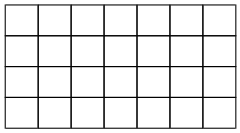
# DISCUSSION FOR SECOND TUTORIAL

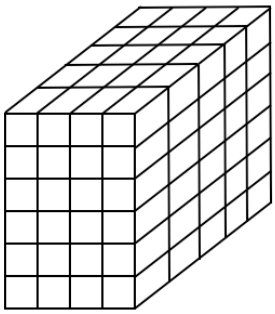
DATE: OCTOBER 3 OR 17, 2011 : DUE IN TUTORIAL OCTOBER 24 OR 31, 2011

A rectangular array is divided into $x$ boxes high and $y$ boxes wide (with $x$ and $y$ positive integers). The picture below represents the picture with $x = 4$ and $y = 7$.



A cell in this rectangle either shares an edge with the larger rectangle (we will call these cells 'exposed') or it is 'sheltered' and lies inside the area that does not share an edge with the larger rectangle. What are the possible dimensions of a rectangle where the number of sheltered cells is equal to the number of exposed cells? (there are 18 exposed cells and 10 sheltered cells in the example).

Consider a rectangular prism divided into cubes with $x$ cubes on one side, $y$ on another and $z$ on a third (where $x, y, z$ are positive integers). The picture below represents such a prism with $x = 4, y = 5$ and $z = 6$.



A cube in this prism either has at least one face exposed (we will call these cubes 'exposed') or it does not have a face exposed (we will call those cubes 'sheltered').

Find the all possible dimensions of the prisms where the number of exposed cubes is equal to the number of sheltered cubes.