Assignment 1

AI1110: Probability and Random Variables
Indian Institute of Techonology Hyderabad

M Srimannarayana
CS22BTECH11038

10.13.3.36: Question. Two dice are thrown at the same time. Determine the probability that the difference of the numbers on the two dice is 2
Answer: $\frac{8}{36}$.

When 2 dice are rolled, each die will have 6 outcomes and the events are independent so,the total number of outcomes are 36

Let the event that difference between the numbers on the dice is 2 be E.

Let us assume a be the outcome of first die and b be the outcome of second die

To satisfy the event E

$$a - b = 2 \tag{1}$$

(or)

$$b - a = 2 \tag{2}$$

Total number of favourable outcomes for event E will be the total number of ordered pairs (a, b) satisfying (1) or (2)

Consider (1)

$$a - b = 2$$
$$a = b + 2$$

For every value of a satisfying (1) there exist exactly one b

$$a \leq 6$$
$$b + 2 \leq 6$$
$$b \leq 4$$

Therefore b can take values from 1 to 4.
so, number of solutions of (1) are 4

By symmetry, the number of solutions of (2) are 4

Therefore,total number of outcomes satisfing event E are 8.

$$P(E) = 8/36$$

Two dice are thrown at the same time the probability that the difference of the numbers on the two dice is 2 is $\frac{8}{36}$