

UNIQUE STUDY POINT

By Sumeet Sahu

Made with ♥ by Sumeet Sahu

Website: uniquestudyonline.com

Contact: Unique Study Point, Amitesh Nagar, Indore, MP

PRACTICE PAPER 01 (2025-26)

CHAPTER 14: PROBABILITY

SUBJECT: MATHEMATICS STANDARD	MAX. MARKS: 40
CLASS: X	DURATION: 1½ hrs

General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five Sections A, B, C, D and E.
3. Section A comprises of 10 MCQs of 1 mark each. Section B comprises of 4 questions of 2 marks each. Section C comprises of 3 questions of 3 marks each. Section D comprises of 1 question of 5 marks and Section E comprises of 2 Case Study Based Questions of 4 marks each.
4. There is no overall choice.
5. Use of Calculators is not permitted.

SECTION - A

Questions 1 to 10 carry 1 mark each.

1. A bag contains 5 red balls and 3 green balls. One ball is drawn at random. What is the probability that the ball drawn is NOT green?
 - (a) $\frac{3}{8}$
 - (b) $\frac{5}{8}$
 - (c) $\frac{1}{2}$
 - (d) $\frac{2}{3}$
2. Two coins are tossed simultaneously. What is the probability of getting at least one head?
 - (a) $\frac{1}{4}$
 - (b) $\frac{1}{2}$
 - (c) $\frac{3}{4}$
 - (d) 1
3. A number is selected at random from numbers 1 to 30. What is the probability that the selected number is a prime number?
 - (a) $\frac{1}{3}$
 - (b) $\frac{1}{2}$
 - (c) $\frac{2}{5}$
 - (d) $\frac{11}{30}$
4. In a single throw of a die, what is the probability of getting a number greater than 4?
 - (a) $\frac{1}{6}$

- (b) $\frac{1}{3}$
- (c) $\frac{1}{2}$
- (d) $\frac{2}{3}$

5. A box contains cards numbered 11 to 60. A card is drawn at random. Find the probability that the number on the card is a perfect square.

- (a) $\frac{1}{5}$
- (b) $\frac{1}{10}$
- (c) $\frac{3}{25}$
- (d) $\frac{2}{25}$

6. An event is very likely to happen. Its probability can be:

- (a) 0.09
- (b) 0.9
- (c) 0.009
- (d) 0.0009

7. A letter is chosen at random from the word 'PROBABILITY'. What is the probability that it is a vowel?

- (a) $\frac{3}{11}$
- (b) $\frac{4}{11}$
- (c) $\frac{5}{11}$
- (d) $\frac{2}{11}$

8. From a well-shuffled pack of 52 cards, one card is drawn at random. What is the probability of getting a red king?

- (a) $\frac{1}{26}$
- (b) $\frac{1}{13}$
- (c) $\frac{1}{52}$
- (d) $\frac{1}{2}$

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
- (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
- (c) Assertion (A) is true but reason (R) is false.
- (d) Assertion (A) is false but reason (R) is true.

9. **Assertion (A):** The sum of probabilities of all elementary events of an experiment is 1.

Reason (R): The probability of a sure event is 1.

10. **Assertion (A):** When a die is thrown, the probability of getting a number less than 7 is 1.

Reason (R): The probability of an impossible event is 0.

SECTION - B

Questions 11 to 14 carry 2 marks each.

11. A bag contains 4 red, 5 black and 6 white balls. A ball is drawn from the bag at random. Find the probability that the ball drawn is:

- (i) white
- (ii) not black

12. A card is drawn at random from a well-shuffled pack of 52 playing cards. Find the probability of getting:

- (i) a red card

(ii) a queen

13. Find the probability of getting 53 Mondays in a leap year.

14. Two dice are thrown simultaneously. Find the probability of getting:

(i) the sum as 8

(ii) a doublet

SECTION - C

Questions 15 to 17 carry 3 marks each.

15. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is thrice that of a red ball, find the number of blue balls in the bag.

16. Cards numbered from 2 to 101 are placed in a box. A card is selected at random. Find the probability that the card has:

(i) an even number

(ii) a square number

(iii) a number which is a multiple of 10

17. Two different dice are thrown together. Find the probability of:

(a) getting a sum of 10

(b) getting a sum divisible by 3

(c) getting a sum less than or equal to 3

SECTION - D

Question 18 carries 5 marks.

18. Red queens, black jacks and black kings are removed from a pack of 52 playing cards. A card is drawn at random from the remaining cards. Find the probability that the drawn card is:

(a) a king

(b) of red colour

(c) a face card

(d) a queen

(e) of black colour

SECTION - E (CASE STUDY BASED QUESTIONS)

Questions 19 to 20 carry 4 marks each.

19. Blood Donation Camp

A school organized a blood donation camp. Students from different classes participated enthusiastically. The data showing the blood groups of 80 students who donated blood is given below:

Blood Group	A	B	AB	O
Number of Students	24	28	8	20

Based on the above information, answer the following questions:

- (i) If one student is selected at random, find the probability that the student has blood group B. (1)
- (ii) If one student is selected at random, find the probability that the student has blood group AB or O. (1)
- (iii) (a) Find the probability that the student selected has blood group A. (1)

OR

- (b) Find the probability that the student selected does not have blood group AB. (1)
- (iv) Which blood group has the maximum number of students? What is the probability of selecting a student with this blood group? (1)

20. Card Game at a Fair

At a school fair, there is a game stall where a box contains 20 cards numbered 1 to 20. A player has to draw one card from the box. If the card shows an even number, the player wins a prize. If the card shows a prime number, the player gets another chance. If the card shows a number divisible by 5, the player gets a consolation prize.

Based on the above information, answer the following questions:

- (i) (a) What is the probability that a player wins a prize? (1)

OR

- (b) What is the probability that a player gets another chance? (1)
- (ii) What is the probability that a player gets a consolation prize? (1)
- (iii) What is the probability that a player neither wins a prize nor gets another chance? (2)

DETAILED ANSWER KEY

SECTION A - ANSWERS

1. Answer: (b) $\frac{5}{8}$

Solution:

Total balls = 5 red + 3 green = 8 balls

Number of balls that are NOT green = 5 red balls

$P(\text{not green}) = \text{Number of red balls} / \text{Total balls} = \frac{5}{8}$

2. Answer: (c) $\frac{3}{4}$

Solution:

When two coins are tossed, possible outcomes = {HH, HT, TH, TT}

Total outcomes = 4

Favorable outcomes (at least one head) = {HH, HT, TH} = 3 outcomes

$P(\text{at least one head}) = \frac{3}{4}$

3. Answer: (a) $\frac{1}{3}$

Solution:

Numbers from 1 to 30 = 30 numbers

Prime numbers from 1 to 30 = {2, 3, 5, 7, 11, 13, 17, 19, 23, 29} = 10 prime numbers

$P(\text{prime number}) = \frac{10}{30} = \frac{1}{3}$

4. Answer: (b) $\frac{1}{3}$

Solution:

When a die is thrown, possible outcomes = {1, 2, 3, 4, 5, 6}

Total outcomes = 6

Numbers greater than 4 = {5, 6} = 2 outcomes

$P(\text{number} > 4) = \frac{2}{6} = \frac{1}{3}$

5. Answer: (c) 3/25

Solution:

Cards numbered 11 to 60 = 50 cards

Perfect squares from 11 to 60 = {16, 25, 36, 49} = 4 numbers

Note: $4 = 2^2$, $9 = 3^2$, $16 = 4^2$, $25 = 5^2$, $36 = 6^2$, $49 = 7^2$, $64 = 8^2$

So perfect squares in range are: 16, 25, 36, 49

However, we need to count cards: 16, 25, 36, 49 = 4 cards

Wait, let me recount: From 11 to 60, we have 50 cards

Perfect squares: 16, 25, 36, 49 = 4 cards

$P(\text{perfect square}) = 4/50 = 2/25$

Correction: Answer should be (d) 2/25

6. Answer: (b) 0.9

Solution:

If an event is very likely to happen, its probability must be close to 1.

Among the options, 0.9 is closest to 1.

Therefore, the probability is 0.9

7. Answer: (b) 4/11

Solution:

Word: PROBABILITY

Total letters = 11

Vowels in PROBABILITY = {O, A, I, I} = 4 vowels

$P(\text{vowel}) = 4/11$

8. Answer: (a) 1/26

Solution:

Total cards = 52

Red kings = King of Hearts + King of Diamonds = 2 red kings

$P(\text{red king}) = 2/52 = 1/26$

9. Answer: (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

Solution:

Assertion (A) is TRUE: The sum of probabilities of all elementary events equals 1.

Reason (R) is TRUE: The probability of a sure event is 1.

However, R does not explain A. They are both true statements but independent of each other.

10. Answer: (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

Solution:

Assertion (A) is TRUE: When a die is thrown, outcomes are $\{1,2,3,4,5,6\}$, all less than 7, so $P = 6/6 = 1$

Reason (R) is TRUE: The probability of an impossible event is 0.

Wait, let me reconsider: R talks about impossible events ($P=0$), while A is about a sure event ($P=1$).

They are opposite concepts, so R does NOT explain A.

Correction: Answer should be (c) Assertion (A) is true but reason (R) is false.

Actually, R is true (impossible events have $P=0$), but it doesn't explain A.

Final Answer: (b) Both true but R is not the correct explanation of A.

SECTION B - ANSWERS

11. Solution:

Total balls = 4 red + 5 black + 6 white = 15 balls

(i) P(white ball):

Number of white balls = 6

$P(\text{white}) = 6/15 = 2/5$

(ii) P(not black):

Number of balls that are not black = 4 red + 6 white = 10 balls

$P(\text{not black}) = 10/15 = 2/3$

12. Solution:

Total cards = 52

(i) P(red card):

Red cards = Hearts + Diamonds = 26 cards

$$P(\text{red card}) = 26/52 = 1/2$$

(ii) P(queen):

Number of queens = 4 (one from each suit)

$$P(\text{queen}) = 4/52 = 1/13$$

13. Solution:

A leap year has 366 days = 52 weeks + 2 extra days

52 complete weeks will definitely have 52 Mondays

For 53 Mondays, one of the 2 extra days must be Monday

Possible combinations of 2 extra days:

(Sun, Mon), (Mon, Tue), (Tue, Wed), (Wed, Thu), (Thu, Fri), (Fri, Sat), (Sat, Sun)

Total combinations = 7

Favorable cases (Monday appears) = (Sun, Mon) and (Mon, Tue) = 2 cases

$$P(53 \text{ Mondays}) = 2/7$$

14. Solution:

When two dice are thrown, total outcomes = $6 \times 6 = 36$

(i) P(sum = 8):

Favorable outcomes: (2,6), (3,5), (4,4), (5,3), (6,2) = 5 outcomes

$$P(\text{sum} = 8) = 5/36$$

(ii) P(doublet):

Doublets: (1,1), (2,2), (3,3), (4,4), (5,5), (6,6) = 6 outcomes

$$P(\text{doublet}) = 6/36 = 1/6$$

SECTION C - ANSWERS

15. Solution:

Let the number of blue balls = x

Total balls = 5 red + x blue = $(5 + x)$ balls

$$P(\text{blue ball}) = x/(5 + x)$$

$$P(\text{red ball}) = 5/(5 + x)$$

$$\text{Given: } P(\text{blue}) = 3 \times P(\text{red})$$

$$x/(5 + x) = 3 \times 5/(5 + x)$$

$$x/(5 + x) = 15/(5 + x)$$

Wait, this gives $x = 15$, let me recalculate:

$$P(\text{blue}) = 3 \times P(\text{red})$$

$$x/(5+x) = 3 \times [5/(5+x)]$$

$$x = 15$$

Therefore, number of blue balls = 15

16. Solution:

Cards numbered 2 to 101 means 100 cards (2, 3, 4, ..., 101)

(i) P(even number):

Even numbers: 2, 4, 6, ..., 100 = 50 even numbers

$$P(\text{even}) = 50/100 = 1/2$$

(ii) P(square number):

Square numbers from 2 to 101: 4, 9, 16, 25, 36, 49, 64, 81, 100 = 9 square numbers

$$P(\text{square}) = 9/100$$

(iii) P(multiple of 10):

Multiples of 10: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 = 10 numbers

$$P(\text{multiple of 10}) = 10/100 = 1/10$$

17. Solution:

Total outcomes when two dice are thrown = 36

(a) P(sum = 10):

Favorable outcomes: (4,6), (5,5), (6,4) = 3 outcomes

$$P(\text{sum} = 10) = 3/36 = 1/12$$

(b) P(sum divisible by 3):

Sums divisible by 3: 3, 6, 9, 12

$$\text{Sum} = 3: (1,2), (2,1) = 2$$

$$\text{Sum} = 6: (1,5), (2,4), (3,3), (4,2), (5,1) = 5$$

$$\text{Sum} = 9: (3,6), (4,5), (5,4), (6,3) = 4$$

$$\text{Sum} = 12: (6,6) = 1$$

$$\text{Total favorable} = 2 + 5 + 4 + 1 = 12$$

$$P(\text{sum divisible by 3}) = 12/36 = 1/3$$

(c) P(sum ≤ 3):

$$\text{Sum} = 2: (1,1) = 1$$

$$\text{Sum} = 3: (1,2), (2,1) = 2$$

$$\text{Total favorable} = 3$$

$$P(\text{sum} \leq 3) = 3/36 = 1/12$$

18. Solution:**Cards removed:**

- Red queens = 2 (Queen of Hearts, Queen of Diamonds)
- Black jacks = 2 (Jack of Spades, Jack of Clubs)
- Black kings = 2 (King of Spades, King of Clubs)

Total cards removed = 6

Remaining cards = $52 - 6 = 46$ cards

(a) P(king):

Kings removed = 2 black kings

Remaining kings = $4 - 2 = 2$ (both red kings)

$P(\text{king}) = \frac{2}{46} = \frac{1}{23}$

(b) P(red card):

Red cards removed = 2 (red queens only)

Red cards remaining = $26 - 2 = 24$

$P(\text{red card}) = \frac{24}{46} = \frac{12}{23}$

(c) P(face card):

Face cards removed = 2 red queens + 2 black jacks + 2 black kings = 6

Total face cards = 12

Remaining face cards = $12 - 6 = 6$

$P(\text{face card}) = \frac{6}{46} = \frac{3}{23}$

(d) P(queen):

Queens removed = 2 (red queens)

Remaining queens = $4 - 2 = 2$ (both black queens)

$P(\text{queen}) = \frac{2}{46} = \frac{1}{23}$

(e) P(black card):

Black cards removed = 2 jacks + 2 kings = 4

Black cards remaining = $26 - 4 = 22$

$P(\text{black card}) = \frac{22}{46} = \frac{11}{23}$

19. Blood Donation Camp - Solutions:

Total students = 80

Blood groups: A = 24, B = 28, AB = 8, O = 20

(i) P(blood group B):

Number of students with blood group B = 28

$$P(B) = 28/80 = 7/20$$

(ii) P(AB or O):

Students with AB or O = 8 + 20 = 28

$$P(AB \text{ or } O) = 28/80 = 7/20$$

(iii)(a) P(blood group A):

Number of students with blood group A = 24

$$P(A) = 24/80 = 3/10$$

OR

(iii)(b) P(not AB):

Students without AB = 24 + 28 + 20 = 72

$$P(\text{not AB}) = 72/80 = 9/10$$

(iv) Blood group with maximum students:

Blood group B has maximum students = 28

$$P(B) = 28/80 = 7/20$$

20. Card Game at Fair - Solutions:

Cards numbered 1 to 20 = 20 cards

Even numbers: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20 = 10 cards

Prime numbers: 2, 3, 5, 7, 11, 13, 17, 19 = 8 cards

Numbers divisible by 5: 5, 10, 15, 20 = 4 cards

(i)(a) P(wins a prize - even number):

$$P(\text{even}) = 10/20 = 1/2$$

OR

(i)(b) P(gets another chance - prime number):

$$P(\text{prime}) = 8/20 = 2/5$$

(ii) P(consolation prize - divisible by 5):

$$P(\text{divisible by } 5) = 4/20 = 1/5$$

(iii) P(neither wins nor gets another chance):

This means: NOT even AND NOT prime

Numbers that are neither even nor prime: 1, 9, 15

Wait, let me list all numbers from 1-20:

1: odd, not prime

9: odd, not prime ($9 = 3^2$)

15: odd, not prime ($15 = 3 \times 5$)

21 is not in range

So favorable outcomes = 3

$$P(\text{neither}) = 3/20$$

Made with ♥ by Sumeet Sahu

Unique Study Point, Amitesh Nagar, Indore, MP

Visit: uniquestudyonline.com