SAMPLE CONTENT

MATHEMATICS PART- I

BASED ON NEW SYLLABUS

STD. X

(ENG. MED.)

Target Publications Pvt. Ltd.

Written as per the new syllabus prescribed by the Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune.

Mathematics Part – I

STD. X

SAMPLE CONTENT

Salient Features

- Written as per the new textbook.
- Exhaustive coverage of entire syllabus.
- Topic-wise distribution of textual questions and practice problems at the beginning of every chapter.
- Covers solutions to all Practice Sets and Problem Sets.
- Includes additional activities for practice.
- Includes additional problems and MCQs for practice.
- Indicative marks for all problems.
- Chapter-wise assessment for every chapter.
- Model Question Paper in accordance with the latest paper pattern.
- Includes Board Question Paper of March 2019.

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PREFACE

Creation of the **'Mathematics Part - I'** book was a rollercoaster ride. We had a plethora of ideas, suggestions and decisions to ponder over. However, our basic premise was to keep this book in line with the new, improved syllabus and to provide students with an absolutely fresh material.

Mathematics Part - I covers several topics including Arithmetic Progression, Quadratic Equations, Linear Equations in Two Variables, Financial Planning, Probability and Statistics. The study of these topics requires a deep and intrinsic understanding of concepts, terms and formulae. Hence, to ease this task, we present **'Std. X: Mathematics Part - I' –** a complete and thorough guide, extensively drafted to boost the confidence of students.

For better understanding of different types of questions, Topic-Wise Distribution of Textual Questions and Practice Problems have been provided at the beginning of every chapter. Before each Practice Set, short and easy explanation of different concepts with illustrations for better understanding is given. Solutions and Answers to Textual Questions and Examples are provided in a lucid manner.

'Textual Activities' covers all the Textual Activities and Projects along with their answers.

'Multiple Choice Questions' and 'Additional Problems for Practice' include multiple unsolved problems for revision and in the process help the students to sharpen their problem solving skills. 'Solved examples' from textbook are also included in the book.

Every chapter ends with a 'Chapter Assessment'. This test stands as a testimony to the fact that the child has understood the chapter thoroughly.

'Activities for practice' includes additional activities along with their answers for the students to practice.

'Challenging Questions' include questions that fall out of the textbook, yet are core to the concerned subject. These questions would prepare the students for the Four Mark Questions that are supposed to be asked in the examination from outside the textbook.

Marks are provided for each and every problem. However, marks mentioned are indicative and are subject to change as per Maharashtra State Board's discretion.

Since according to the paper pattern, 20% weightage is accorded to the Std. IX syllabus, we have aptly included them in a separate chapter i.e. 'One mark and Two marks questions (from Std. IX)'.

'Model Question Paper' based on the pattern prescribed by the State Board is provided at the end to help the students prepare for written examination.

The journey to create a complete book is strewn with triumphs, failures and near misses. If you think we've nearly missed something or want to applaud us for our triumphs, we'd love to hear from you.

Please write to us on : mail@targetpublications.org

A book affects eternity; one can never tell where its influence stops.

Best of luck to all the aspirants!

From,
Publisher

Edition: Second

Disclaimer

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This work is purely inspired upon the course work as prescribed by the Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune. Every care has been taken in the publication of this reference book by the Authors while creating the contents. The Authors and the Publishers shall not be responsible for any loss or damages caused to any person on account of errors or omissions which might have crept in or disagreement of any third party on the point of view expressed in the reference book.

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SAMPLE CONTENT

Evaluation Scheme

Academic year 2018 - 2019 and onwards

Mathematics - Part I	40 Marks	Written Examination	Time: 2 hours
Mathematics - Part II	40 Marks	Written Examination	Time: 2 hours
Internal Evaluation	20 Marks		
Total	**100 Marks**		

The scheme of internal evaluation will be as follows.

Aggregate of marks of tests of Maths - Part I and Maths - Part II	10 (converted marks)
Marks of practicals on Maths - Part I	5
Marks of practicals on Maths - Part II	5
Total marks of internal evaluation	**20**

- In the academic year, two unit tests (Mathematics - Part I, 20 + 20 marks; Mathematics - Part II, 20 + 20 marks) will be conducted. The aggregate marks of the two tests will be converted into 10 marks.

PAPER PATTERN

Question No.	Type of Questions	Total Marks	Marks with option
1.	(A) Solve 4 out of 6 subquestions (1 mark each)	04	06
	(B) Solve 2 out of 3 subquestions (2 marks each)	04	06
2.	(A) Solve 4 out of 4 MCQ (1 mark each)	04	04
	(B) Solve 2 out of 3 subquestions (2 marks each)	04	06
3.	(A) Solve activity based 2 subquestions out of 3 (2 marks each)	04	06
	(B) Solve 2 out of 3 subquestions (2 marks each)	04	06
4.	Solve 3 out of 4 subquestions (3 marks each)	09	12
5.	Solve 1 out of 2 subquestions (4 marks each)	04	08
6.	Solve 1 out of 2 subquestions (3 marks each)	03	06
	Total Marks	**40**	**60**

Note: The subquestions in Q. No.1 will be based on syllabus of Std. IX.

SAMPLE CONTENT

The division of marks in question papers as per objectives will be as follows.

Mathematics - Part I	
Objectives	Percentage of marks
Previous knowledge	20
Knowledge and understanding	30
Application	40
Skill	10

Mathematics - Part II	
Objectives	Percentage of marks
Previous knowledge	20
Knowledge and understanding	30
Application	30
Skill	20

[**Reference**: महाराष्ट्र राज्य पाठ्यपुस्तक निर्मिती व अभ्यासक्रम संशोधन मंडळ, पुणे निर्मित मूल्यमापन आराखडा]

[**P.S.** Scan this **Q.R. Code** to get a better understanding of the Paper Pattern.**]**

Contents

No.	Topic Name	Page No.
1	Linear Equations in Two Variables	1
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	Board Question Paper – March 2019	242

Solved examples from textbook are indicated by "+".

SAMPLE CONTENT

5 Probability

Type of Problems	Practice set	Q. Nos.
Random experiment and its outcome	5.1	Q.1
	Practice Problems (Based on Practice Set 5.1)	Q.1, 2, 3
Sample space and number of sample points	5.2	Q. 1 to Q. 4
	Practice Problems (Based on Practice Set 5.2)	Q. 1, 2, 3
Events and number of elements in the event	5.3	Q.1
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Probability of an event	5.4	Q.1 to Q.5
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	Problem Set – 5	Q.2 to Q.17

Let's Study

Random Experiment

An experiment in which all possible results are known in advance, but none of them can be predicted with certainty and there is equal possibility for each result is called as a 'Random experiment'.

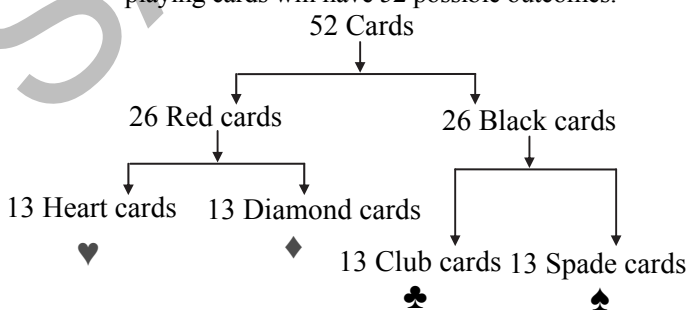
Example:
Tossing a coin, throwing a die, drawing a card from a pack of well shuffled playing cards, etc.

Outcome

The result of a random experiment is called an outcome.

Examples:

i. Tossing a coin will have two possible outcomes – 'Head' (H) or 'Tail' (T).
ii. Throwing a die will have six possible outcomes 1, 2, 3, 4, 5 or 6.
iii. Drawing a card from a pack of well shuffled playing cards will have 52 possible outcomes.



In a pack of playing cards, there are four sets (decks) namely Heart, Diamond, Club and Spade.

Each set has 13 cards. They include an ace card (A), a King (K), a Queen (Q), a Jack (J) and 9 number cards (i.e. 2, 3, 4, 5, 6, 7, 8, 9, 10).

4 Kings, 4 Queens, 4 Jacks are face cards. Thus, they are 12 face cards in a pack of cards.

Note : Ace cards are not counted as face cards.

Equally likely outcomes

A given number of outcomes are said to be equally likely if none of them occurs in preference to others.

Example:

If a coin is tossed, possibilities of getting a head or tail are equal. i.e.,these are equally likely outcomes.

But by tossing a coin if we get same surface frequently, then that coin is biased. In this case the outcomes are not likely to occur equally.

Note:

In a random experiments, we assume that objects used are fair or unbiased.

SAMPLE CONTENT

Try This

1. In which of the following experiments possibility of expected outcome is more?

(Textbook pg. no. 116)

i. Getting 1 on the upper face when a die is thrown.

ii. Getting head by tossing a coin.

Solution:

i. On a die there are 6 numbers.

∴ There are 6 possibilities of getting any one number from 1 to 6 on the upper face i.e. $\frac{1}{6}$ is the possibility.

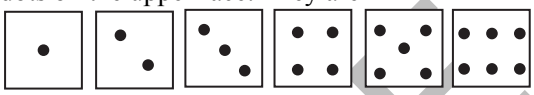
ii. There are two possibilities (H or T) on tossing a coin i.e. $\frac{1}{2}$ possibility.

∴ **In the second experiment, the possibility of expected outcome is more.**

Textual Activity

1. Throw a die, once. What are the different possibilities of getting dots on the upper face? (Textbook pg. no. 114)

Ans: There are six different possibilities of getting dots on the upper face. They are



Practice Set 5.1

1. How many possibilities are there in each of the following? [1 Mark each]

i. Vanita knows the following sites in Maharashtra. She is planning to visit one of them in her summer vacation. Ajintha, Mahabaleshwar, Lonar Sarovar, Tadoba wild life sanctuary, Amboli, Raigad, Matheran, Anandavan.

ii. Any day of a week is to be selected randomly.

iii. Select one card from the pack of 52 cards.

iv. One number from 10 to 20 is written on each card. Select one card randomly.

Solution:

i. Here, 8 sites of Maharashtra are given.

∴ There are 8 possibilities in a random experiment of visiting a site out of 8 sites in Maharashtra.

ii. There are 7 days in a week.

∴ There are 7 possibilities in a random experiment of selecting a day of the week.

iii. There are 52 cards in a pack of cards.

∴ There are 52 possibilities in a random experiment of selecting one card from the pack of 52 cards.

iv. There are 11 cards numbered from 10 to 20.

∴ There are 11 possibilities in a random experiment of selecting one card from the given set of cards.

Let's Study

Sample Space

The set of all possible outcomes of a random experiment is called sample space.

It is denoted by 'S' or 'Ω' (omega).

Each element of a sample space is called a sample point.

The number of elements in the set S is denoted by n(S).

If n(S) is finite, then the sample space is called a finite sample space.

Some examples of finite sample space.

(Textbook pg. no. 117)

Sr. No.	Random experiment	Sample space	Number of sample points in S
1.	One coin is tossed.	S = {H,T}	n(S) = 2
2.	Two coins are tossed.	S = {HH, HT, TH, TT}	n(S) = 4
3.	Three coins are tossed.	S = {HHH, HHT, HTH, THH, HTT, THT, TTH, TTT}	n(S) = 8
4.	A die is thrown.	S = {1, 2, 3, 4, 5, 6}	n(S) = 6

SAMPLE CONTENT

5.	Two dice are thrown.	S = {(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)}	n(S) = 36
6.	A card is drawn from a pack bearing numbers from 1 to 25.	S = {1, 2, 3, 4, ……,25}	n(S) = **25**
7.	A card is drawn from a well shuffled pack of 52 playing cards.	**Diamond:** Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King **Spade:** Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King **Heart:** Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King **Club:** Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King	n(S) = 52

Remember This

i. The sample space for a coin tossed twice is the same as that of two coins tossed simultaneously. The same is true for three coins.

ii. The sample space for a die rolled twice is the same as two dice rolled simultaneously.

Practice Set 5.2

1. For each of the following experiments write sample space 'S' and number of sample points n(S). [1 Mark each]

i. One coin and one die are thrown simultaneously.

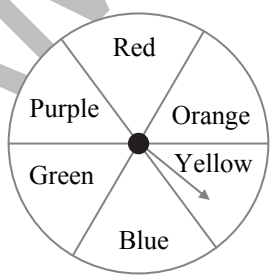
ii. Two digit numbers are formed using digits 2, 3 and 5 without repeating a digit.

Solution:

i. Sample space,
S = {(H, 1), (H, 2), (H, 3), (H, 4), (H, 5), (H, 6), (T, 1), (T, 2), (T, 3), (T, 4), (T, 5), (T, 6)}
∴ n(S) = 12

ii. Sample space,
S = {23, 25, 32, 35, 52, 53}
∴ n(S) = 6

2. The arrow is rotated and it stops randomly on the disc. Find out on which colour it may stop. [1 Mark]



Solution:

There are total six colours on the disc.
Sample space,
S = {Red, Orange, Yellow, Blue, Green, Purple}
∴ n(S) = 6
∴ **Arrow may stop on any one of the six colours.**

3. In the month of March 2019, find the days on which the date is a multiple of 5. (see the given page of the calendar). [1 Mark]

MARCH - 2019						
M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Solution:

Dates which are multiple of 5:
5, 10, 15, 20, 25, 30
∴ S = {Tuesday, Sunday, Friday, Wednesday, Monday, Saturday}
∴ n(S) = 6
∴ **The days on which the date will be a multiple of 5 are Tuesday, Sunday, Friday, Wednesday, Monday and Saturday.**

4. Form a 'Road safety committee' of two, from 2 boys (B_1, B_2) and 2 girls (G_1, G_2). Complete the following activity to write the sample space. [2 Marks]

Solution:

i. Committee of 2 boys = $\boxed{B_1B_2}$

ii. Committee of 2 girls = $\boxed{G_1G_2}$

iii. Committee of one boy and one girl
= $\boxed{B_1G_1}$ $\boxed{B_1G_2}$ $\boxed{B_2G_1}$ $\boxed{B_2G_2}$

∴ Sample space
= **{B_1B_2, G_1G_2, B_1G_1, B_1G_2, B_2G_1, B_2G_2}**

Let's Study

Event

The outcomes satisfying particular condition are called favourable outcomes.
A set of favourable outcomes of a given sample space is an **event.**

SAMPLE CONTENT

It is denoted by capital letters A, B, C, etc. (except S). The number of elements in the event, say A, is denoted by n(A).

Note: Event is a subset of the sample space.

Examples:

1. If A is the event of getting head, when a coin is tossed, then
   Sample space, S = {H, T}
   ∴ A = {H}
   ∴ n(A) = 1
2. If A is the event of getting an odd number on the top, when a die is thrown , then
   Sample space, S = {1, 2, 3, 4, 5, 6}
   ∴ A = {1, 3, 5}
   ∴ n(A) = 3

Something More

Types of events

1. **Certain (Sure) event:**
   An event which contains all the sample points of the sample space is called a certain event. The sample space is a certain event.
2. **Impossible event (Null event):**
   An event which does not contain any sample point of the sample space is called an impossible event.
3. **Simple (Elementary) event:**
   An event consisting of only one sample point of a sample space is called a simple (elementary) event.
4. **Complement of an event:**
   Let A be an event of a sample space S. Then set of all those sample points which are in S but not in A is called the complement of an event A.
5. **Mutually exclusive events:**
   Let S be the sample space and A and B be two events of S. Events A and B are called mutually exclusive events, if they do not have any sample point in common.
6. **Exhaustive events:**
   Two or more events are said to be exhaustive events if their union is a sample space, i.e. if A ∪ B = S for events A and B of a sample space S.

Practice Set 5.3

1. Write sample space 'S' and number of sample points n(S) for each of the following experiments. Also write events A, B, C in the set form and write n(A), n(B), n(C). **[3 Marks each]**

i. One die is rolled,
   Event A: Even number on the upper face.
   Event B: Odd number on the upper face.
   Event C: Prime number on the upper face.

ii. Two dice are rolled simultaneously,
   Event A: The sum of the digits on upper faces is a multiple of 6.
   Event B: The sum of the digits on the upper faces is minimum 10.
   Event C: The same digit on both the upper faces.

iii. Three coins are tossed simultaneously.
   Condition for event A: To get at least two heads.
   Condition for event B: To get no head.
   Condition for event C: To get head on the second coin.

iv. Two digit numbers are formed using digits 0, 1, 2, 3, 4, 5 without repetition of the digits.
   Condition for event A: The number formed is even.
   Condition for event B: The number is divisible by 3.
   Condition for event C: The number formed is greater than 50.

v. From three men and two women, environment committee of two persons is to be formed.
   Condition for event A: There must be at least one woman member.
   Condition for event B: One man, one woman committee to be formed.
   Condition for event C: There should not be a woman member.

vi. One coin and one die are thrown simultaneously.
   Condition for event A: To get head and an odd number.
   Condition for event B: To get a head or tail and an even number.
   Condition for event C: Number on the upper face is greater than 7 and tail on the coin.

Solution:

i. Sample space (S) = {1, 2, 3, 4, 5, 6}
∴ n(S) = 6
Condition for event A: Even number on the upper face.

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$\therefore$ A = {2, 4, 6}

$\therefore$ n(A) = 3

Condition for event B: Odd number on the upper face.

$\therefore$ B = {1, 3, 5}

$\therefore$ n(B) = 3

Condition for event C: Prime number on the upper face.

$\therefore$ C = {2, 3, 5}

$\therefore$ n(C) = 3

---

ii. Sample space,

S = {(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6),
(2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6),
(3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6),
(4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6),
(5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6),
(6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)}

$\therefore$ n(S) = 36

Condition for event A: The sum of the digits on the upper faces is a multiple of 6.

$\therefore$ A = {(1, 5), (2, 4), (3, 3), (4, 2), (5, 1), (6, 6)}

$\therefore$ n(A) = 6

Condition for event B: The sum of the digits on the upper faces is minimum 10.

$\therefore$ B = {(4, 6), (5, 5), (5, 6), (6, 4), (6, 5), (6, 6)}

$\therefore$ n(B) = 6

Condition for event C: The same digit on both the upper faces.

$\therefore$ C = {(1, 1), (2, 2), (3, 3), (4, 4), (5, 5), (6, 6)}

$\therefore$ n(C) = 6

---

iii. Sample space,

S = {HHH, HHT, HTH, THH, HTT, THT, TTH, TTT}

$\therefore$ n(S) = 8

Condition for event A: To get at least two heads.

$\therefore$ A = {HHT, HTH, THH, HHH}

$\therefore$ n(A) = 4

Condition for event B: To get no head.

$\therefore$ B = {TTT}

$\therefore$ n(B) = 1

Condition for event C: To get head on the second coin.

$\therefore$ C = {HHH, HHT, THH, THT}

$\therefore$ n(C) = 4

---

iv. Sample space (S) = {10, 12, 13, 14, 15,
20, 21, 23, 24, 25,
30, 31, 32, 34, 35,
40, 41, 42, 43, 45,
50, 51, 52, 53, 54}

$\therefore$ n(S) = 25

Condition for event A: The number formed is even.

$\therefore$ A = {10, 12, 14, 20, 24, 30, 32, 34, 40, 42, 50, 52 , 54}

$\therefore$ n(A) = 13

Condition for event B: The number formed is divisible by 3.

$\therefore$ B = {12, 15, 21, 24, 30, 42, 45, 51, 54}

$\therefore$ n(B) = 9

Condition for event C: The number formed is greater than 50.

$\therefore$ C = {51, 52, 53, 54}

$\therefore$ n(C) = 4

---

v. Let the three men be M_1, M_2, M_3 and the two women be W_1, W_2.

Out of these men and women, a environment committee of two persons is to be formed.

$\therefore$ Sample space,

S = {M_1M_2, M_1M_3, M_1W_1, M_1W_2, M_2M_3, M_2W_1, M_2W_2, M_3W_1, M_3W_2, W_1W_2}

$\therefore$ n(S) = 10

Condition for event A: There must be at least one woman member.

$\therefore$ A = {M_1W_1, M_1W_2, M_2W_1, M_2W_2, M_3W_1, M_3W_2, W_1W_2}

$\therefore$ n(A) = 7

Condition for event B: One man, one woman committee to be formed.

$\therefore$ B = {M_1W_1, M_1W_2, M_2W_1, M_2W_2, M_3W_1, M_3W_2}

$\therefore$ n(B) = 6

Condition for event C: There should not be a woman member.

$\therefore$ C = {M_1M_2, M_1M_3, M_2M_3}

$\therefore$ n(C) = 3

---

vi. Sample space,

S = {(H, 1), (H, 2), (H, 3), (H, 4), (H, 5), (H, 6), (T, 1), (T, 2), (T, 3), (T, 4), (T, 5), (T, 6)}

$\therefore$ n(S) = 12

Condition for event A: To get head and an odd number.

$\therefore$ A = {(H, 1), (H, 3), (H, 5)}

$\therefore$ n(A) = 3

Condition for event B: To get a head or tail and an even number.

$\therefore$ B = {(H, 2), (H, 4), (H, 6), (T, 2), (T, 4), (T, 6)}

$\therefore$ n(B) = 6

Condition for event C: Number on the upper face is greater than 7 and tail on the coin.

The greatest number on the upper face of a die is 6.

$\therefore$ Event C is an impossible event.

$\therefore$ C = { }

$\therefore$ n(C) = 0

SAMPLE CONTENT

Let's Study

Probability of an event

In Mathematical language, when possibility of an expected event is expressed in number, it is called 'Probability'.

For a random experiment, if sample space is 'S'and 'A' is an expected event, then probability of 'A' is P(A). It is given by the following formula:

$$P(A) = \frac{\text{Number of sample points in the event A}}{\text{Number of sample points in sample space}}$$

$$\therefore \quad \mathbf{P(A) = \frac{n(A)}{n(S)}}$$

Example:

1. If a die is thrown, then find the probability of getting a composite number on the upper face.

Solution:

When a die is thrown,

Sample space (S) = {1, 2, 3, 4, 5, 6}

$\therefore$ n(S) = 6

Let A be the event of getting a composite number on the upper face.

$\therefore$ A = {4, 6}

$\therefore$ n(A) = 2

$$\therefore \quad P(A) = \frac{n(A)}{n(S)} = \frac{2}{6}$$

$$\therefore \quad \mathbf{P(A) = \frac{1}{3}}$$

Textual Activity

1. Do the following activities.

i. Total number of students in your class, n(S) = ☐

Number of students from your class, wearing spectacles, n(A) = ☐

Probability of a randomly selected student wearing spectacles, P(A) = ☐

Probability of a randomly selected student not wearing spectacles, P(B) = ☐ (Textbook pg. no. 128)

(Students should attempt the above activities on their own.)

ii. Decide the sample space yourself and fill in the following boxes. (Textbook pg. no. 128)

Sample space

S = {**1, 4, 9, 16, 25, 36**}

n(S) = **6**

The condition for event A is 'getting an even number'.

A = {**4, 16, 36**}

n (A) = **3**

$$\therefore \quad P(A) = \frac{3}{6} = \frac{1}{2}$$

(Students may take any other sample space and complete the activity.)

Remember This

i. The probability is expressed as a fraction or a percentage.

ii. The probability of any event is from 0 to 1 or 0% to 100%.

If E is any event,

$0 \le P(E) \le 1$ or $0\ \% \le P(E) \le 100\ \%$.

Practice Set 5.4

1. If two coins are tossed, find the probability of the following events.

i. Getting at least one head.

ii. Getting no head. **[July 17]**

[3 Marks]

Solution:

Sample space,

S = {HH, HT, TH, TT}

$\therefore$ n(S) = 4

i. Let A be the event of getting at least one head.

$\therefore$ A = {HT, TH, HH}

$\therefore$ n(A) = 3

$$\therefore \quad P(A) = \frac{n(A)}{n(S)}$$

$$\therefore \quad P(A) = \frac{3}{4}$$

---

ii. Let B be the event of getting no head.

$\therefore$ B = {TT}

$\therefore$ n(B) = 1

$$\therefore \quad P(B) = \frac{n(B)}{n(S)}$$

$$\therefore \quad P(B) = \frac{1}{4}$$

$$\therefore \quad \mathbf{P(A) = \frac{3}{4}; P(B) = \frac{1}{4}}$$

SAMPLE CONTENT

2. If two dice are rolled simultaneously, find the probability of the following events.

i. The sum of the digits on the upper faces is at least 10. **[Oct 14]**

ii. The sum of the digits on the upper faces is 33.

iii. The digit on the first die is greater than the digit on second die. **[Oct 14]**

[3 Marks]

Solution:

Sample space,

S = {(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6),
(2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6),
(3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6),
(4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6),
(5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6),
(6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)}

$\therefore$ n(S) = 36

i. Let A be the event that the sum of the digits on the upper faces is at least 10.

$\therefore$ A = {(4, 6), (5, 5), (5, 6), (6, 4), (6, 5), (6, 6)}

$\therefore$ n(A) = 6

$\therefore$ $P(A) = \frac{n(A)}{n(S)} = \frac{6}{36}$

$\therefore$ $P(A) = \frac{1}{6}$

---

ii. Let B be the event that the sum of the digits on the upper faces is 33.

The sum of the digits on the upper faces can be maximum 12.

$\therefore$ Event B is an impossible event.

$\therefore$ B = { }

$\therefore$ n(B) = 0

$\therefore$ $P(B) = \frac{n(B)}{n(S)} = \frac{0}{36}$

$\therefore$ P(B) = 0

---

iii. Let C be the event that the digit on the first die is greater than the digit on the second die.

$\therefore$ C = {(2, 1), (3, 1), (3, 2), (4, 1), (4, 2), (4, 3),
(5, 1), (5, 2), (5, 3), (5, 4), (6, 1), (6, 2),
(6, 3), (6, 4), (6, 5),}

$\therefore$ n(C) = 15

$\therefore$ $P(C) = \frac{n(C)}{n(S)} = \frac{15}{36}$

$\therefore$ $P(C) = \frac{5}{12}$

$\therefore$ **$P(A) = \frac{1}{6}$; P(B) = 0; $P(C) = \frac{5}{12}$**

3. There are 15 tickets in a box, each bearing one of the numbers from 1 to 15. One ticket is drawn at random from the box. Find the probability of event that the ticket drawn:

i. shows an even number.

ii. shows a number which is a multiple of 5. **[2 Marks]**

Solution:

Sample space,

S = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15}

$\therefore$ n(S) = 15

i. Let A be the event that the ticket drawn shows an even number.

$\therefore$ A = {2, 4, 6, 8, 10, 12, 14}

$\therefore$ n(A) = 7

$\therefore$ $P(A) = \frac{n(A)}{n(S)}$

$\therefore$ $P(A) = \frac{7}{15}$

---

ii. Let B be the event that the ticket drawn shows a number which is a multiple of 5.

$\therefore$ B = {5, 10, 15}

$\therefore$ n(B) = 3

$\therefore$ $P(B) = \frac{n(B)}{n(S)} = \frac{3}{15}$

$\therefore$ $P(B) = \frac{1}{5}$

$\therefore$ **$P(A) = \frac{7}{15}$; $P(B) = \frac{1}{5}$**

---

4. A two digit number is formed with digits 2, 3, 5, 7, 9 without repetition. What is the probability that the number formed is

i. an odd number?

ii. a multiple of 5? **[3 Marks]**

Solution:

Sample space (S) = {23, 25, 27, 29,
32, 35, 37, 39,
52, 53, 57, 59,
72, 73, 75, 79,
92, 93, 95, 97}

$\therefore$ n(S) = 20

i. Let A be the event that the number formed is an odd number.

$\therefore$ A = {23, 25, 27, 29, 35, 37, 39, 53, 57, 59, 73, 75, 79, 93, 95, 97}

$\therefore$ n(A) = 16

$\therefore$ $P(A) = \frac{n(A)}{n(S)} = \frac{16}{20}$

$\therefore$ $P(A) = \frac{4}{5}$

---

ii. Let B be the event that the number formed is a multiple of 5.

$\therefore$ B = {25, 35, 75, 95}

$\therefore$ n(B) = 4

SAMPLE CONTENT

$\therefore \quad P(B) = \frac{n(B)}{n(S)} = \frac{4}{20}$

$\therefore \quad P(B) = \frac{1}{5}$

$\therefore \quad \mathbf{P(A) = \frac{4}{5}; P(B) = \frac{1}{5}}$

---

5. A card is drawn at random from a pack of well shuffled 52 playing cards. Find the probability that the card drawn is

i. an ace. ii. a spade.

[3 Marks]

Solution:

There are 52 playing cards.

$\therefore \quad n(S) = 52$

i. Let A be the event that the card drawn is an ace.

$\therefore \quad n(A) = 4$

$\therefore \quad P(A) = \frac{n(A)}{n(S)} = \frac{4}{52}$

$\therefore \quad P(A) = \frac{1}{13}$

---

ii. Let B be the event that the card drawn is a spade.

$\therefore \quad n(B) = 13$

$\therefore \quad P(B) = \frac{n(B)}{n(S)} = \frac{13}{52}$

$\therefore \quad P(B) = \frac{1}{4}$

$\therefore \quad \mathbf{P(A) = \frac{1}{13}; P(B) = \frac{1}{4}}$

Problem Set – 5

1. Choose the correct alternative answer for each of the following questions.

i. Which number cannot represent a probability?

(A) $\frac{2}{3}$ (B) 1.5

(C) 15% (D) 0.7

ii. A die is rolled. What is the probability that the number appearing on upper face is less than 3?

(A) $\frac{1}{6}$ (B) $\frac{1}{3}$

(C) $\frac{1}{2}$ (D) 0

iii. What is the probability of the event that a number chosen from 1 to 100 is a prime number?

(A) $\frac{1}{5}$ (B) $\frac{6}{25}$

(C) $\frac{1}{4}$ (D) $\frac{13}{50}$

iv. There are 40 cards in a bag. Each bears a number from 1 to 40. One card is drawn at random. What is the probability that the card bears a number which is a multiple of 5?

(A) $\frac{1}{5}$ (B) $\frac{3}{5}$

(C) $\frac{4}{5}$ (D) $\frac{1}{3}$

v. If $n(A) = 2$, $P(A) = \frac{1}{5}$, then $n(S) = ?$

(A) 10 (B) $\frac{5}{2}$

(C) $\frac{2}{5}$ (D) $\frac{1}{3}$

Answers:

i. (B) ii. (B)

iii. (C) iv. (A)

v. (A)

Hints:

i. The probability of any event is from 0 to 1 or 0% to 100%.

iii. $n(S) = 100$

Let A be the event that the number chosen is a prime number.

$\therefore \quad A = \{2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97\}$

$\therefore \quad n(A) = 25$

$\therefore \quad P(A) = \frac{n(A)}{n(S)} = \frac{25}{100} = \frac{1}{4}$

---

2. Basketball players John, Vasim, Akash were practising the ball drop in the basket. The probabilities of success for John, Vasim and Akash are $\frac{4}{5}$, 0.83 and 58% respectively. Who had the greatest probability of success ? [2 Marks]

Solution:

The probability that the ball is dropped in the basket by John $= \frac{4}{5} = 0.80$

SAMPLE CONTENT

The probability that the ball is dropped in the basket by Vasim = 0.83

The probability that the ball is dropped in the basket by Akash = 58% = $\frac{58}{100} = 0.58$

$0.83 > 0.80 > 0.58$

$\therefore$ **Vasim has the greatest probability of success.**

---

3. In a hockey team there are 6 defenders , 4 offenders and 1 goalie. Out of these, one player is to be selected randomly as a captain. Find the probability of the selection that:

i. The goalie will be selected.

ii. A defender will be selected. **[3 Marks]**

Solution:

Total number of players in the hockey team
$= 6 + 4 + 1 = 11$

$\therefore$ $n(S) = 11$

i. Let A be the event that the captain selected will be a goalie.

There is only one goalie in the hockey team.

$\therefore$ $n(A) = 1$

$\therefore$ $P(A) = \frac{n(A)}{n(S)}$

$\therefore$ $P(A) = \frac{1}{11}$

---

ii. Let B be the event that the captain selected will be a defender.

There are 6 defenders in the hockey team.

$\therefore$ $n(B) = 6$

$\therefore$ $P(B) = \frac{n(B)}{n(S)}$

$\therefore$ $P(B) = \frac{6}{11}$

$\therefore$ **$P(A) = \frac{1}{11}$; $P(B) = \frac{6}{11}$**

---

4. Joseph kept 26 cards in a cap, bearing one English alphabet on each card. One card is drawn at random. What is the probability that the card drawn is a vowel card ? **[2 Marks]**

Solution:

Each card bears an English alphabet.

$\therefore$ $n(S) = 26$

Let A be the event that the card drawn is a vowel card.

There are 5 vowels in English alphabets.

$\therefore$ $A = \{a, e, i, o, u\}$

$\therefore$ $n(A) = 5$

$\therefore$ $P(A) = \frac{n(A)}{n(S)} = \frac{5}{26}$

$\therefore$ **The probability that the card drawn is a vowel card is $\frac{5}{26}$.**

---

5. A balloon vendor has 2 red, 3 blue and 4 green balloons. He wants to choose one of them at random to give it to Pranali. What is the probability of the event that Pranali gets,

i. a red balloon. ii. a blue balloon.

iii. a green balloon. **[3 Marks]**

Solution:

Let the 2 red balloon be R_1, R_2,
3 blue balloons be B_1, B_2, B_3, and
4 green balloons be G_1, G_2, G_3, G_4.

$\therefore$ Sample space
$S = \{R_1, R_2, B_1, B_2, B_3, G_1, G_2, G_3, G_4\}$

$\therefore$ $n(S) = 9$

i. Let A be the event that Pranali gets a red balloon.

$\therefore$ $A = \{R_1, R_2\}$

$\therefore$ $n(A) = 2$

$\therefore$ $P(A) = \frac{n(A)}{n(S)}$

$\therefore$ $P(A) = \frac{2}{9}$

$\therefore$ **The probability that Pranali gets a red balloon is $\frac{2}{9}$.**

---

ii. Let B be the event that Pranali gets a blue balloon.

$\therefore$ $B = \{B_1, B_2, B_3\}$

$\therefore$ $n(B) = 3$

$\therefore$ $P(B) = \frac{n(B)}{n(S)} = \frac{3}{9}$

$\therefore$ $P(B) = \frac{1}{3}$

$\therefore$ **The probability that Pranali gets a blue balloon is $\frac{1}{3}$.**

---

iii. Let C be the event that Pranali gets a green balloon.

$\therefore$ $C = \{G_1, G_2, G_3, G_4\}$

$\therefore$ $n(C) = 4$

$\therefore$ $P(C) = \frac{n(C)}{n(S)}$

$\therefore$ $P(C) = \frac{4}{9}$

$\therefore$ **The probability that Pranali gets a green balloon is $\frac{4}{9}$.**

SAMPLE CONTENT

6. A box contains 5 red, 8 blue and 3 green pens. Rutuja wants to pick a pen at random. What is the probability that the pen is blue? [2 Marks]

Solution:

Let 5 red pens be R_1, R_2, R_3, R_4, R_5.

8 blue pens be $B_1, B_2, B_3, B_4, B_5, B_6, B_7, B_8$. and

3 green pens be G_1, G_2, G_3.

$\therefore$ Sample space

$S = \{R_1, R_2, R_3, R_4, R_5, B_1, B_2, B_3, B_4, B_5, B_6, B_7, B_8, G_1, G_2, G_3\}$

$\therefore$ $n(S) = 16$

Let A be the event that Rutuja picks a blue pen.

$\therefore$ $A = \{B_1, B_2, B_3, B_4, B_5, B_6, B_7, B_8\}$

$\therefore$ $n(A) = 8$

$\therefore$ $P(A) = \frac{n(A)}{n(S)} = \frac{8}{16}$

$\therefore$ $P(A) = \frac{1}{2}$

$\therefore$ **The probability that Rutuja picks a blue pen is $\frac{1}{2}$.**

---

7. Six faces of a die are as shown below.

A	B	C	D	E	A

If the die is rolled once, find the probability of

i. 'A' appears on upper face.

ii. 'D' appears on upper face. **[3 Marks]**

Solution:

Sample space

$S = \{A, B, C, D, E, A\}$

$\therefore$ $n(S) = 6$

i. Let R be the event that 'A' appears on the upper face.

$\therefore$ $R = \{A, A\}$

$\therefore$ $n(R) = 2$

$\therefore$ $P(R) = \frac{n(R)}{n(S)} = \frac{2}{6}$

$\therefore$ $P(R) = \frac{1}{3}$

---

ii Let Q be the event that 'D' appears on the upper face.

Total number of faces having 'D' on it = 1

$Q = \{D\}$

$\therefore$ $n(Q) = 1$

$\therefore$ $P(Q) = \frac{n(Q)}{n(S)}$

$\therefore$ $P(Q) = \frac{1}{6}$

$\therefore$ **$P(R) = \frac{1}{3}$; $P(Q) = \frac{1}{6}$**

---

8. A box contains 30 tickets, bearing only one number from 1 to 30 on each. If one ticket is drawn at random, find the probability of an event that the ticket drawn bears

i. an odd number.

ii. a complete square number. **[3 Marks]**

Solution:

Sample space,

$S = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30\}$

$\therefore$ $n(S) = 30$

i. Let A be the event that the ticket drawn bears an odd number.

$\therefore$ $A = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29\}$

$\therefore$ $n(A) = 15$

$\therefore$ $P(A) = \frac{n(A)}{n(S)} = \frac{15}{30}$

$\therefore$ $P(A) = \frac{1}{2}$

---

ii. Let B be the event that the ticket drawn bears a complete square number.

$\therefore$ $B = \{1, 4, 9, 16, 25\}$

$\therefore$ $n(B) = 5$

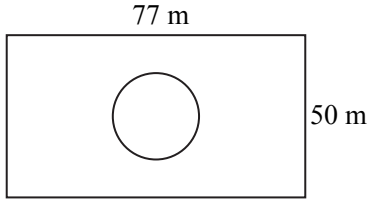
$\therefore$ $P(B) = \frac{n(B)}{n(S)} = \frac{5}{30}$

$\therefore$ $P(B) = \frac{1}{6}$

$\therefore$ **$P(A) = \frac{1}{2}$; $P(B) = \frac{1}{6}$**

---

9. Length and breadth of a rectangular garden are 77 m and 50 m. There is a circular lake in the garden having diameter 14 m. Due to wind, a towel from a terrace on a nearby building fell into the garden. Then find the probability of the event that it fell in the lake.



[3 Marks]

Solution:

Area of the rectangular garden

= length × breadth

= 77 × 50

SAMPLE CONTENT

$\therefore$ Area of the rectangular garden = 3850 sq.m

Radius of the lake = $\frac{14}{2} = 7$ m

Area of circular lake = $\pi r^2 = \frac{22}{7} \times 7 \times 7$

$\therefore$ Area of circular lake = 154 sq.m

$\therefore$ Probability that the towel fell in the lake

$= \frac{\text{Area of the lake}}{\text{Area of the garden}} = \frac{154}{3850} = \frac{1}{25}$

$\therefore$ **The probability of the event that the towel fell in the lake is $\frac{1}{25}$.**

---

10. In a game of chance, a spinning arrow comes to rest at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8. All these are equally likely outcomes. Find the probability that it will rest at [1 Mark each]

i. 8.
ii. an odd number.
iii. a number greater than 2.
iv. a number less than 9.

Solution:

Sample space (S) = {1, 2, 3, 4, 5, 6, 7, 8}

$\therefore$ n(S) = 8

i. Let A be the event that the spinning arrow comes to rest at 8.

$\therefore$ A = {8}

$\therefore$ n(A) = 1

$\therefore$ $P(A) = \frac{n(A)}{n(S)}$

$\therefore$ $P(A) = \frac{1}{8}$

---

ii. Let B be the event that the spinning arrow comes to rest at an odd number.

$\therefore$ B = {1, 3, 5, 7}

$\therefore$ n(B) = 4

$\therefore$ $P(B) = \frac{n(B)}{n(S)} = \frac{4}{8}$

$\therefore$ $P(B) = \frac{1}{2}$

---

iii. Let C be the event that the spinning arrow comes to rest at a number greater than 2.

$\therefore$ C = {3, 4, 5, 6, 7, 8}

$\therefore$ n(C) = 6

$\therefore$ $P(C) = \frac{n(C)}{n(S)} = \frac{6}{8}$

$\therefore$ $P(C) = \frac{3}{4}$

---

iv. Let D be the event that the spinning arrow comes to rest at a number less than 9.

$\therefore$ D = {1, 2, 3, 4, 5, 6, 7, 8}

$\therefore$ n(D) = 8

$\therefore$ $P(D) = \frac{n(D)}{n(S)} = \frac{8}{8}$

$\therefore$ P(D) = 1

$\therefore$ **$P(A) = \frac{1}{8}$; $P(B) = \frac{1}{2}$; $P(C) = \frac{3}{4}$; P(D) = 1**

---

11. There are six cards in a box, each bearing a number from 0 to 5. Find the probability of each of the following events, that a card drawn shows, [1 Mark each]

i. a natural number.
ii. a number less than 1.
iii. a whole number.
iv. a number greater than 5.

Solution:

Sample space (S) = {0, 1, 2, 3, 4, 5}

$\therefore$ n(S) = 6

i. Let A be the event that the card drawn shows a natural number.

$\therefore$ A = {1, 2, 3, 4, 5}

$\therefore$ n(A) = 5

$\therefore$ $P(A) = \frac{n(A)}{n(S)}$

$\therefore$ $P(A) = \frac{5}{6}$

---

ii. Let B be the event that the card drawn shows a number less than 1.

$\therefore$ B = {0}

$\therefore$ n(B) = 1

$\therefore$ $P(B) = \frac{n(B)}{n(S)}$

$\therefore$ $P(B) = \frac{1}{6}$

---

iii. Let C be the event that the card drawn shows a whole number.

$\therefore$ C = {0, 1, 2, 3, 4, 5}

$\therefore$ n(C) = 6

$\therefore$ $P(C) = \frac{n(C)}{n(S)} = \frac{6}{6}$

$\therefore$ P(C) = 1

---

iv. Let D be the event that the card drawn shows a number greater than 5.

Here, the greatest number is 5.

$\therefore$ Event D is an impossible event.

$\therefore$ D = { }

$\therefore$ n(D) = 0

$\therefore$ $P(D) = \frac{n(D)}{n(S)} = \frac{0}{6}$

$\therefore$ P(D) = 0

$\therefore$ **$P(A) = \frac{5}{6}$; $P(B) = \frac{1}{6}$; P(C) = 1; P(D) = 0**

SAMPLE CONTENT

12. A bag contains 3 red, 3 white and 3 green balls. One ball is taken out of the bag at random. What is the probability that the ball drawn is:
i. red. ii. not red.
iii. either red or white. **[3 Marks]**

Solution:

Let the three red balls be R_1, R_2, R_3, three white balls be W_1, W_2, W_3 and three green balls be G_1, G_2, G_3.

$\therefore$ Sample space,
$S = \{R_1, R_2, R_3, W_1, W_2, W_3, G_1, G_2, G_3\}$

$\therefore$ $n(S) = 9$

i. Let A be the event that the ball drawn is red.

$\therefore$ $A = \{R_1, R_2, R_3\}$

$\therefore$ $n(A) = 3$

$\therefore$ $P(A) = \frac{n(A)}{n(S)} = \frac{3}{9}$ $\therefore$ $P(A) = \frac{1}{3}$

---

ii. Let B be the event that the ball drawn is not red.

$\therefore$ $B = \{W_1, W_2, W_3, G_1, G_2, G_3\}$

$\therefore$ $n(B) = 6$

$\therefore$ $P(B) = \frac{n(B)}{n(S)} = \frac{6}{9}$

$\therefore$ $P(B) = \frac{2}{3}$

---

iii. Let C be the event that the ball drawn is red or white.

$\therefore$ $C = \{R_1, R_2, R_3, W_1, W_2, W_3\}$

$\therefore$ $n(C) = 6$

$\therefore$ $P(C) = \frac{n(C)}{n(S)} = \frac{6}{9}$

$\therefore$ $P(C) = \frac{2}{3}$

$\therefore$ **$P(A) = \frac{1}{3}$; $P(B) = \frac{2}{3}$; $P(C) = \frac{2}{3}$**

---

13. Each card bears one letter from the word 'mathematics'. The cards are placed on a table upside down. Find the probability that a card drawn bears the letter 'm'. **[2 Marks]**

Solution:

Sample space
$S = \{m, a, t, h, e, m, a, t, i, c, s\}$

$\therefore$ $n(S) = 11$

Let A be the event that the card drawn bears the letter 'm'.

$\therefore$ $A = \{m, m\}$

$\therefore$ $n(A) = 2$

$\therefore$ $P(A) = \frac{n(A)}{n(S)}$

$\therefore$ $P(A) = \frac{2}{11}$

$\therefore$ **The probability that a card drawn bears letter 'm' is $\frac{2}{11}$.**

14. Out of 200 students from a school, 135 like Kabaddi and the remaining students do not like the game. If one student is selected at random from all the students, find the probability that the student selected dosen't like Kabaddi. **[3 Marks]**

Solution:

Total number of students in the school = 200

$\therefore$ $n(S) = 200$

Number of students who like Kabaddi = 135

$\therefore$ Number of students who do not like Kabaddi = 200 – 135 = 65

Let A be the event that the student selected does not like Kabaddi.

$\therefore$ $n(A) = 65$

$\therefore$ $P(A) = \frac{n(A)}{n(S)} = \frac{65}{200}$

$\therefore$ $P(A) = \frac{13}{40}$

$\therefore$ **The probability that the student selected doesn't like Kabaddi is $\frac{13}{40}$.**

---

15. A two digit number is to be formed from the digits 0, 1, 2, 3, 4. Repetition of the digits is allowed. Find the probability that the number so formed is a:
i. prime number. ii. multiple of 4.
iii multiple of 11. **[3 Marks]**

Solution:

Sample space (S) = {10, 11, 12, 13, 14,
20, 21, 22, 23, 24,
30, 31, 32, 33, 34,
40, 41, 42, 43, 44}

$\therefore$ $n(S) = 20$

i. Let A be the event that the number so formed is a prime number.

$\therefore$ $A = \{11, 13, 23, 31, 41, 43\}$

$\therefore$ $n(A) = 6$

$\therefore$ $P(A) = \frac{n(A)}{n(S)} = \frac{6}{20}$

$\therefore$ $P(A) = \frac{3}{10}$

---

ii. Let B be the event that the number so formed is a multiple of 4.

$\therefore$ $B = \{12, 20, 24, 32, 40, 44\}$

$\therefore$ $n(B) = 6$

$\therefore$ $P(B) = \frac{n(B)}{n(S)} = \frac{6}{20}$

$\therefore$ $P(B) = \frac{3}{10}$

SAMPLE CONTENT

iii. Let C be the event that the number so formed is a multiple of 11.

$\therefore$ C = {11, 22, 33, 44}

$\therefore$ n(C) = 4

$\therefore$ $P(C) = \frac{n(C)}{n(S)} = \frac{4}{20}$

$\therefore$ $P(C) = \frac{1}{5}$

$\therefore$ **$P(A) = \frac{3}{10}$, $P(B) = \frac{3}{10}$, $P(C) = \frac{1}{5}$**

---

16. The faces of a die bear numbers 0, 1, 2, 3, 4, 5. If the die is rolled twice, then find the probability that the product of digits on the upper face is zero. [3 Marks]

Solution:

Sample space,

S = {(0, 0), (0, 1), (0, 2), (0, 3), (0, 4), (0, 5),
(1, 0), (1, 1), (1, 2), (1, 3), (1, 4), (1, 5),
(2, 0), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5),
(3, 0), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5),
(4, 0), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5),
(5, 0), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5)}

$\therefore$ n(S) = 36

Let A be the event that the product of digits on the upper face is zero.

$\therefore$ A = {(0, 0), (0, 1), (0, 2), (0, 3), (0, 4), (0, 5), (1, 0), (2, 0), (3, 0), (4, 0), (5, 0)}

$\therefore$ n(A) = 11

$\therefore$ $P(A) = \frac{n(A)}{n(S)}$

$\therefore$ $P(A) = \frac{11}{36}$

$\therefore$ **The probability that the product of the digits on the upper face is zero is $\frac{11}{36}$.**

Activities for practice

1. The six faces of a die are marked

A	B	C	D	E	O

The event M is getting a vowel on the upper face of the die when it is tossed. Complete the following activity.

Solution:

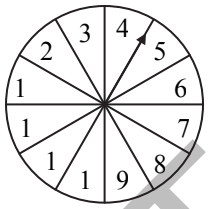
S = {☐}

n(S) = ☐

M = {☐}

n(M) = ☐

2. In the adjoining figure, the arrow rests on any number, after the rotation of the disc. The probability that it will rest on any number is equal. Let A be any random event. To find the probability of A, fill in the boxes.



Solution:

n(S) = ☐

Let A be the event that arrow points at the number which is a perfect cube.

A = ☐

$\therefore$ n(A) = ☐

$P(A) = \frac{n(A)}{n(S)}$ = ☐

3. In a class of 42 students in Model High School, 3 students use spectacles. Fill in the following boxes to find the probability of a students selected at random is wearing sepctacles.

Solution:

The total number of students in the class is 42.

$\therefore$ n(S) = ☐ ,

Let A be the event that a student uses spectacles.

$\therefore$ n(A) = ☐

$\therefore$ P(A) = ☐ … [Formula]

$\therefore$ P(A) = ☐

4. Out of 200 students from a school, 135 like Kabaddi and the remaining students do not like the game. If one student is selected at random from all the students, to find the probability that the student selected doesn't like Kabaddi fill in the boxes.

Solution:

Total number of students in the school = n(S) = ☐

$\therefore$ Number of students who do not like Kabaddi = ☐

Let A be the event that the student selected does not like Kabaddi.

$\therefore$ n(A) = ☐

$\therefore$ $P(A) = \frac{n(A)}{n(S)}$

$\therefore$ P(A) = ☐

SAMPLE CONTENT

5. There are 15 tickets bearing the numbers 1 to 15 in a bag. One ticket is drawn at random from the bag. To find the probability of event A, that the ticket drawn bears a number multiple of 5, Fill in the boxes.

Solution:

n(S) = ☐

Let A be the event that ticket bears a number multiple of 5.

∴ n(A) = ☐

∴ P(A) = $\frac{\square}{\square}$ …[Formula]

∴ P(A) = ☐

Answers

1. S = {**A,B,C,D,E,O**}

n(S) = **6**

M = {**A,E,O**}

n(M) = **3**

2. n(S) = **12**

Let A be the event that arrow points at the number which is a perfect cube.

A = **{1, 8}**

∴ n(A) = **2**

P(A) = $\frac{n(A)}{n(S)} = \frac{\mathbf{1}}{\mathbf{6}}$

3. The total number of students in the class is 42.

∴ n(S) = **42**

Let A be the event that a student uses spectacles.

∴ n(A) = **3**

∴ P(A) = $\frac{\mathbf{n(A)}}{\mathbf{n(S)}}$

∴ P(A) = $\frac{\mathbf{1}}{\mathbf{14}}$

4. Total number of students in the school

n(S) = **200**

∴ Number of students who do not like Kabaddi = **65**

Let A be the event that the student selected does not like Kabaddi.

∴ n(A) = **65**

∴ P(A) = $\frac{n(A)}{n(S)}$

∴ P(A) = $\frac{\mathbf{13}}{\mathbf{40}}$

5. n(S) = **15**

A is the event that ticket bears a number multiple of 5.

∴ n(A) = **3**

∴ P(A) = $\frac{\mathbf{n(A)}}{\mathbf{n(S)}}$

∴ P(A) = $\frac{\mathbf{1}}{\mathbf{5}}$

Multiple Choice Questions

1. If two digit numbers are formed using the digits 0, 1, 2, 3, 4, 5 with repeating them, then n(S) =
(A) 25 (B) 35 (C) 30 (D) 40

2. There are 4 boys and 3 girls. If a group of two is to be formed, then the number of sample points are
(A) 21 (B) 12 (C) 18 (D) 15

3. If two coins are tossed, then the probability of getting at most one head is
(A) $\frac{3}{4}$ (B) $\frac{1}{4}$ (C) $\frac{1}{2}$ (D) 1

4. Two coins are tossed simultaneously. The probability of getting at most one tail is
(A) 1 (B) $\frac{1}{2}$ (C) $\frac{1}{4}$ (D) $\frac{3}{4}$

5. A coin is tossed three times. What is the probability of getting at least 1 head?
(A) $\frac{1}{2}$ (B) $\frac{7}{8}$ (C) $\frac{3}{8}$ (D) $\frac{1}{8}$

6. Three coins are tossed simultaneously what is the probability of getting no head.
(A) $\frac{1}{8}$ (B) $\frac{1}{4}$ (C) $\frac{3}{8}$ (D) $\frac{3}{4}$

SAMPLE CONTENT

7. A die is thrown. The probability of getting a prime number is

(A) $\frac{1}{3}$ (B) $\frac{1}{2}$ (C) $\frac{2}{3}$ (D) $\frac{5}{6}$

8. A die is rolled what is probability that number on the upper face is 7.

(A) 0 (B) $\frac{1}{2}$ (C) $\frac{1}{3}$ (D) $\frac{1}{6}$

9. The probability of getting an even number, when a die is thrown is _____.

(A) $\frac{1}{2}$ (B) $\frac{1}{6}$ (C) $\frac{1}{3}$ (D) $\frac{5}{6}$

10. When a die is thrown, the probability of getting an even number less than 5 is

(A) $\frac{1}{6}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) 0

11. Two dice are thrown. The probability of getting sum of the numbers on their upper faces at most 4 is

(A) $\frac{1}{12}$ (B) $\frac{5}{6}$ (C) $\frac{1}{6}$ (D) $\frac{11}{12}$

12. Two dice are thrown. The probability of getting same number on their upper faces is

(A) $\frac{1}{12}$ (B) $\frac{5}{6}$ (C) $\frac{1}{6}$ (D) $\frac{11}{12}$

13. If two different dice are rolled together, the probability of getting an even number on both dice is

(A) $\frac{1}{36}$ (B) $\frac{1}{2}$ (C) $\frac{1}{6}$ (D) $\frac{1}{4}$

14. A bookshelf contains 40 books marked with numbers 1 to 40. If one book is drawn from this shelf at random, then the probability that the number on the book is a perfect square is

(A) $\frac{3}{20}$ (B) $\frac{2}{15}$ (C) $\frac{1}{10}$ (D) $\frac{1}{3}$

15. A letter of English alphabet is chosen at random. The probability that the letter is consonant is _____.

(A) $\frac{5}{26}$ (B) $\frac{20}{26}$ (C) $\frac{21}{26}$ (D) $\frac{1}{26}$

16. If a card is drawn from a well shuffled pack of 52 cards, then the probability that it is a queen card is

(A) $\frac{3}{13}$ (B) $\frac{1}{13}$ (C) $\frac{4}{13}$ (D) $\frac{2}{13}$

17. If a card is drawn from a well shuffled pack of 52 cards, then the probability that it is an ace card is

(A) $\frac{3}{13}$ (B) $\frac{1}{13}$ (C) $\frac{4}{13}$ (D) $\frac{2}{13}$

18. From a well shuffled pack of 52 cards, one card is drawn at random. What is the probability that it is a number card?

(A) $\frac{10}{13}$ (B) $\frac{11}{13}$ (C) $\frac{9}{13}$ (D) $\frac{12}{13}$

19. A card is selected from a deck of 52 cards. The probability of its being a red face card is

(A) $\frac{3}{26}$ (B) $\frac{3}{13}$ (C) $\frac{2}{13}$ (D) $\frac{1}{2}$

20. A card is selected from a deck of 52 cards. The probability of its not an ace of hearts is

(A) $\frac{4}{52}$ (B) $\frac{13}{52}$ (C) $\frac{48}{52}$ (D) $\frac{51}{52}$

21. If a card is drawn from a well shuffled pack of 52 cards, then the probability of getting neither red card nor a queen card is

(A) $\frac{3}{13}$ (B) $\frac{6}{13}$ (C) $\frac{4}{13}$ (D) $\frac{2}{13}$

22. If $P(A) = \frac{1}{5}$, $n(S) = 20$, then $n(A) = ?$

(A) $\frac{1}{4}$ (B) $\frac{1}{5}$ (C) 4 (D) 5

23. A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, then how many tickets has she bought?

(A) 40 (B) 240 (C) 480 (D) 750

24. A box contains 90 discs, numbered from 1 to 90. If one disc is drawn at random from the box, the probability that it bears a prime number less than 23 is

(A) $\frac{7}{90}$ (B) $\frac{10}{90}$ (C) $\frac{4}{45}$ (D) $\frac{9}{89}$

Additional Problems for Practice

Based on Practice Set 5.1

How many possibilities are there in each of the following? **[1 Mark each]**

1. A date from 1 to 15 in the month of March is randomly selected.
2. A letter from word 'geography' is selected randomly.
3. List of games played in school is given. Students has to select any one of the games. Kho-kho, Cricket, Football, Kabaddi, Table tennis.

SAMPLE CONTENT

Based on Practice Set 5.2

1. For the following experiment write sample space 'S' and number of sample points n(S).
   Two digit numbers are formed from the digits 1, 3 and 7 where the digits are repeated. **[1 Mark]**

2. In the month of January 2019, find the days on which the date is a multiple of 6.

January 2019						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

[1 Mark]

3. Form a 'committee' of two, from 3 men (M_1, M_2, M_3) and 2 women (W_1, W_2). Complete the following activity to write the sample space.
   i. Committee of two men = □, □, □
   ii. Committee of two women = □
   iii. Committee of one man and one woman = $\boxed{M_1W_1}$ □ □ □ □ □

∴ Sample space = {_____, _____, _____, _____, _____, _____, _____, _____, _____, _____,}

[2 Marks]

Based on Practice Set 5.3

1. A die is thrown. If A is an event of getting an odd number then write the sample space and event A in set notation.
   [Mar 15; July 15] [1 Mark]

2. A die is thrown, then write the sample space (S) and number of sample points n(S) and also write event A of getting numbers multiple of 3 on the upper face and write n(A). **[Mar 14] [2 Marks]**

3. Two coins are tossed simultaneously. Write the sample space (S), n(S), the following event A using set notation and n(A), where 'A is the event of getting at least one head.'
   [Mar 17] [2 Marks]

+4. Two coins are tossed simultaneously. Write the sample space (S) and number of sample points n(S). Also write the following events in the set form and write the number of sample points in each event. **[2 Marks each]**
   i. Condition for event A : to get at least one tail.
   ii. Condition for event B : to get only one head.
   iii. Condition for event C : to get at most one tail.
   iv. Condition for event D : to get no head.

5. A box contains 20 cards marked with numbers 1 to 20. One card is drawn at random. Write the event A using the number on the card is a multiple of 4. Write S, n(S), A and n(A).
   [Mar 18] [2 Marks]

6. There are 30 tickets numbered from 1 to 30 in a box and a ticket is drawn at random. If A is the event that the number on the ticket is a perfect square, then write the sample space S, n(S), the event A and n(A).
   [July 15] [2 Marks]

+7. A bag contains 50 cards. Each card bears only one number from 1 to 50. One card is drawn at random from the bag. Write the sample space. Also write the events A, B and find the number of sample points in them. **[2 Marks each]**
   i. Condition for event A : the number on the card is divisible by 6.
   ii. Condition for event B : the number on the card is a complete square.

+8. A sanitation committee of 2 members is to be formed from 3 boys and 2 girls. Write sample space 'S' and number of sample points n(S). Also write the following events in set form and number of sample points in the event.
   [2 Marks each]
   i. Condition for event A : at least one girl must be a member of the committee.
   ii. Condition for event B : Committee must be of one boy and one girl.
   iii. Condition for event C : Committee must be of boys only.
   iv. Condition for event D : At the most one girl should be a member of the committee.

9. Write sample space 'S' and number of sample point n(S) for each of the following experiments. Also write events P, Q, R in the set form and write n(P), n(Q), n(R).
   i. Two coins are tossed simultaneously.
      Condition for event P: To get head on both coins.
      Condition for event Q: To get tail on first coin. **[2 Marks]**
   ii. Three coins are tossed simultaneously.
      Condition for event P: To get at least one tail.
      Condition for event Q: To get no tail.
      Condition for event R: To get tail on the second coin. **[3 Marks]**

SAMPLE CONTENT

iii. A box contains 20 balls, bearing only one number from 1 to 20 on each. If one ball is drawn at random.
Condition for event P: Number on the ball is divisible by 4.
Condition for event Q: Number on the ball is a prime number.
Condition for event R: Number on the ball is an odd number less than 15.
[3 Marks]

iv. Two digit numbers are formed using digits 2, 3, 5, 7, 9 without repetition of the digits.
Condition for event P: The number formed is odd.
Condition for event Q: The number is a multiple of 5.
Condition for event R: The number formed is greater than 75. **[3 Marks]**

v. From three girls and one boy, committee of two persons is to be formed.
Condition for event P: There must be at least one boy in the committee.
Condition for event Q: There must be two girls in the committee. **[3 Marks]**

+10. Two dice are rolled, write the sample space 'S' and number of sample points n(S). Also write events and number of sample points in the event according to the given condition.
[2 Marks each]
i. Sum of the digits on upper face is a prime number.
ii. Sum of the digits on the upper face is multiple of 5.
iii. Sum of the digits on the upper face is 25.
iv. Digit on the upper face of the first die is less than the digit on the second die.

Based on Practice Set 5.4

+1. Find the probability of the following, when one coin is tossed.
i. Getting head ii. Getting tail
[3 Marks]

2. If three coins are tossed, find the probability of the following events.
i. Getting at least one tail.
ii. Getting head on third coin.
[3 Marks]

3. A die is thrown, then find the probability of the following events:
A is an Event : getting a number divisible by 3.
B is an Event : getting a number less than 5.
[Mar 16] [2 Marks]

4. If one die is rolled then find the probability of each of the following events. **[1 Mark each]**
+i. Number on the upper face is prime
+ii. Number on the upper face is even.
iii. Getting a number which is less than 7 on the upper face.
iv. Getting an odd number. **[Mar 13, 18]**

5. Two dice are thrown. Find the probability of the following events: **[2 Mark each]**
i. The product of numbers on their upper faces is 12. **[Mar 17]**
ii. The product of the numbers on their upper faces is 10. **[July 17]**
iii. The sum of the numbers on their upper faces is multiple of 9. **[July 17]**
iv. The sum of the numbers on their upper faces is at least 9. **[Mar 18]**
v. The sum of the numbers on their upper faces is 15. **[Mar 18]**
vi. The number on the upper face of the second die is greater than the number on the upper face of the first die. **[Mar 18]**

6. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of the events that the card drawn is:
i. a black card. ii. a diamond card.
[2 Marks]

7. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of the events that the card drawn is:
+i. a red card
+ii. a face card. **[July 15]**
iii. a king **[July 15]**
[3 Marks]

+8. A box contains 5 strawberry chocolates, 6 coffee chocolates and 2 peppermint chocolates. Find the probability of each of the following events, if one of the chocolates is picked from the box at random.
i. it is a coffee chocolate.
ii. it is a peppermint chocolate.
[3 Marks]

9. In a cricket team there are 6 batsmen, 4 bowlers and 1 wicketkeeper. Out of these, one player is to be selected at random as captain. Find the probability of the selection that:
i. a bowler will be selected
ii. the wicketkeeper will be selected.
[3 Marks]

10. A bag contains 3 yellow, 4 blue and 5 white balls. One ball is drawn at random. Find the probability that it is:
i. blue. ii. yellow or white.
iii. not white.
[3 Marks]

SAMPLE CONTENT

11. There are 40 tickets numbered 1 to 40 in a box. A ticket is drawn. What is the probability that the ticket drawn:
    i. bears an odd number.
    ii. bears a number which is a perfect square.
    [3 Marks]

12. A box contains 20 cards marked with the numbers 1 to 20. One card is drawn from this box at random. What is the probability of the following events :
    i. The number on the card is a prime number. **[Mar 12]**
    ii. The number on the card is a perfect square. **[Mar 12]**
    [2 Marks]

13. There are three boys and two girls. A committee of two is to be formed. Find the probability of the following events:
    Event A : The committee contains at least one boy.
    Event B : The committee contains one boy and one girl.
    [Mar 16] [3 Marks]

14. Two digit numbers are formed from the digits 0, 1, 2, 3, 4 where the digits are not repeated. Find the probability of each of the events that:
    i. the number formed is an even number.
    [Oct 12, 14; July 16]
    ii. the number formed is a prime number.
    [Oct 12, 14]
    [3 Marks]

15. The probability of passing in an exam for Ramesh, Jay, Sunil are $\frac{3}{7}$, 0.78 and 66 %. Who has the least probability of passing?
    [2 Marks]

16. In a certain race there are three boys A, B, C. The winning probability of A is twice than B and the winning probability of B is twice than C. If P(A) + P(B) + P(C) = 1, then find the probabilities of their winning.
    [Mar 16; July 16] [4 Marks]

Chapter Assessment

Total marks: 20

Q.1. A. Choose the correct alternative. **[3]**

i. A die is rolled. What is the probability that the number appearing on upper face is greater than 4?

(A) $\frac{1}{2}$ (B) $\frac{5}{2}$ (C) $\frac{2}{5}$ (D) $\frac{1}{3}$

ii. If n(S) = 36, P(A) = $\frac{5}{12}$, then n(A) = ?

(A) 15 (B) $\frac{12}{5}$ (C) $\frac{5}{2}$ (D) $\frac{1}{3}$

iii. If two digit numbers are formed using the digits 1, 2, 3, 4 without repeating them, then n(S) =

(A) 16 (B) 20 (C) 12 (D) 25

Q.1. B. Complete the following activity. (Any one) **[2]**

i. Each card bears one letter from the word 'Mathematics'. The cards are placed on a table upside down. Fill in the following boxes to find the probability that a card drawn bears vowel.

Solution:

The total number of letters in the word Mathematics is 11

∴ n(S) = ☐

Let A be the event that the card drawn bears vowel.

∴ n(A) = ☐

∴ P(A) = ☐ …[Formula]

∴ P(A) = ☐

SAMPLE CONTENT

ii. Complete the following activity. Three coins are tossed simultaneously. The sample space is given as
S = {HHH, HHT, HTH, HTT, THH, THT, TTH, TTT}
n(S) = 8
Let A be the event of getting two heads and one tail.

∴ A = {☐}

∴ n(A) = ☐

Let B be the event of getting tail on third coin.

∴ B = {☐}

∴ n(B) = ☐

Q.2. Solve the following questions. (Any one) **[2]**

i. If one coin and one die thrown simultaneously find the probability of getting even number and tail.

ii. There are 3 red, 7 green and 12 white marbles in a jar. One marble is drawn at random. Find the probability that marble drawn is not green.

iii. There are 60 tickets numbered from 1 to 60 in a box. A ticket is drawn at random. What is the probability that the ticket drawn bears a prime number?

Q.3. Solve the following questions. (Any two) **[6]**

i. If two dice are rolled simultaneously, find the probability of the following events.
   a. The product of the digits on the upper faces is 14.
   b. The sum of the digits on the upper faces is multiple of 6.
   c. The digit on the first die is greater than the digit on second die.

ii. A card is drawn at random from a pack of well shuffled 52 playing cards. Find the probability that the card drawn is
   a. a red picture card.
   b. a club card.
   c. a queen of spade.

iii. The diameter of a circular garden is 70 m. There is square shape fountain in a garden having side 20 m. If a ball falls in the garden. Find the probability that the ball falls in the fountain.

Q.4. Solve the following questions. (Any one) **[4]**

i. Find the probability of getting 53 Fridays in a leap year.

ii. A jar contains 24 marbles. Some are green and others are blue. If a marble is drawn at random from the jar, the probability of it being green is $\frac{2}{3}$. Find the number of blue marbles in the jar.

Q.5. Solve the following questions. **[3]**

i. In a random experiment of choosing a card from a well shuffled pack of cards, the probability of expected outcome for which of the following is the least and for which one is the most?
   a. Getting a red face card
   b. Getting a black ace
   c. Getting a diamond king
   d. Getting a number card of diamond
   e. Getting a jack or a king

Answers

Multiple Choice Questions

1. (C) 2. (A) 3. (A) 4. (D) 5. (B) 6. (A) 7. (B) 8. (A) 9. (A) 10. (B)
11. (C) 12. (C) 13. (D) 14. (A) 15. (C) 16. (B) 17. (B) 18. (C) 19. (A) 20. (D)
21. (B) 22. (C) 23. (C) 24. (C)

SAMPLE CONTENT

Additional Problems for Practice

Based on Practice Set 5.1

1. 15 2. 9 3. 5

Based on Practice Set 5.2

1. S = {11, 13, 17, 31, 33, 37, 71, 73, 77}, n(S) = 9
2. S = {Sunday, Saturday, Friday, Thursday, Wednesday}
   n(S) = 5
3. i. M_1M_2, M_2M_3, M_3M_1
   ii. W_1W_2
   iii. M_1W_2, M_2W_1, M_2W_2, M_3W_1, M_3W_2
   Sample space = {M_1M_2, M_2M_3, M_3M_1, W_1W_2, M_1W_1, M_1W_2, M_2W_1, M_2W_2, M_3W_1, M_3W_2}

Based on Practice Set 5.3

1. S = {1, 2, 3, 4, 5, 6}, A = {1, 3, 5}
2. S = {1, 2, 3, 4, 5, 6}, n (S) = 6
   A = {3, 6}, n (A) = 2
3. S = {HH, HT, TH, TT}, n(S) = 4
   A = {HT, TH, HH}, n(A) = 3
4. S = {HH, HT, TH, TT}, n(S) = 4
   i. A = {HT, TH, TT}, n(A) = 3
   ii. B = {HT, TH}, n(B) = 2
   iii. C = {HH, HT, TH}, n(C) = 3
   iv. D = {TT}, n(D) = 1
5. S = { 1, 2, 3, 4,…. ,20}, n(S) = 20,
   A = {4, 8, 12, 16, 20} , n(A) = 5
6. S = { 1, 2, 3, 4,…. ,30}, n(S) = 30,
   A = {1, 4, 9, 16, 25} , n(A) = 5
7. S ={ 1, 2, 3, 4,…. ,50} , n(S) = 50
   A ={6, 12, 18, 24, 30, 36, 42, 48} , n(A) = 8
   B = {1, 4, 9, 16, 25, 36, 49} , n(B) = 7
8. S = {B_1B_2, B_1B_3, B_2B_3, B_1G_1, B_1G_2, B_2G_1, B_2G_2, B_3G_1, B_3G_2, G_1G_2 }, n(S) = 10
   A = {B_1G_1, B_1G_2, B_2G_1, B_2G_2, B_3G_1, B_3G_2, G_1G_2 }, n(A) = 7
   B = {B_1G_1 , B_1G_2, B_2G_1, B_2G_2, B_3G_1, B_3G_2}, n(B) = 6
   C = {B_1B_2, B_1B_3, B_2B_3}, n(C) = 3
   D = {B_1B_2, B_1B_3, B_2B_3, B_1G_1, B_1G_2, B_2G_1, B_2G_2, B_3G_1, B_3G_2}, n(D) = 9
9.
   i. S = {HH, HT, TH, TT}, n(S) = 4
   P = {HH}, n(P) = 1
   Q = {TH, TT}, n(Q) = 2
   ii. S ={HHH, HHT, HTH, THH, HTT, THT,TTH, TTT}, n(S) = 8
   P ={HHT, HTH, THH, HTT, THT, TTH, TTT}, n(P) = 7
   Q = {HHH}, n(Q) = 1
   R = {HTH, HTT, TTH, TTT}, n(R) = 4
   iii. S ={ 1, 2, 3, 4,…. ,20} , n(S) = 20
   P ={4, 8, 12, 16, 20} , n(P) = 5
   Q ={2, 3, 5, 7, 11, 13, 17, 19} , n(Q) = 8
   R ={1, 3, 5, 7, 9, 11, 13} , n(R) = 7
   iv. S = {23, 25, 27, 29,
   32, 35, 37, 39,
   52, 53, 57, 59,
   72, 73, 75, 79,
   92, 93, 95, 97} , n(S) = 20
   P ={23, 25, 27, 29, 35, 37, 39, 53, 57, 59, 73, 75, 79, 93, 95, 97} , n(P) = 16
   Q ={25, 35, 75, 95} , n(Q) = 4
   R ={79, 92, 93, 95, 97} , n(R) = 5
   v. S ={ B_1G_1, B_1G_2, B_1G_3, G_1G_2 , G_1G_3, G_2G_3 }, n(S) = 6
   P ={ B_1G_1, B_1G_2, B_1G_3} , n(P) = 3
   Q ={ G_1G_2 , G_1G_3, G_2G_3 } , n(Q) = 3
10. S = {(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)}
    n(S) = 36
    i. E = {(1, 1), (1, 2), (1, 4), (1, 6), (2, 1), (2, 3), (2, 5), (3, 2), (3, 4), (4, 1), (4, 3), (5, 2), (5, 6), (6, 1), (6, 5)},
    n(E) = 15
    ii. F = {(1, 4), (2, 3), (3, 2), (4, 1), (4, 6), (5, 5), (6, 4)}, n(F) = 7
    iii. G = { } = ϕ, n(G) = 0
    iv. H = {(1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 3), (2, 4), (2, 5), (2, 6), (3, 4), (3, 5), (3, 6), (4, 5), (4, 6), (5, 6)},
    n(H) = 15

Based on Practice Set 5.4

1. i. $\frac{1}{2}$ ii. $\frac{1}{2}$
2. i. $\frac{7}{8}$ ii. $\frac{1}{2}$
3. $P(A) = \frac{1}{3}$, $P(B) = \frac{2}{3}$

SAMPLE CONTENT

4. i. $\frac{1}{2}$ ii. $\frac{1}{2}$
iii. 1 iv. $\frac{1}{2}$

5. i. $\frac{1}{9}$ ii. $\frac{1}{18}$ iii. $\frac{1}{9}$
iv. $\frac{5}{18}$ v. 0 vi. $\frac{5}{12}$

6. i. $\frac{1}{2}$ ii. $\frac{1}{4}$

7. i. $\frac{1}{2}$ ii. $\frac{3}{13}$ iii. $\frac{1}{13}$

8. i. $\frac{6}{13}$ ii. $\frac{2}{13}$

9. i. $\frac{4}{11}$ ii. $\frac{1}{11}$

10. i. $\frac{1}{3}$ ii. $\frac{2}{3}$ iii. $\frac{7}{12}$

11. i. $\frac{1}{2}$ ii. $\frac{3}{20}$

12. i. $\frac{2}{5}$ ii. $\frac{1}{5}$

13. $P(A) = \frac{9}{10}$, $P(B) = \frac{3}{5}$

14. i. $\frac{5}{8}$ ii. $\frac{5}{16}$

15. Ramesh

16. $P(A) = \frac{4}{7}$, $P(B) = \frac{2}{7}$, $P(C) = \frac{1}{7}$

Chapter Assessment

1. A.
i. (D) ii. (A) iii. (C)

1. B.
i. The total number of letters in the word Mathematics is 11
$\therefore$ n(S) = **11**
Let A be the event that the card drawn bears vowel.
$\therefore$ n(A) = **4**
$\therefore$ $P(A) = \frac{\mathbf{n(A)}}{\mathbf{n(S)}}$ $\therefore$ $P(A) = \frac{\mathbf{4}}{\mathbf{11}}$

ii. Let A be the event of getting two heads and one tail.
$\therefore$ A = {**HHT, HTH, THH**}
$\therefore$ n(A) = **3**
Let B be the event of getting tail on third coin.
$\therefore$ B = {**HHT, HTT, THT, TTT**}
$\therefore$ n(B) = **4**

2. i. $\frac{1}{4}$ ii. $\frac{15}{22}$ iii. $\frac{17}{60}$

3. i. a. 0 b. $\frac{1}{6}$ c. $\frac{5}{12}$
ii. a. $\frac{3}{26}$ b. $\frac{1}{4}$ c. $\frac{1}{52}$
iii. $\frac{8}{77}$

4. i. $\frac{2}{7}$ ii. 8

5. i. Least : Getting a black ace
Most : Getting a number card of diamond

SAMPLE CONTENT

Std. X

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- हिंदी लोकवाणी
- मराठी अक्षरभारती
- आमोदः (सम्पूर्ण संस्कृतम्)
- आनन्दः (संयुक्त संस्कृतम्)
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