Exam 3 Practice Problems

Part 2 – Conditional Probability

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1. Given \( P(E) = 0.4, P(F) = 0.2 \) and \( P(E \cup F) = 0.5 \),
   (a) Are \( E \) and \( F \) independent?
   (b) Are \( E \) and \( F \) mutually exclusive?

2. Find \( P(B^c | A) \) from the Venn diagram:

3. Urn A has 3 blue and 4 green balls. Urn B has 4 blue and 3 green balls. A ball is chosen from urn A and placed in urn B. A ball is then chosen from urn B. What is the probability that the transferred ball was blue given that the ball drawn from urn B is blue?

4. A company has rated 75% of its employees as satisfactory and 25% is unsatisfactory. Personnel records indicate that 90% of those rated satisfactory had previous work experience and 40% of those rated unsatisfactory had previous work experience. What is the probability that an employee with previous work experience is unsatisfactory?

5. An urban area has 4 earthquake faults under it. The table below shows the probability that a particular fault will have a quake of magnitude 6 or greater in the next 20 years.

<table>
<thead>
<tr>
<th>Fault</th>
<th>Alpha</th>
<th>Beta</th>
<th>Gamma</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>probability</td>
<td>15%</td>
<td>13%</td>
<td>9%</td>
<td>8%</td>
</tr>
</tbody>
</table>

(a) What is the probability that none of the faults will have a quake in the next 20 years?
(b) What is the probability that exactly one of the faults will have a quake in the next 20 years?

6. Two fair six-sided dice are rolled. Given that the sum shown uppermost is five, what is the probability that a 3 is shown on one of the two dice?

7. Two cards are chosen in succession from a standard deck of 52 cards. Given that the second card is a heart, what is the probability that the first card was a diamond?