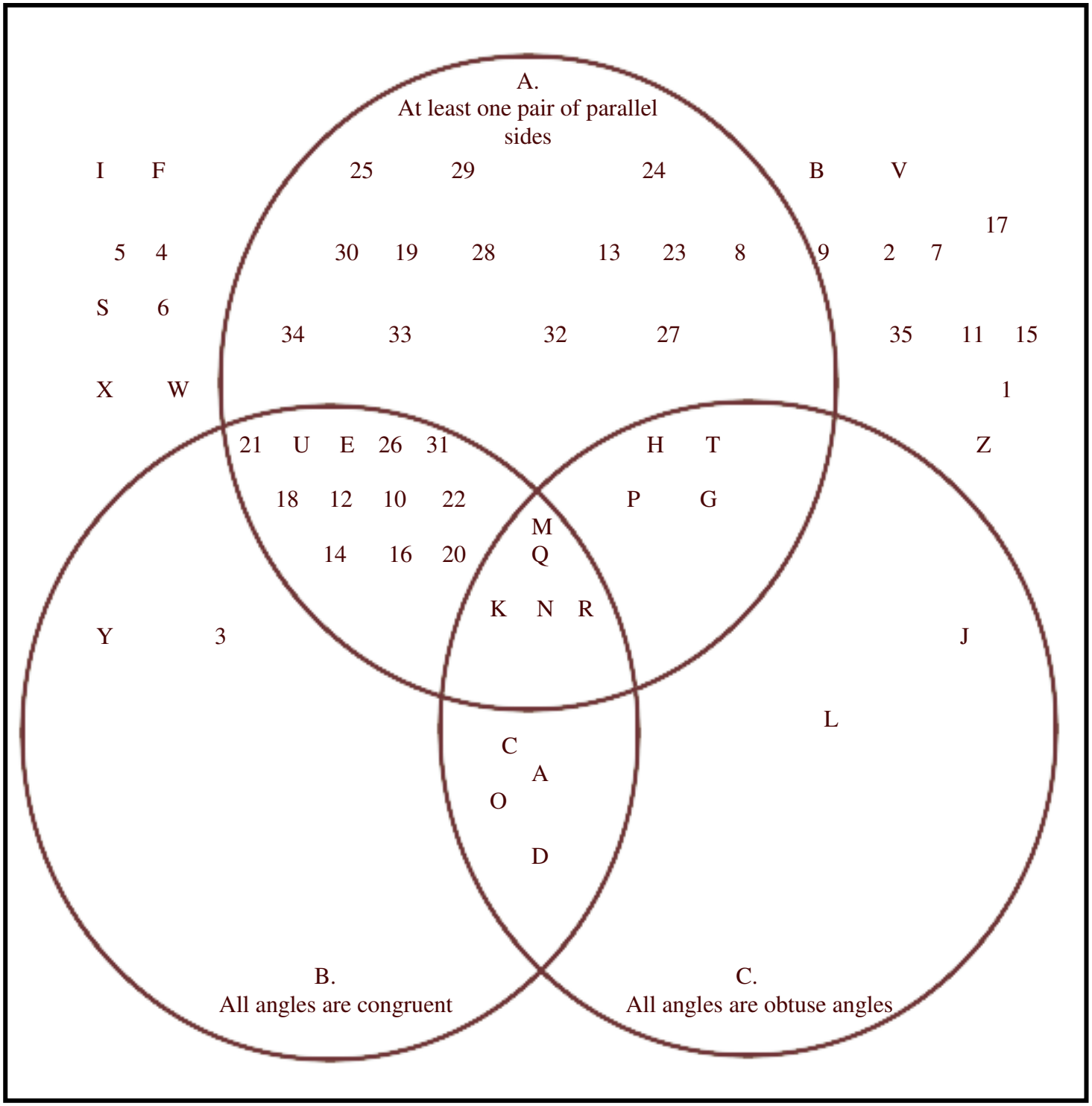
Attachment #2 – Vocabulary Terms

1. polygon
2. congruent angles
3. congruent sides
4. obtuse angle
5. acute angle
6. irregular polygon
7. regular polygon

Teacher's Copy-Answer Copy (Attachment #3)



Attachment #4
Group Names _____