## 8th grade Task 2 Squares and Rectangles

<table>
<thead>
<tr>
<th>Student Task</th>
<th>Use the properties of shapes to find similar shapes.</th>
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| Core Idea 4 Geometry and Measurement | Analyze characteristics and properties of two- and three-dimensional geometric shapes; develop mathematical arguments about geometric relationships; apply transformations and use symmetry to analyze mathematical situations; and apply appropriate techniques tools, and formulas to determine measurements.  
  - Understand relationships among the angles, side lengths, perimeter, and area of similar objects  
  - Describe sizes, positions, and orientations of shapes under informal transformations such as flips, turns, slides, and scaling. |
| Core Idea 2 Mathematical Reasoning | Employ forms of mathematical reasoning and justification appropriately to the solution of a problem.  
  - Formulate conjectures and test them for validity |

Eighth Grade – 2003
Squares and Rectangles

This problem gives you the chance to:

- use properties of shapes
- use coordinates

1. What specific properties must a quadrilateral have in order to be a rectangle?

2. What specific property must a rectangle have in order to be a square?

On this grid, the Xs indicate two corners of a square.

There are three different ways to draw a square with these Xs as two of its corners.

3. Draw the three squares on the grid.

4. Write the coordinates of the corners of the three squares.

Square 1 ( , ) ( , ) ( , ) ( , )
Square 2 ( , ) ( , ) ( , ) ( , )
Square 3 ( , ) ( , ) ( , ) ( , )

Eighth Grade – 2003
The points marked by Xs on this grid indicate two corners of a rectangle. Suppose that the area of each square on the grid is 1 cm².

5. On the grid above, draw a rectangle with two of its corners on the Xs. Your rectangle should have a width to height ratio of 2 : 3.

6. What is the area of your rectangle?  

7. How many different rectangles can be drawn on the grid using the points marked by Xs as corners?

Explain your reasoning.

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Eighth Grade – 2003
# Squares and Rectangles

The core elements of performance required by this task are:
- use properties of shapes
- use coordinates

Based on these, credit for specific aspects of performance should be assigned as follows:

<table>
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<tr>
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1. Gives correct answers as:
   - The corners must be right angles.  
     2  

2. Gives correct answer as:
   - The sides must be all the same length.  
     1  

3. Draws three correct squares on the grid with corners on the Xs.
   - Partial credit:
     - Draws two correct squares: 2 points
     - Draws one correct square: 1 point
     3

4. Gives correct coordinates as:
   - Square 1 (5, 4) (5, 8) (9, 8) (9, 4)
   - Square 2 (5, 4) (9, 4) (9, 0) (5, 0)
   - Square 3 (5, 4) (7, 6) (9, 4) (7, 2)
   - Partial credit:
     - Gives correct coordinates for two of the three squares: 2 points
     - Gives correct coordinates for one of the three squares: 1 point
     3

5. Draws correct rectangle with corners at (5, 10) (9, 10).
   1

6. Gives correct answer as:
   - 24 cm²
   1

7. Gives explanation such as:
   - 12 or 13 (thinking of how many can be drawn on this grid with other two corners on grid-points)
     1 or
   - As many as you like because the height of the rectangle can be any size – the grid can go on forever and/or other two corners do not have to be on grid-points.
     1 or
   - Correctly considers rectangles with ratios 2:3.
     1

| Total Points | 12 |

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Eighth Grade – 2003