

Name:

MATH 320: Homework 3

Due _____ : Turn in a hard copy, neat and stapled.

1. A computer company has a shipment of 60 computer components of which 12 are defective. If 8 components are chosen at random to be tested, what is the probability that:
 - (a) All are good?
 - (b) 5 are good and 3 are defective?
 - (c) At least 6 are defective?
2. 12 people, 6 men and 6 women, are to be seated in a row of 12 chairs. What is the probability that the men and women end up in alternate chairs?
3. An auto insurance company finds in the past 10 years 25% of its policyholders have filed liability claims, 33% have filed comprehensive claims, and 18% have filed both types of claims. What is the probability that a policyholder chosen at random has not filed a claim of either kind?
4. Prove $P(A \cap B) \geq P(A) + P(B) - 1$.

Note that this theorem allows us to place a lower bound on the probability of simultaneous events (intersection) in terms of the probabilities of the individual events.
5. You are given $P(A \cup B) = 0.6$ and $P(A \cup \sim B) = 0.85$. Determine $P(A)$ using each of the following methods:
 - (a) Venn Diagram.
 - (b) Set theory and probability theorems.
6. If 5 cards are dealt from a deck of 52 ordinary playing cards, find the probability of:
 - (a) A “full house”. Note that a full house contains three matching cards of one rank and two matching cards of another rank. *HINT: Think of selecting the rank and the suit as separate tasks.*
 - (b) A hand of one pair. Note that one pair contains two cards of the same rank and three cards of three other ranks.

Select answers

1. (a) Prob ≈ 0.147
(b) Prob ≈ 0.147
(c) Prob ≈ 0.809
2. Prob ≈ 0.0022
3. Prob = 0.6
- 4.
5. Prob = 0.45
6. (a) Prob ≈ 0.0014
(b) Prob ≈ 0.4226