3.5 Dependent Conditional Probability Assignment

1. Select the events that are dependent.
   A. Drawing a spade from a standard deck of 52 playing cards and then drawing another spade, without replacing the first card.
   B. Rolling a 2 and rolling a 5 with a pair of six-sided dice, numbered 1 to 6.
   C. Drawing an odd card from a standard deck of 52 playing cards, putting it back, and then drawing another odd card.
   D. Rolling an even number and rolling an odd number with a pair of six-sided dice, numbered 1 to 6.

2. Paul has four loonies, three toonies, and five quarters in his pocket. He needs two quarters for a parking meter. He reaches into his pocket and pulls out two coins at random. Determine the probability that both coins are loonies.
   \[
P(L_1 L_2) = P(L_1) \cdot P(L_2) = \frac{4}{12} \cdot \frac{3}{11} = 0.0909 = 9.1\%\]
   or \[\frac{4 \cdot 3}{12 \cdot 11} \quad \text{since order doesn't matter}\]

3. Two cards are drawn, without being replaced, from a standard deck of 52 playing cards. Determine the probability of drawing a face card then drawing an even-numbered card.
   \[
P(F \cap E) = P(F) \cdot P(E \mid F) = \frac{12}{52} \cdot \frac{20}{51} = \frac{20}{221} = 0.0905\]
   or \[\frac{12 \cdot 20 \cdot 5 \cdot 51}{52 \cdot 52} \quad \text{order matters}\]

4. Mrs. Johnson rolls a regular six-sided blue die and a regular six-sided orange die. If the blue die shows a 4 and the sum of the two dice is greater than 7, then Mrs. Johnson wins a point. To the nearest percent, the probability that Mrs. Johnson will win a point is \[0.0833\%\].
5. Connie Spins a spinner with equal sections numbered 1-8. She rolls a standard die. If the spinner lands on 3 and the sum of the two numbers is greater than 6, Connie wins a point. Determine the probability Connie will win a point.

\[
P(\text{spinner}) = \frac{1}{8} \quad P(\text{sum} > 6) = \frac{3}{6} = \frac{1}{2}
\]

\[
P(\text{spinner} \cap \text{sum} > 6) = \frac{1}{8} \times \frac{1}{2} = \frac{1}{16}
\]

6. Tony draws a card from a well shuffled deck of 52 playing cards. Then he draws another card from the deck without replacing the first. Determine the probability both are jacks.

\[
P(\text{J} \cap \text{J}) = \frac{4}{52} \times \frac{3}{51} = \frac{1}{221} \text{ or } 0.0045
\]

7. Cellphone users were surveyed about their phone plan with these results. 50% of users have a data plan. 70% of users with a data plan also have call display. What percent of cell phone users have a data plan and call display?

\[
P(\text{D} \cap \text{C}) = P(\text{D}) \times P(\text{C} | \text{D}) = 0.50 \times 0.70 = 0.35 = 35\%
\]

8. The probability that a plane will land on time is 0.85. The probability that a plane will leave Saskatoon on time and arrive in Vancouver on time is 0.7. The probability that a plane will arrive in Vancouver on time, given that it left Saskatoon on time is ______

\[
P(\text{S} | \text{V}) = \frac{P(\text{S} \cap \text{V})}{P(\text{V} | \text{S})} = \frac{0.70}{0.85} = 0.82 = 82\%
\]