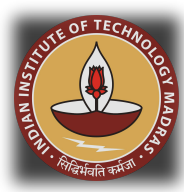


Essentials of Data Science with R software -1

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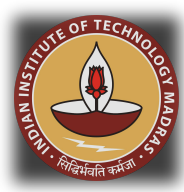


Probability

1. **Sample space** : set of all outcomes of an experiment
2. Range of probability : [0 - 1]
3. Sum of all possible outcomes = 1

$$\text{Probability}(\text{outcome}) = \frac{\text{outcome frequency}}{\text{no.of trails}}$$

When no.of trails tends to infinity we assume the probability of the outcome will converge to the limiting value.



Probability multiple events

- Probability that Dhoni play the last over and hit a six in the last over ??

$$P(D, H) ; P(D, H, B, S, \dots)$$

- Probability that i fail exam and question paper is easy ?

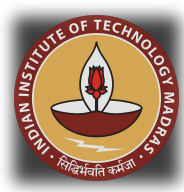
$$P(e, f)$$

$$P(x_1, x_2, \dots, x_n)$$

- Probability of my clothes drying and it rains/ sunny ?

$$P(d, r) ; P(d, s)$$

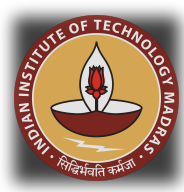
↑



Conditional Probability

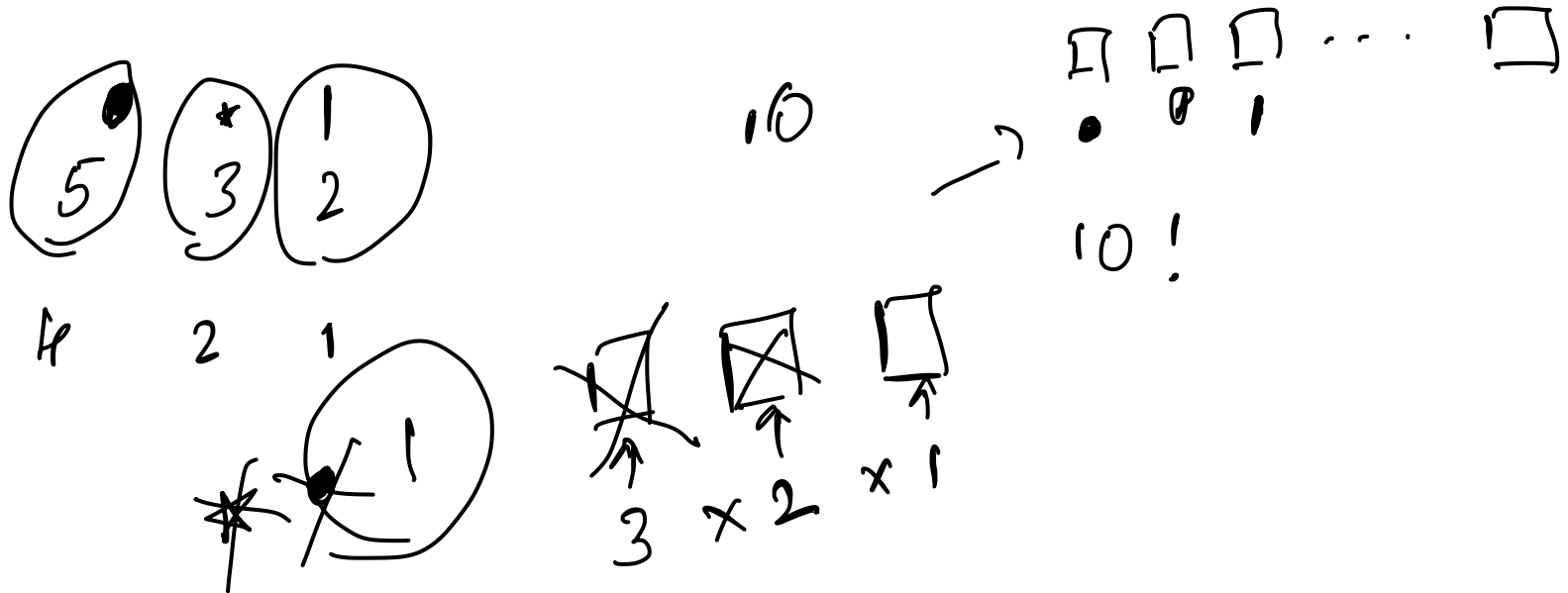
- Probability that Dhoni hits a six in the last over given the bowler is ~~Sharma~~ ^{Bumrah} ??
- Probability that i fail exam given the question paper is easy ?
- Probability of my clothes drying when it rains/ sunny ?

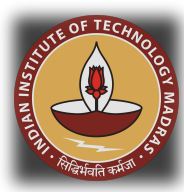
$P(\text{Cover} / \text{iPhone})$



Examples

- A QR code is labelled by printing with five thick dots, three medium stars, and two thin lines. If each ordering of the ten symbols represents a different label, how many different labels can be generated by using this scheme?





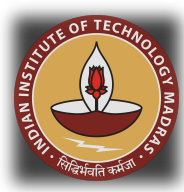
Examples

- **A party has eight boxes. If six identical balls are to be placed in these boxes, how many different combinations are possible?**



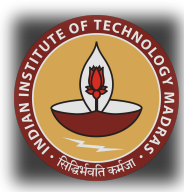
Examples

- **The probabilities that a person can speak Tamil or Telugu are 0.2 and 0.3, respectively. The probability that a person can speak both Tamil or Telugu is 0.38. A person is randomly stopped and investigated. What is the probability that the person will know Tamil and Telugu ?**



Examples

- **A news channel broadcasts 850 news articles per day and 50 of them are fake. Two news articles are selected randomly without replacement. What is the probability that the second part is fake, given that the first part is fake?**

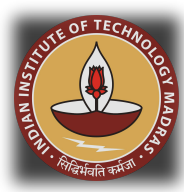


Examples

- An student figures that there is a 20% chance that her/his teacher will set up an exam today. If the teacher does, the student is 80% certain that she/he will score 100% of marks. What is the probability that the student will score 100% marks ?

$$P(B) = 0.2$$

$$\begin{aligned} P(A \cap B) &= P(A|B) P(B) \\ &= 0.8 \times 0.2 = 0.16 \end{aligned}$$



Examples

$$S = \{ (H, H), (H, T), (T, T), (T, H) \}$$

$$P(H \geq 1) = 1 - P(H = 0)$$



Examples



Examples