talent sprint | Indian Institute of Science भारतीय विज्ञान संस्थान

1. Explain what is meant by random variables and the types of random variables.

2. Let X be a binomial random variable with parameters (12, 0.5). Find the variance and the standard deviation of X.

3. Calculate the variance for these final exam scores.

24, 58, 61, 67, 71, 73, 76, 79, 82, 83, 85, 87, 88, 88, 92, 93, 94, 97

4. You roll two fair dice. Find the probability that the first die is a 4 given that the sum is 7.

5. At a certain university, 4% of men are over 6 feet tall and 1% of women are over 6 feet tall. The total student population is divided in the ratio 3:2 in favour of women. If a student is selected at random from among all those over six feet tall, what is the probability that the student is a woman?

6. The proportion of people in a given community who have a certain disease is 0.005. A test is available to diagnose the disease. If a person has the disease, the probability that the test will produce a positive signal is 0.99. If a person does not have the disease, the probability that the test will produce a positive signal is 0.01. If a person tests positive, what is the probability that the person actually has the disease?

7. Of the microprocessors manufactured by a certain process, 20% are defective. Five microprocessors are chosen at random. Assume they function independently. What is the probability that they all work?

8. At an e-commerce customer service center a total of 112 complaints were received. 78 customers complained about late delivery of the items and 40 complained about poor product quality. (a) Calculate the probability that a customer complaint will be about both late delivery and product quality. (b) What is the probability that a complaint is only about poor quality of the product?