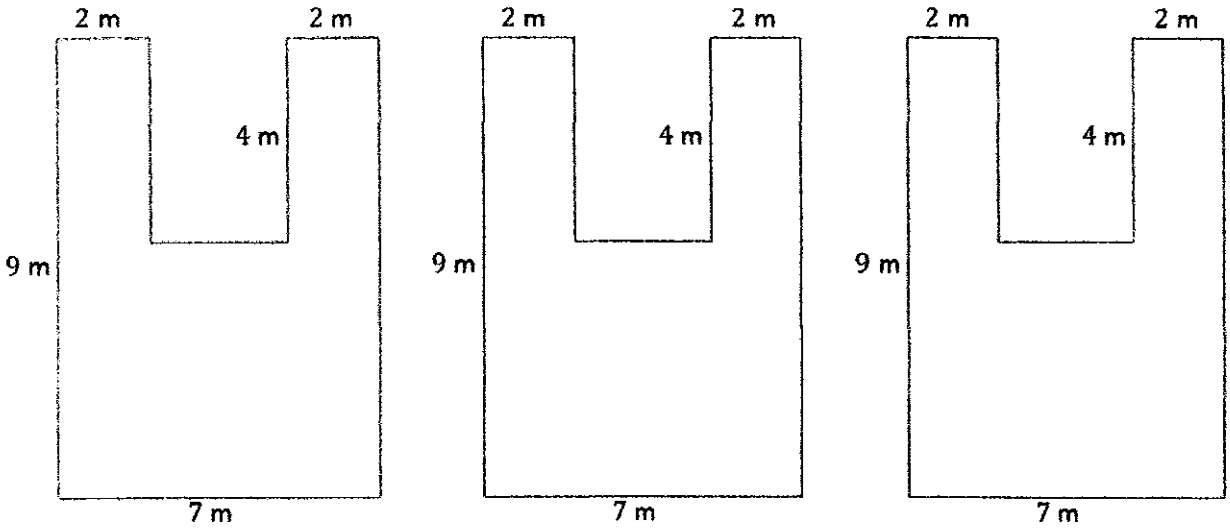
Example 1: Decomposing Polygons into Rectangles

The Intermediate School is producing a play that needs a special stage built. A diagram is shown below (not to scale).

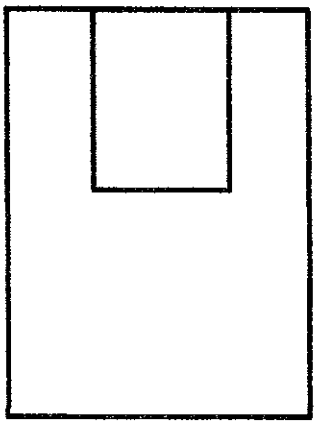
a. On the first diagram, divide the stage into three rectangles using two horizontal lines. Find the dimensions of these rectangles and calculate the area of each. Then find the total area of the stage.

b. On the second diagram, divide the stage into three rectangles using two vertical lines. Find the dimensions of these rectangles and calculate the area of each. Then find the total area of the stage.

c. On the third diagram, divide the stage into three rectangles using one horizontal line and one vertical line. Find the dimensions of these rectangles and calculate the area of each. Then find the total area of the stage.



d. Consider this as a large rectangle with a piece removed.



i. What are the dimensions of the large rectangle and the small rectangle?

ii. What are the areas of the two rectangles?

iii. What operation is needed to find the area of the original figure?

iv. What is the difference in area between the two rectangles?

v. What do you notice about your answers to (a), (b), (c), and (d)?

vi. Why do you think this is true?