

ECONOMICS 7330—Probability and Statistics, Fall 2022

Homework 1. Monday August 22. Due Wednesday August 31.

1. Let $A = a, b, c, d$ and $B = a, c, e, f$.

(a) Find $A \cup B$.

(b) Find $A \cap B$.

2. Describe the sample space S for the following experiments.

(a) Flip a coin.

(b) Roll a six-sided die.

(c) Roll two six-sided dice.

3. Prove that $P[A \cup B] = P[A] + P[B] - P[A \cap B]$.

4 Show that $P[A \cap B] \leq P[A] \leq P[A \cup B] \leq P[A] + P[B]$.

5. Prove that $[\bigcup_{i=1}^{\infty} A_i]^C = \bigcap_{i=1}^{\infty} A_i^C$.

6. We observe the price of 2 stocks, stock A and stock B.

The probability that the price of stock A increases is 0.8 and the probability that the price of stock B increases is 0.5. We also know that the probability of the event that the price of either stock A or stock B increases is 0.9.

a) What is the probability that the price of stock A increases at the same time as the price of stock B increases?

b) What is the probability that the price of A increases if you observe that the price of stock B increases?

(State clearly which formulas you used).