Probability Homework

1. Give an example of an event that has the probability of 0.
   The probability that you roll a 7 on a six-sided dice (sides 1-6).

2. Give an example of an event that has the probability of 1.
   The probability that you pick a green M&M from a bag of green M&M's.

3. Give the sample space for the spinner below if it is spun once and give the probability for each outcome.

   ![Spinner Diagram]

   \[ P(A) = \frac{1}{4} \quad P(C) = \frac{1}{4} \quad P(B) = \frac{1}{4} \]

   **Sample Space**
   The spinner sections A, B, C

4. When both the experimental and theoretical probabilities are possible to determine, will the probability for the same event ever be equal? Explain.
   Since theoretical probability is based upon a scenario that one could find experimental probability, these probabilities could possibly be equal.

5. a. If the probability of an event occurring is \( P(E) \), then the probability of the event not occurring is \( 1 - P(E) \). Explain why this makes sense.
   I means an event is certain to happen, or it is the sum of the probabilities for all events, so subtracting off the probability that one event would happen gives the sums of all the probabilities besides that event. In other words, the probability that something will happen other than that event.

   b. What is the probability of drawing an ace from a deck of 52 cards?
   \[ \frac{4}{52} = \frac{1}{13} \]

   c. What is the probability of **not** drawing an ace from a deck of 52 cards?
   \[ 1 - \frac{4}{52} = \frac{48}{52} = \frac{12}{13} \]

   d. What is the probability of **not** getting two heads on a toss of a penny and nickel?
   \[ 1 - \frac{1}{4} = \frac{3}{4} \]

   e. What is the probability of **not** getting a 5 on a toss of one die?
   \[ 1 - \frac{1}{6} = \frac{5}{6} \]
6. Using the following spinner, find the probability of each event.

\[ \text{a) } P(\text{red}) = \frac{1}{4} \]
\[ \text{b) } P(\text{green}) = \frac{2}{6} = \frac{1}{3} \]
\[ \text{c) } P(\text{red or blue}) = \frac{1}{4} + \frac{1}{2} - 0 = \frac{1}{2} \]
\[ \text{d) } P(\text{red and green}) = 0 \]
\[ \text{e) } P(\text{not blue}) = \frac{3}{4} \]

7. Create a tree diagram to determine the sample space. The breakfast at Pattie's Place has a choice of cereal, eggs, or French toast with a choice of milk, coffee or juice. How many choices are there?

There are nine choices.

8. From an ordinary deck of 52 cards, determine the probability of each.

\[ \text{a) A four or five } \frac{9}{52} + \frac{4}{52} - 0 = \frac{13}{52} = \frac{1}{4} \]
\[ \text{b) Three of clubs } \frac{1}{52} \]
\[ \text{c) A jack or a heart } \frac{3}{52} + \frac{13}{52} - \frac{1}{52} = \frac{15}{52} = \frac{3}{13} \]
\[ \text{d) A king of diamonds } \frac{1}{52} \]
\[ \text{e) A black ace or a red ace } \frac{2}{52} + \frac{2}{52} - 0 = \frac{4}{52} = \frac{1}{13} \]