1. Three six-sided dice are rolled. The six sides of each die are numbered 1 – 6. Let $A$ be the event that the first die shows an even number, let $B$ be the event that the second die shows an even number, and let $C$ be the event that the third die shows an even number. Also, for each $i = 1, \ldots, 6$, let $A_i$ be the event that the first die shows the number $i$, let $B_i$ be the event that the second die shows the number $i$, and let $C_i$ be the event that the third die shows the number $i$. Express each of the following events in terms of the named events described above:

a. The event that all three dice show even numbers.
b. The event that no die shows an even number.
c. The event that at least one die shows an odd number.
d. The event that at most two dice show odd numbers.
e. The event that the sum of the three dices is no greater than 5.

2. A power cell consists of two subcells, each of which can provide from 0 to 5 volts, regardless of what the other subcell provides. The power cell is functional if and only if the sum of the two voltages of the subcells is at least 6 volts. An experiment consists of measuring and recording the voltages of the two subcells. Let $A$ be the event that the power cell is functional, let $B$ be the event that two subcells have the same voltage, let $C$ be the event that the first subcell has a strictly higher voltage than the second subcell, and let $D$ be the event that the power cell is not functional but needs less than one additional volt to become functional.

a. Define a sample space $S$ for the experiment as a set of ordered pairs that makes it possible for you to express the four sets above as events.
b. Express each of the events $A, B, C, \text{ and } D$ as sets of ordered pairs that are subsets of $S$.
c. Express the following set in terms of $A, B, C, \text{ and/or } D$:

$$\{(x, y) : x = y \text{ and } x + y \leq 5\}.$$