

1. An experiment consists of drawing a single card from a standard deck of cards (no jokers). We'll use an abbreviation system like this: 3D is the three of diamonds, QH is the queen of hearts, and so on.
 - (a) How many outcomes are there? What do we call the set of all outcomes?
 - (b) Give the event E_1 of drawing a black face card, using the abbreviation system described. Remember that an event is a set - use appropriate notation.
 - (c) Give the event E_2 of drawing a card that is red *and* a number that is a multiple of five.
 - (d) Give the event E_3 of drawing a card that is red *or* a number that is a multiple of five, using ... where clear and appropriate to save some writing.
 - (e) Give $P(E_1)$, $P(E_2)$ and $P(E_3)$, the probabilities of events E_1 , E_2 and E_3 .

2. You are going to create a (not very secure!) password consisting of one of the digits 1, 2, 3, 4, 5 *followed by* one of the letters A, B, C.
- (a) How many such passwords are there?
 - (b) Thinking of the act of creating such a password as an experiment, give the sample space S .
 - (c) Give the event E_1 of creating a password that begins with an even digit.
 - (d) Give the event E_2 of creating a password that begins with a number less than or equal to three or whose letter is a vowel. (Remember what a vowel is?)
 - (e) Give the event E_3 of creating a password that begins with a number less than or equal to three and whose letter is a vowel.
 - (f) Give $P(E_1)$, $P(E_2)$ and $P(E_3)$.

3. A password is to consist of a letter of the alphabet followed by two of the digits zero through 9, then followed by three more letters of the alphabet, and ending with one of the characters #, \$, % or &. With regards to the letters, assume that *the password is case sensitive*.

(a) How many such passwords are there?

(b) What is the probability of creating a password beginning with a capital letter, followed by a digit that is a multiple of three, and whose three other letters are lower case abc, *in that order*.

(c) Should the probability of creating a password beginning with a capital letter, followed by a digit that is a multiple of three, and whose three other letters are lower case a, b, and c, *in any order* be greater, or less, than the probability you found in (b)?

(d) Find the actual probability for the sort of password described in (c).