

Stat 50 – Worksheet #2: Operations on Events

1. Bowl 1 contains slips of paper numbered 1,2,8. Bowl 2 contains slips of paper numbered 3,4,7,9. One slip of paper is randomly selected from each bowl. One possible outcome of this experiment is that the 8 was drawn from Bowl 1 and the 7 drawn from Bowl 2; this outcome may be represented as the ordered pair, (8,7).
 - (a) Write out the sample space, \mathcal{S} for this experiment. (Note there are 12 possible outcomes in \mathcal{S} .)
 - (b) Let A be the event that both numbers drawn are even. List the outcomes in A .
 - (c) Let B be the event that at least one number is even. List the outcomes in B .
 - (d) Let C be the event that the sum of the numbers is more than 10. Let the outcomes in C .
 - (e) List the outcomes in $A \cap C$.
2. A number is randomly selected from the sample space below:

$$\mathcal{S} = \{2, 5, 7, 8, 17, 25, 100\}$$

Define events as follows:

A = the number under 10

B = the number is evenly divisible by 5

C = the number is even

Write out the outcomes in the following events:

- (a) A
- (b) B
- (c) A^C
- (d) $A \cap C$
- (e) $A \cup C$
- (f) $A^C \cap B^C$
- (g) Calculate $P(A \cup C)$ as the number of outcomes in the event $A \cup C$ divided by the number in the sample space, \mathcal{S}
- (h) Calculate $P(A \cup C)$ using the Addition Rule
 $P(A \cup C) = P(A) + P(C) - P(A \cap C)$ and compare it to your answer from the previous part.
 - (i) Are the events B and C mutually exclusive? Justify your answer using this specific sample space.

3. In a study of college students, data are collected on whether or not each subject lives on-campus and whether or not the subject studies in the library. 58% of the subjects live on campus and 40% study in the library. 25% live on campus and study in the library. What is the probability a randomly selected subject

- (a) lives off-campus
- (b) lives on-campus or studies in the library
- (c) lives on-campus and does not study in the library
- (d) neither lives on-campus nor studies in the library