



Problem of the Week

Problem E

A New Pair of Dice

A standard six-sided die has its faces marked with the numbers 1, 2, 3, 4, 5, and 6. The die is *fair*, which means that when it is rolled each of its faces has the same probability of being the top face. When two standard six-sided dice are rolled and the numbers on the top faces are added together, the sums range from 2 to 12.

Noemi creates two special six-sided dice that are also fair, but have non-standard numbers on their faces. Numbers on these special dice are positive integers and may appear more than once. The largest number on one of her special dice is 8. When the two special dice are rolled and the numbers on the top faces are added together, the sums range from 2 to 12 and the probability of obtaining each sum is the same as it would be if two standard dice had been used.

Determine all possible pairs of special dice that Noemi could have created.

