1. A pair of dice, one red and one green, is rolled. What is the probability. 
\[ N(S) = 36 \]

\[ E = \{ (3,6), (6,3), (4,5), (5,4) \} \]

a) the sum of the two numbers is 9.
\[ P(\text{sum} = 9) = \frac{4}{36} = \frac{1}{9} \]

b) the sum is 9 if you know that the red die is a 4.
\[ P(\text{sum} = 9 \mid \text{red} = 4) = \frac{P(\text{sum} = 9 \text{ and red} = 4)}{P(\text{red} = 4)} = \frac{1/36}{1/36} = \frac{1}{1} = 1 \]

2. Suppose A and B are independent events with \( P(A) = 0.4 \) and \( P(B) = 0.6 \). Find each of the following.

a) \( P(\text{A \cap B}) = (0.4)(0.6) = 0.24 \)

b) \( P(\text{A} \mid \text{B}) = \frac{P(\text{A} \lor \text{B})}{P(B)} = \frac{0.24}{0.6} = 0.4 \)

c) \( P(\text{A} \lor \text{B}) = P(A) + P(B) - P(\text{A \cap B}) = 0.4 + 0.6 - 0.24 = 0.76 \)

d) \( P(\text{A} \mid \text{B}^c) = \frac{P(A \lor \text{B}^c)}{P(B^c)} = \frac{0.16}{0.4} = 0.4 \)