

# Sample Questions: Foundations of Probability

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1. Prove  $P(A^c) = 1 - P(A)$ . Use the axioms of probability and the tabular format illustrated in lecture.

2. Prove  $P(\emptyset) = 0$ . Use the axioms of probability and the tabular format illustrated in lecture.

3. Prove that if  $A \subseteq B$  then  $P(A) \leq P(B)$ . Use the axioms of probability and the tabular format illustrated in lecture.

4. Prove the Addition Law:  $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ . Use the axioms of probability and the tabular format illustrated in lecture.

5. If 23 out of 25 are employed, what is the probability of randomly choosing an unemployed person? The answer is a number. Circle your answer.

6. If you roll two fair dice, what is the probability of getting a sum greater than 2? The answer is a number. Circle your answer.

7. If you roll two fair dice, what is the probability of getting two different numbers? Your answer is a number. Circle your answer.

8.  $P(A) = 0.4$ ,  $P(B) = 0.5$  and  $P(A \cap B) = 0.3$ . What is  $P(A \cup B)$ ? The answer is a number. Circle your answer.

9. Of the cars in a used car lot, 50% have engine trouble and 50% have transmission trouble. If 25% have both problems and you buy a car at random, what is the probability that both the engine and transmission are okay? The answer is a number. Circle your answer.

10. Of the prisoners in a jail, 75% are convicted murderers and 50% have been convicted of both murder and armed robbery. Twenty percent are in jail for offences other than murder or armed robbery. If you pick a prisoner at random, what is the probability that she is an armed robber?

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<http://www.utstat.toronto.edu/~brunner/oldclass/256f18>