

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 four 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 the sequence $HHTH$?

(b) (5 points) For the same fair coin, what is the probability of the sequence $TTHH$?

(c) (5 points) If instead of a fair coin, $p_H = \frac{3}{4}$, what is the probability of the sequence $HHTH$? Please leave the answer as a fraction.

2. Assume that having a male or a female child are mutually exclusive, collectively exhaustive, and equally likely. Also assume that a child's gender is independent of their siblings' gender.

(a) (5 points) What is the likelihood of having two boys and a girl, in any order? Be sure to consider all the different ways this could happen.

(b) (5 points) What is the probability of having two boys and a girl or a boy and two girls, in any order?

3. For fun if you finish early: If you have paper with parallel lines a distance l apart, what is the probability that a needle of length l dropped on the paper will cross one of those lines?