1. In a certain community, there are several plumbers, and plumber A does 40% of the plumbing jobs. A survey showed that 10% of customers were dissatisfied with their most recent plumbing job. Half of the dissatisfied customers had employed plumber A.

(a) Find the probability that a customer was dissatisfied, given that the job was done by plumber A.
(b) Find the probability that a customer was satisfied, given that the job was done by plumber A.

2. Let $A$ and $B$ be events with $P(A) = 0.6$ and $P(B) = 0.3$.

(a) Is it possible that $P(A \cup B) = 0.1$? Explain.
(b) What is the smallest possible value for $P(A \cap B)$?
(c) Is it possible that $P(A \cup B) = 0.7$? Explain.
(d) What is the largest possible value for $P(A \cap B)$?

3. Of items produced by a factory, 40% come from line I and 60% from line II. Eight percent of the items produced on line I and 10% of the items produced on line II are defective. An item is chosen at random. Find the probability that it is not defective.

4. An insurance company estimates that 40% of policyholders who have only an auto policy will renew next year and 60% of policyholders who have only a homeowners policy will renew next year. The company estimates that 80% of policyholders who have both an auto policy and a homeowners policy will renew at least one of those policies next year. Company records show that 65% of policyholders have an auto policy, 50% of policyholders have a homeowners policy, and 15% of policyholders have both an auto policy and a homeowners policy. Using the company's estimates, calculate the percentage of policyholders that will renew at least one policy next year.

5. A plane is missing and is presumed to have equal probability of going down in any of three regions. If the plane is actually down in region $i$, the probability is 0.9 that it will be found upon a search of region $i$. A search of region 1 has been performed and the plane was not found. Find the conditional probability that the plane is in

(a) Region 1
(b) Region 2
(c) Region 3