Bulletin Board Border

Please help me. I would like to make a geometry bulletin board that has a border of circles, triangles and squares. I know that 20 shapes will fit across the board and that 12 shapes will fit down the board. If I start in the top left-hand corner with a circle, followed by a triangle, then a square, and repeat this pattern all around the board, how many of each shape will I need?

Explain your solution using words and pictures.

Grade Levels 3 - 5

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Context

This problem worked well because it forced students to draw the problem and show all their work. Students first thought they could add all the numbers given and solve the problem without a diagram. When they became involved in the problem solving they realized why drawing clear diagrams is so useful.

What This Task Accomplishes

This task allows students to explore a real-life problem using perimeter. It assesses their ability to take information given and apply it to a diagram.

What the Student Will Do

The task provides information that most students will need to diagram. Some students in my fourth grade class had difficulty placing the corner pieces and counted them twice. The more accurate the diagram, the more accurate the solution.

Time Required for Task

60 minutes

Interdisciplinary Links

None, this is strictly a problem-solving problem.

Teaching Tips

Teachers tell students that a diagram will help them with problem solving, but we often get, "I did it in my head." This problem allows students to draw a simple diagram to a challenging problem. Allow students the opportunity to actually make the boarder on a bulletin board.

Suggested Materials

- Paper
- Pencil
- Actual shapes may be used

Possible Solutions

Students may conclude that 64 shapes are needed. They will add the numbers given in the task and draw a diagram that represents their interpretation. Hopefully by drawing a diagram, students will use the corner pieces correctly, and conclude that 60 shapes are needed, 20 of each shape.

Benchmark Descriptors

Novice

The student used inappropriate concepts and procedures to solve the problem (s/he may have multiplied 20 by 12 to get 240). There is little evidence in the explanation of a strategy or reasoning. The diagram does not relate to the problem (there is no evidence of a border).

Apprentice

The student understood part of the problem and showed some mathematical reasoning, (using a pattern of shapes for the border), but did not use the corner pieces as a continuation of the pattern. There is some use of a diagram and mathematical notation.

Practitioner

The solution shows a broad understanding of the problem. The strategy was to use an accurate diagram to organize the solution. A Practitioner may have slight computational errors in their solution, as long as the explanation and diagram are correct.

Expert

The solution shows a deep understanding of the problem including the ability to identify the appropriate mathematical concepts. This student makes connection between the border and the mathematical concept of perimeter. The student verified the solution. ("To check I counted the perimeter and I got 60.") The diagram is actively used to find the solution and the student is making an attempt at using a chart, although it ends up just being a way to present the solution. S/he uses appropriate mathematical notation.

Novice



Apprentice



Practitioner



Expert

