

**Stats 1**  
(PSCI 8356)  
Professor Jim Bisbee

**PROBLEM SET 2: Due Friday, September 6th by 11:59PM.**

*A reminder: you may work with others in the class on this problem set, and you are in fact encouraged to do so. However, the work you hand in must be your own. Handwritten work is acceptable, but word-processed work (e.g., using L<sup>A</sup>T<sub>E</sub>X or RMarkdown) is preferred.*

*The following two questions are designed to get you nimble with the sorts of proofs we'll be doing in class with scalar algebra and summation signs:*

1. Prove the Law of Total Probability, that is:

$$P(A) = \sum_{i=1}^k P(A|B_i)P(B_i)$$

2. Show that the probability of a set  $A$  of equiprobable simple events  $E_i$  is equal to the number of simple events in  $A$  over the total number of simple events in  $S$ , that is:

$$P(A) = \frac{|A|}{n}$$

*Most of the remaining problems come from WMS, 7th edition, which is on our Brightspace. Note that the answers to odd-numbered, non-asterisked problems may be found in the back of the book. (In contrast to those answers, please show all your work.)*

3. WMS Exercise 2.124
4. WMS Exercise 2.125
5. WMS Exercise 2.47
6. There are 16 students in Stats I. Of these students, 11 are male. I assign the students at random to three teams consisting of 6, 5, and 5 students respectively. Figure out the probability of having all single-sex teams.