

STAT 270 Lecture 11
 Fall 2015
 2 October 2015

- We finished ‘Probability Basics’ and started ‘Discrete Distributions’.
- We have finished Chapter 3 and are in Section 4.1.
- Problems from text: 3.18, 3.24, 3.25, 3.46 (too subtle for an exam – depends on the interpretation of the English) and 4.01.
- Handwritten slides.
- Key jargon, ideas:

- Bayes Theorem: If $P(A) > 0$ and $P(B) > 0$ then

$$\begin{aligned}
 P(B|A) &= \frac{P(BA)}{P(A)} \\
 &= \frac{P(A|B)P(B)}{P(A)} \\
 &= \frac{P(A|B)P(B)}{P(AB) + P(AB')} \\
 &= \frac{P(A|B)P(B)}{P(A|B)P(B) + P(A|B')P(B')}
 \end{aligned}$$

- Bayes Theorem: If B_1, \dots, B_k are mutually exclusive and *exhaustive* then

$$P(B_i|A) = \frac{P(A|B_i)P(B_i)}{\sum_j P(A|B_j)P(B_j)}.$$

Exhaustive means

$$B_1 \cup \dots \cup B_k = \mathcal{S}.$$

- I redid the example of the previous lecture using a tree.