AP Statistics   **Probability Practice**

1. A fast food establishment has many different products for sale. Suppose that 60% of all customers order a hamburger of some kind, 12% purchase a milkshake, and 5% order both. If a customer is randomly selected, what is the probability that he or she ordered neither a hamburger nor a milkshake?

2. A large bakery has many different products for sale. Suppose that 70% of all customers of the bakery order donuts, 50% order cinnamon rolls, and 40% order both. If a customer is randomly selected, what is the probability that they ordered either donuts or cinnamon rolls but not both?

3. A local dealer has two video stores in a town, one located on Foothill Drive and the other one on Grand Avenue. The Foothill Drive store does 70% of the dealer's business in the town, and the Grand Avenue store does the rest. In the Foothill Drive store, 40% of all rentals are DVD's. At the Grand Avenue store, 30% of the rentals are DVD's. If a customer is elected at random, what is the approximate probability that the customer rented a DVD?

4. A car rental agency has two locations, one by the airport and the other downtown. The agency rents 70% of its cars at the airport and the rest downtown. At the airport, 20% of the rentals are SUV's. At the downtown location, 40% are SUV's. If a customer is selected at random, what is the probability that she did not rent an SUV?

5. Suppose that three candidates in the national presidential election Candidate A, Candidate B, and Candidate C—are running from three different regions of the country—Region 1, Region 2, and Region 3, respectively. If a candidate does not receive a majority (more than 50% of the vote that are cast), then the two candidates with the most votes are pitted against each other in a runoff election a few weeks later.

Based on previous results, Region 1 casts about 35% of all votes in the country. Polls indicate that Region 1 will cast about 70% of its votes for candidate A, 20% for Candidate B, and 10% for Candidate C.

Based on previous results, Region 2 casts about 50% of all votes in the country. Polls indicate that Region 2 will cast about 20% of its votes for candidate A, 60% for Candidate B, and 20% for Candidate C.

Based on previous results, Region 3 casts about 15% of all votes in the country. Polls indicate that Region 3 will cast about 25% of its votes for candidate A, 15% for Candidate B, and 60% for Candidate C.

(a) If the actual vote is in line with the preliminary estimates, will one of the candidates receive a majority of the votes? If not, which two candidates will be in the runoff election? Show your work that leads to your conclusion.

(b) What is the probability that a randomly selected voter came from Region 2, if it cast their ballot for Candidate A?

(c) Are voting for Candidate A and residing in Region 2 independent? You should be able to answer this question with no further work on your part.