

CHAPTER-15

Probability

Task-1: Worksheet

Topic	Probability
Nature of Task	Content Oriented
Learning Objective	<ul style="list-style-type: none">• To understand the commonly used word 'probability' in Mathematical sense.• To be able to explain the key terms like random experiment, sample, space, events, outcomes, favourable and unfavourable outcomes.• To calculate probability using formula.
Execution of Task	Teacher may write these questions on board and discuss the answers after 10 minutes. After the completion of worksheet students can exchange them and check each other's worksheet with the inputs given by teacher.
Duration	1 Period
Criteria for Assessment	Students can exchange papers and award marks to each other.
Follow up	Discussion on incorrect response can be followed by home assignment carrying similar questions or the questions based on the same concepts.



Worksheet

- Write all possible outcomes when
 - one coin is tossed
 - two coins are tossed
 - one die is rolled.
- Three coins are tossed simultaneously 100 times. The following outcomes are recorded.

Outcome	3 tails	two tails	one tail	no tail
Frequency	23	28	23	26

Find the probability of coming up more than one tail.
- An experiment is conducted. Probabilities of an event are calculated by some students. Which of the following could be a correct answer ?

A. $\frac{5}{4}$ B. $\frac{1}{3}$ C. $-\frac{2}{3}$ D. 1.3
- A die is rolled 300 times and the following outcomes are recorded.

Outcome	1	2	3	4	5	6
Frequency	42	60	55	53	60	30

 - Find the probability of getting an even number
 - Find the probability of getting a number more than 4.

Follow up : Home Assignment

- Define a sample space.
- What is a random experiment ? Explain.
- Give some examples of statements involving probabilistic situations.
- The probability of occurrence of an event = _____.
- Two coins are tossed 200 times and the results are given below:

Both Head	One Head & One Tail	Both Tails
56	96	48

- What is the probability of the event "Both Heads"?
- What is the probability of the event "Both Tails"?



6. What are the limits of probability of occurrence of an event.

7. At a crossing, 1000 vehicles passed on a particular day:

Two wheelers
310

Three wheelers
270

four wheelers
420

(a) What is the probability of a two wheeler passing from that crossing on a day?

(b) $P(\text{A three wheeler}) =$ _____.

(c) $P(\text{A four wheeler}) =$ _____.

Task-2: MCQ Worksheet

Topic	Probability
Nature of Task	Content Oriented
Content Coverage	Empirical Probability
Learning Objective	<ul style="list-style-type: none"> To define and to calculate empirical/ experimental probability. To differentiate between empirical and mathematical probability. To appreciate that probability of an event lies between 0 and 1.
Execution of Task	Teacher can conduct a 20 minutes MCQ.
Duration	1 Period
Criteria for Assessment	For correct response 1 mark can be given.
Follow up	Discussion on MCQ can be followed by An Activity where there can actually conduct an experiment to show outcomes and to calculate the probability can ask the students to perform different experiment (e.g. with dice) to verify and to understand the formula of empirical probability thoroughly.



Multiple Choice Questions

1. A coin is tossed 1000 times and 560 times a "head" occurs. The empirical probability of occurrence of a Head in this case is

A. 0.5 B. 0.56 C. 0.44 D. 0.056

2. Two coins are tossed 200 times and the following out comes are recorded

HH	HT/TH	TT
56	110	34

What is the empirical probability of occurrence of at least one Head in the above case

A. 0.33 B. 0.34 C. 0.66 D. 0.83

A die is thrown 200 times and the following outcomes are noted, with their frequencies:

Outcome	1	2	3	4	5	6
Frequency	56	22	30	42	32	18

3. What is the empirical probability of getting a 1 in the above case.

A. 0.28 B. 0.22 C. 0.15 D. 0.21

4. What is the empirical probability of getting a number less than 4 ?

A. 0.50 B. 0.54 C. 0.46 D. 0.52

5. What is the empirical probability. of getting a number greater than 4.

A. 0.32 B. 0.25 C. 0.18 D. 0.30

6. On a particular day, the number of vehicles passing a crossing is given below :

Vehicle	Two wheeler	Three wheeler	Four wheeler
Frequency	52	71	77

What is the probability of a two wheeler passing the crossing on that day ?

A. 0.26 B. 0.71 C. 0.385 D. 0.615

7. The following table shows the blood-group of 100 students

Blood group	A	B	O	AB	B ⁺
Number of Students	12	23	35	20	10

One student is taken at random. What is probability that his blood group is B⁺

A. 0.12 B. 0.35 C. 0.20 D. 0.10

8. In a bag, there are 100 bulbs out of which 30 are bad ones. A bulb is taken out of the bag at random. The probability of the selected bulb to be good is

A. 0.50 B. 0.70 C. 0.30 D. None of these



9. On a page of telephone directory having 250 telephone numbers, the Frequency of the unit digits of those number are given below :

0	1	2	3	4	5	6	7	8	9
18	22	32	28	40	30	30	22	18	10

A telephone number is selected from the page at random. What is the probability that its unit digit is

(a) 2

- A. 0.16 B. 0.128 C. 0.064 D. 0.04

(b) More than 6

- A. 0.20 B. 0.25 C. 0.32 D. 0.16

(c) less than 2

- A. 0.16 B. 0.18 C. 0.22 D. 0.32

SUGGESTIVE PROBABILITY ACTIVITY

Activity: Toss two coins simultaneously 20 times and record your observations in the following table

No. of times the two coins are tossed	20
No. of times no head comes up	
No. of times one head comes up	
No. of times two heads come up	

Calculate

$$A = \frac{\text{No. of times no head come up}}{\text{Total no. of times two coins are tossed}} = \frac{\boxed{}}{\boxed{}}$$

$$B = \frac{\text{No. of times one head come up}}{\text{Total no. of times two coins are tossed}} = \frac{\boxed{}}{\boxed{}}$$

$$C = \frac{\text{No. of times two heads come up}}{\text{Total no. of times two coins are tossed}} = \frac{\boxed{}}{\boxed{}}$$

The experimental or empirical probability

P (E) of an event E is given by

$$P(E) = \frac{\text{Number of trials in which event E happened}}{\text{The total number of trials}}$$



Task-3: Remedial Worksheet

Q.1. A coin is tossed 1000 times; with the following out comes :

Heads: 455, tails : 545

Compute the probability for each event.

$$P(\text{getting Heads}) = \frac{\boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$$

$$P(\text{getting Tails}) = \frac{\boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$$

What is

$$P(\text{getting Heads}) + P(\text{getting Tails}) = \boxed{} + \boxed{} = \underline{\hspace{2cm}}$$

Note : Head and Tail are only two possible outcomes of each trial.

Important Points to Note :

1. The probability of an event lies between 0 and 1.
2. The sum of all the probabilities of all possible outcomes of an experiment is 1.

Q.2. Consider the following data.

Bag	1	2	3	4	5
Balls	40	48	42	39	41

There are 5 bags in all containing number of balls mentioned above respectively. What is the probability of having more than 40 balls in a bag ?

Observe : In how many bags there are more than 40 balls ?

$$\boxed{} \text{ {Hint : Observe bag 2, 3, 5}}$$

$$\text{So, } P(\text{having more than 40 balls in a bag}) = \frac{\boxed{}}{\boxed{5}} \text{ {There are total 5 bags}}$$

$$= \underline{\hspace{2cm}}.$$



Task-4: Oral Assessment

Topic	Probability
Nature of Task	Post Content
Content Coverage	All Concepts Learn in Topic
Learning Objective	<ul style="list-style-type: none"> To tell the probability of a given event using given frequency distribution table. To understand that sum of the probabilities of all possible outcomes of an experiment is unity. To assess the students understanding and proficiency to apply all the concepts learnt in the 'probability'
Execution of Task	Teacher can conduct an oral assessment in the class. Every student can be called individually and can be asked 4 to 5 questions and can be graded according to rubric discussed for oral assessment. At the time of oral assessment other students can be given a simple worksheet and a reference concept sheet so that they get time to revise their concepts thoroughly. These sheets may not be graded.
Duration	1-2 Periods
Criteria for Assessment	For correct response 1 mark can be given and for incorrect response no marks.

Suggestive Oral Questions

1. Illustrate some events which relate to probability.
2. What is a random experiment ?
3. What is an event ?
4. What is an out come?
5. What is the difference between experimental probability and mathematical probability.
6. Is it correct to say that Probability of occurrence of an event

$$= \frac{\text{No. of cases favourable to an event}}{\text{Total number of cases}}$$

7. If a coin is tossed 100 and the event "head" occurs 60 lines, what is the experimental probability of occurrence of a Head ?



