

Psychology 2101
Homework 7
Fall, 2008

Comment. On page 170 in the textbook, when the probability of occurrence of “A or B” is discussed, it means, literally, “A or B or Both”, that is, $\Pr(A \cup B)$. For example, the probability of an Ace or a Club computed on page 171 includes the possibility of an Ace of Clubs. The Ace of Clubs is both an Ace and a Club.

1. (30 points). Suppose $\Omega = \{1, 2, 3, 4, 5, 6\}$, $A = \{1, 3, 4\}$, and $B = \{3, 5, 6\}$.

Find:

- a. $A - B$
- b. $B - A$
- c. $A \cap B$
- d. \bar{A}
- e. $\overline{A \cup B}$
- f. $\bar{A} \cap \bar{B}$
- g. $A \cup B$
- h. $\overline{A \cap B}$
- i. $\bar{A} \cup \bar{B}$
- j. $(A \cup B) - (A \cap B)$

2. (10 points). The probability that you are a female, a Democrat, or both is .80. The probability that you are a female is .50, and the probability that you are a Democrat is .50. What is the probability that you are both a female *and* a Democrat?

3. (10 points.) 27% of all people are Smurks, and all Smurfs are Nerds. In this case, we can definitely say that the probability that you are a Smurf and a Nerd is _____? (Support your reasoning with a Venn diagram.)

4. (10 points). You draw a card at random from a standard poker deck. What is the probability that the card you draw will be a face card (jack, king, or queen) or a heart?

5. (10 points). For each of the following, state whether or not the events are *mutually exclusive*? Justify your answers.

- a. Sally is tall. Sally is rich.
- b. Person A is male. Person A is female.
- c. Jamal gets an A in chemistry. Jamal makes the Dean's List.
- d. Herbert fails 3 courses. Herbert makes the Dean's list.
- e. Animal X has scales and gills. Animal X is a mammal.

6. (10 points). What is the probability of choosing a Jack or a seven in one draw from a standard poker deck?

7. (10 points). What is the probability of choosing club or a face card (or both) in one draw from a standard poker deck?

8. (10 points). Which of the following groups of events are *exhaustive* of all possibilities? For each, explain why or why not.

- a. You flip a coin. Heads, Tails
- b. You have a "normal" child. Boy, Girl
- c. You buy a house. The house cost between \$100,000 and \$200,000. The house cost more than \$200,000.
- d. You graduate from college. You receive a B.A. You receive a Ph.D.
- e. You purchase a car. It cost more than \$20,000. It cost less than or equal to \$20,000.