Answer the questions in the spaces provided. If you run out of room for an answer, continue on the back of the page.

Question:	1	2	3	Total
Points:	15	10	0	25
Score:				

Name and section: _____

1. Given that you have a coin that you flip N times in independent trials, answer the following questions.
   (a) (5 points) If the coin is fair ($p_H = p_T = \frac{1}{2}$), what is the probability of getting exactly seven heads in the N trials ($N \geq 7$)?

   $p =$

   (b) (10 points) For the same fair coin, if $N = 20$ and given that the first 10 flips are all heads, what will be the average total number of heads $\langle n_{h,\text{total}} \rangle$ in the 20 coin flips?

   $\langle n_{h,\text{total}} \rangle =$

2. (10 points) You have two dice, each with four sides (with the sides numbered 1-4), and you roll both and add up the number shown on each die. What is the average of the sum?

   $\langle \text{sum} \rangle =$

3. For fun if you finish early: A circular table has 60 chairs around it. There are N people seated at this table so that the next person seated must sit next to someone. Find the smallest possible value of N. (AHSME 1991 #15 via `https://ocw.mit.edu/high-school/mathematics/combinatorics-the-fine-art-of-counting/assignments/`)

$N_{\min} =$