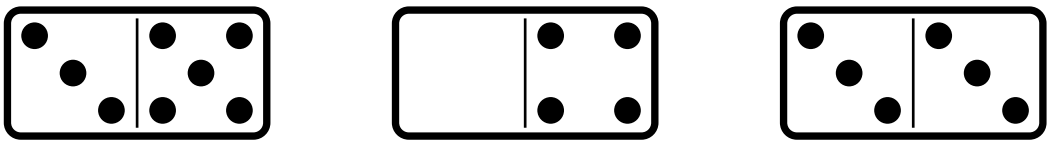
Problem of the Week

Problem C

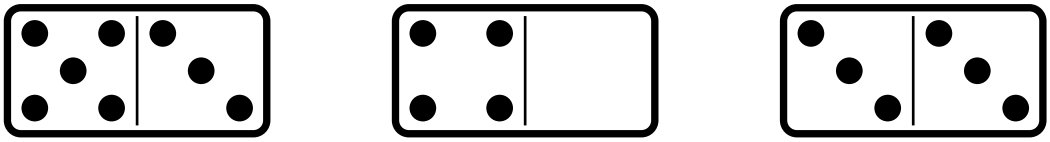
Dominoes

A domino tile is a rectangular tile with a line dividing its face into two square ends. Each end is marked with a number of dots (also called pips) or is blank.



The domino on the left is a $[3, 5]$ domino, since there are 3 pips on one end and 5 pips on the other end. The domino in the middle is a $[0, 4]$ domino, since there are 0 pips on one end and 4 pips on the other end. The domino on the right is a $[3, 3]$ domino, since there are 3 pips on one end and 3 pips on the other end.

We can also rotate the domino tiles:



The domino on the left is a $[5, 3]$ domino. However, since each tile has just been rotated, $[5, 3]$ and $[3, 5]$ represent the same domino. Similarly, the domino in the middle is a $[4, 0]$ domino. Note that $[4, 0]$ and $[0, 4]$ represent the same domino.

A 2-set of dominoes contains all the tiles with the number of pips on any end ranging from 0 to 2, and no two dominoes can be the same. A 2-set of dominoes has the following 6 tiles: $[0, 0], [0, 1], [0, 2], [1, 1], [1, 2], [2, 2]$. (Notice that the three dominoes $[1, 0]$, $[2, 0]$ and $[2, 1]$ are not listed because they are the same as the three dominoes $[0, 1]$, $[0, 2]$ and $[1, 2]$).

A 10-set of dominoes contains all the tiles with the number of pips on any end ranging from 0 to 10, and no two dominoes can be the same. How many tiles are in a 10-set of dominoes?