

## Section #2 Warmup

---

Based on handout by Gili Rusak and Alex Tsun

### Lecture 5: Independence

1. Definitions: Cite Bayes' Theorem.
2. True or False. Note that true means *always* true.
  - (a) In general,  $P(A, B|C) = P(B|C)P(A|B, C)$ .
  - (b) If  $A$  and  $B$  are independent, so are  $A$  and  $B^C$ .

### Lecture 6: Random Variables and Expectation

1. Definitions:
  - (a) If  $X$  is a random variable, what is  $E[X]$ ? What is  $E[g(X)]$ ?
  - (b) For random variables  $X_1, \dots, X_n$ , what is  $E[\sum_{i=1}^n X_i]$ ?
2. True or False: For any random variable  $X$ ,  $E[X^2] = E[X]^2$ .
3. Short Answer: Let  $X$  = the value on one roll of a 6 sided die. Recall that  $E[X] = 7/2$ . What is  $\text{Var}(X)$ ?

### Lecture 7: Variance, Bernoulli, Binomial

1. Definitions: PMF for  $X \sim \text{Binomial}(n, p)$ . What is  $p_X(k)$ ?
2. Short Answer: Let  $X$  be the number of flips of a coin with  $P(\text{head}) = p$  up to and including the first head. What is the range of  $X$  and  $p_X(k)$ ?