CHAPTER TEST: PROBABILITY

Mathematics | Class IX | (2026/PROBAB/09/001)

Time: 1.5 Hours **Max. Marks: 40**

General Instructions:

- All questions are compulsory.
- Section A contains 8 MCQs of 1 mark each.
- Section B contains 4 questions of 2 marks each.
- Section C contains 3 questions of 3 marks each.
- Section D contains 2 questions of 5 marks each.
- Use of calculators is strictly prohibited.

Section A: Multiple Choice Questions (8 Marks)

1. The probability of an event happening is p. The probability of the event not happening is:
   (a) $p - 1$
   (b) $1 - p$
   (c) $1 - \frac{1}{p}$
   (d) $1 + p$

2. Which of the following cannot be the probability of an event?
   (a) $\frac{2}{3}$
   (b) -1.5
   (c) 15%
   (d) 0.7

3. A die is thrown once. The probability of getting a prime number is:
   (a) $\frac{1}{2}$
   (b) $\frac{1}{3}$
   (c) $\frac{1}{6}$
   (d) $\frac{2}{3}$

4. A bag contains 3 red, 5 black and 7 white balls. A ball is drawn from the bag at random. The probability that the ball drawn is not black is:
   (a) $\frac{1}{3}$
   (b) $\frac{9}{15}$
   (c) $\frac{5}{15}$

(d) $\frac{2}{3}$

5. In 1000 trials of a coin toss, heads appeared 455 times. The experimental probability of getting a tail is:

   (a) 0.455
   (b) 0.545
   (c) 0.555
   (d) 0.445

6. If $P(E) = 0.37$, then $P(\text{not } E)$ is:

   (a) 0.37
   (b) 0.73
   (c) 0.63
   (d) 0.53

7. A survey of 200 students showed that 135 like kabaddi while 65 do not. The probability that a student chosen at random does not like kabaddi is:

   (a) $\frac{13}{40}$
   (b) $\frac{27}{40}$
   (c) $\frac{13}{20}$
   (d) $\frac{27}{20}$

8. The sum of the probabilities of all events of an experiment is:

   (a) 0
   (b) 1
   (c) 0.5
   (d) Any value between 0 and 1

Section B: Very Short Answer Questions (8 Marks)

1. A coin is tossed 500 times with the following frequencies: Head: 245, Tail: 255. Compute the probability for each event.

2. Define "Sample Space" and provide the sample space for tossing two coins simultaneously.

3. A box contains 80 light bulbs, out of which 10 are defective. If a bulb is picked at random, find the probability that it is not defective.

4. Can the experimental probability of an event be greater than 1? Justify your answer in one sentence.

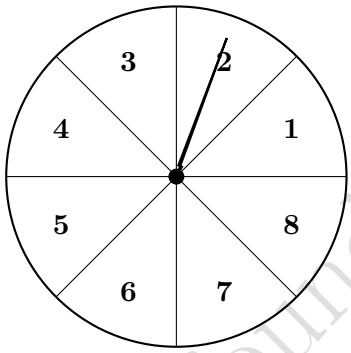
Section C: Short Answer Questions (9 Marks)

1. A die is thrown 1000 times with the frequencies for the outcomes 1, 2, 3, 4, 5 and 6 as given in the following table:

Outcome	1	2	3	4	5	6
Frequency	179	150	157	149	175	190

   Find the probability of getting an outcome: (i) less than 3, (ii) an even number.

2. Consider the spinning wheel shown below. If the pointer is spun, find the probability that it stops on: (i) A prime number, (ii) A number divisible by 3.



3. Three coins are tossed simultaneously 200 times with the following frequencies of different outcomes:

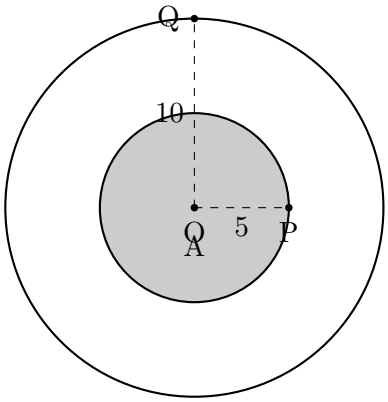
Outcome	3 heads	2 heads	1 head	No head
Frequency	23	72	77	28

   Compute the probability of getting (i) exactly 2 heads, (ii) at least 2 heads.

Section D: Long Answer Questions (10 Marks)

1. A weather station record shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times.
   (a) What is the probability that on a given day it was correct?
   (b) What is the probability that it was not correct?
   (c) If for the next month (30 days), the station maintains the same accuracy, how many days is the forecast expected to be wrong?

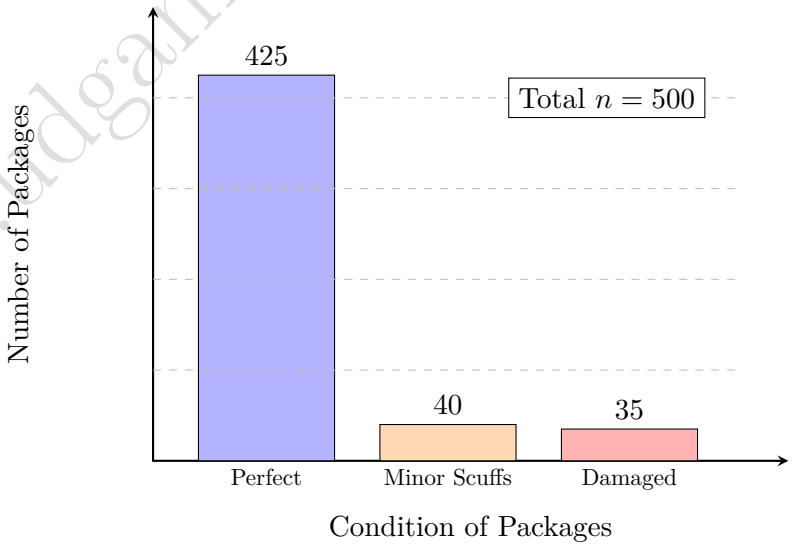
2. A target is shown below consisting of two concentric circles of radii 5 cm and 10 cm. A dart is thrown at the target. Assuming the dart hits the larger circle at a random point: (i) Find the probability that the dart hits the inner shaded region. (ii) Find the probability that the dart hits the outer non-shaded ring. (Note: Use the concept of area to find theoretical probability).



Section E

Case Study:

The history of probability began with games, but modern scope extends to industrial precision. At a local logistics hub, a quality manager conducts an experimental study on parcel deliveries to determine the empirical probability of damage. Over a thirty-day period, the facility processed exactly five hundred fragile packages. The manager recorded that four hundred twenty-five packages arrived in perfect condition, while forty packages sustained minor external scuffs, and the remaining packages were classified as significantly damaged. This data collection allows students to analyze the likelihood of future outcomes based on observed frequencies rather than just theoretical assumptions. By calculating the ratio of specific outcomes to the total trials, we transition from simple counting to predictive mathematics. Understanding these ratios helps the company improve packaging standards and provides a practical application of elementary probability concepts.



Multiple Choice Questions

1. Which of the following best describes the probability calculated in this case study?

(a) Theoretical Probability

(b) Subjective Probability

(c) Experimental (Empirical) Probability

(d) Geometric Probability

2. Based on the manager's recorded data, what is the total number of packages classified as "significantly damaged"?

   (a) 35

   (b) 75

   (c) 40

   (d) 15

3. What is the empirical probability that a randomly selected package from this study arrived in "Perfect" condition?

   (a) 17/20

   (b) 425/100

   (c) 1/500

   (d) 85/100

4. If the logistics hub processes 2,000 packages next month, based on this experiment, how many packages are expected to have "Minor Scuffs"?

   (a) 40

   (b) 160

   (c) 120

   (d) 80

5. Let $P(E)$ be the probability of a package being damaged. Which mathematical statement regarding the sum of probabilities of all possible elementary events in this experiment is true?

   (a) Sum > 1

   (b) Sum < 1

   (c) Sum $= 1$

   (d) Sum $= 0$