

Sticks and Stones
Homework Problems
Version 1.0
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1. The players on my sports team scored 20 points in total in today's game. I have three players. How many different scoring patterns possibly happened? Assume that every player scored at least 1 point.
2. Same question, but now consider the possibility that a player might score zero points. For example, it might be that two of my players both scored zero points, and all points were therefore scored by my star third player. Now how many possibilities are there?
3. HARDER. I roll three normal six-sided dice. If the three rolled numbers add up to 10, I win. Thus, a roll of 1, 3, and 6 would win. But a roll of 4, 4, and 5 would not. How many different ways can I win? (Hint: If your answer is 36, you are close but not quite there. Think about the difference between this problem and a problem like "I have three numbers, and they add up to 10.")
4. HARDER. I roll four normal six-sided dice. If the four rolled numbers add up to 4, I win. Thus, obviously, there is only one possible winning roll: 1, 1, 1 and 1. If you try to solve this problem using sticks-and-stones, however, you might at first get an answer of 3. Do you see why? Can you adjust the sticks-and-stones method so that you get the correct answer? (HINT: This is your first three-stick problem. How does that impact your math?)
5. SAME AS ABOVE. Suppose that I have four numbers (A, B, C, D) and they add up to 16. The numbers must be 1 or greater, not zero. For example, my numbers might be (1, 3, 8, 4) or (2, 6, 6, 2) or (3, 1, 4, 8). How many different possible patterns are there?
6. HARDER. Suppose that I have five numbers (A, B, C, D, E) and they add up to 16. The numbers must be 1 or greater, not zero. For example, my numbers might be (1, 3, 6, 4, 2) or (2, 4, 7, 2, 1). How many different possible patterns are there? Do you expect this answer to be greater than the previous answer, or less?