

**MATHEMATICS****CLASS 9***Chapter 7: The Mathematics of Maybe (Introduction to Probability)***WORKSHEET**

Name: \_\_\_\_\_

Class/Section: \_\_\_\_\_

Date: \_\_\_\_\_

**Instructions:**

1. This worksheet contains 25 Multiple Choice Questions (MCQs) covering Chapter 7.
2. Read each question carefully and select the single correct option (A, B, C, or D).
3. An Answer Key table along with short explanations is provided at the end of the document.

**Q1. What is the definition of sample space in probability?**

- A) The total number of favourable outcomes
- B) The set of all possible outcomes of a random experiment
- C) The ratio of successful outcomes to total outcomes
- D) An event that is certain to happen

**Q2. What is the probability of an event that is impossible to occur?**

- A) 0                      B) 0.5                      C) 1                      D) -1

**Q3. The probability of a certain event (an event sure to happen) is equal to:**

- A) 0                      B) 0.5                      C) 1                      D) Greater than 1

**Q4. Which of the following numbers CANNOT be the probability of an event?**

- A) 0.75                      B)  $\frac{2}{3}$                       C) -0.5                      D) 15%

**Q5. A fair coin is tossed once. What is the probability of getting Heads?**

- A) 1                      B)  $\frac{1}{2}$                       C)  $\frac{1}{4}$                       D) 0

**Q6. If a fair six-sided die is rolled, what is the probability of getting a 4?**

A)  $4/6$ B)  $1/6$ C)  $1/4$ D)  $1/2$ 

**Q7. A fair die is rolled once. What is the probability of getting an even number?**

A)  $1/6$ B)  $1/3$ C)  $1/2$ D)  $2/3$ 

**Q8. Two fair coins are tossed simultaneously. What is the sample size,  $n(S)$ ?**

A) 2

B) 3

C) 4

D) 8

**Q9. In a simultaneous toss of two fair coins, what is the probability of getting at least one Head?**

A)  $1/4$ B)  $1/2$ C)  $3/4$ 

D) 1

**Q10. Three fair coins are tossed together. What is the total number of possible outcomes in the sample space?**

A) 3

B) 6

C) 8

D) 9

**Q11. Three fair coins are tossed. What is the probability of getting exactly two Heads?**

A)  $1/8$ B)  $3/8$ C)  $1/2$ D)  $5/8$ 

**Q12. A bag contains 3 red, 2 blue, and 5 green balls. If one ball is drawn at random, what is the probability that it is blue?**

A)  $1/5$ B)  $2/5$ C)  $3/10$ D)  $1/2$ 

**13. From a bag containing 3 red balls and 7 blue balls, what is the probability of NOT drawing a red ball?**

A)  $3/10$ B)  $7/10$ C)  $1/2$ D)  $4/10$ 

**14. Ten identical cards numbered 1 to 10 are in a box. One card is drawn at random. What is the probability of drawing a prime number?**

A)  $2/5$ B)  $1/2$ C)  $3/10$ D)  $3/5$

**15. A die is rolled once. What is the probability of getting a number strictly greater than 4?**

- A)  $1/6$                       B)  $1/3$                       C)  $1/2$                       D)  $2/3$

**16. If  $P(E)$  represents the theoretical probability of an event  $E$ , which inequality is always true?**

- A)  $0 < P(E) < 1$                       B)  $0 \leq P(E) \leq 1$   
C)  $-1 \leq P(E) \leq 1$                       D)  $P(E) > 1$

**17. In a random survey of 50 students, 15 students preferred Football. What is the relative frequency (experimental probability) of students preferring Football?**

- A) 0.15                      B) 0.30                      C) 0.45                      D) 0.50

**18. If a coin is flipped 100 times and Heads appears 56 times, what is the experimental probability of getting Tails?**

- A) 0.56                      B) 0.44                      C) 0.50                      D) 0.64

**19. You roll a fair 6-sided die and get the number 4 eight times in a row. What is the probability of rolling a 4 on the 9th roll?**

- A) Near 0                      B)  $1/6$                       C)  $8/9$                       D) 1

**20. The false belief that a streak of a particular outcome in a random process makes the opposite outcome 'due' to happen is called:**

- A) Sample fallacy                      B) Gambler's fallacy  
C) Experimental error                      D) Relative bias

**21. Tree diagrams are primarily used in probability to:**

- A) Calculate the average of a dataset  
B) List and organize outcomes of multi-step experiments systematically  
C) Draw bar graphs for frequency distribution  
D) Prove that all events are equally likely

**22. Fruit Basket A contains 1 Apple and 2 Oranges. Basket B contains 1 Banana and 1 Mango. If one fruit is randomly picked from each basket, how many total outcome pairs are in the sample space?**

- A) 4                      B) 5                      C) 6                      D) 8

**23. In a sample of 30 sweets, 8 are green. In a large bag of 600 sweets, what is the estimated number of green sweets based on this sample probability?**

- A) 120                      B) 160                      C) 180                      D) 240

**24. Rank the event: 'Next Monday will come after Sunday' on a probability scale from 0 to 1.**

- A) 0 (Impossible)                      B) 0.5 (Equally likely)  
C) 0.8 (More likely)                      D) 1 (Certain)

**25. Rank the event: 'It will snow in Mumbai in July' on the standard probability scale.**

- A) 0 (Impossible)                      B) 0.2 (Less likely)  
C) 0.5 (Equally likely)                      D) 1 (Certain)

## ANSWER KEY &amp; EXPLANATIONS TABLE

| Q. No. | Correct Option | Explanation / Justification                                                                        |
|--------|----------------|----------------------------------------------------------------------------------------------------|
| 1      | Option B       | The set of all possible outcomes of a random experiment is called the sample space S.              |
| 2      | Option A       | An impossible event cannot happen, so its probability is 0.                                        |
| 3      | Option C       | An event that is certain to occur always happens, so its probability is 1.                         |
| 4      | Option C       | Probability can never be negative. Therefore, -0.5 is impossible.                                  |
| 5      | Option B       | $S = \{H, T\}$ , $n(S) = 2$ . Favourable outcome = $\{H\}$ , $n(E) = 1$ . $P(H) = 1/2$ .           |
| 6      | Option B       | $S = \{1, 2, 3, 4, 5, 6\}$ , $n(S) = 6$ . Favourable = $\{4\}$ , $n(E) = 1$ . $P(4) = 1/6$ .       |
| 7      | Option C       | Even numbers = $\{2, 4, 6\}$ , $n(E) = 3$ . $P(\text{Even}) = 3/6 = 1/2$ .                         |
| 8      | Option C       | $S = \{HH, HT, TH, TT\}$ . Total outcomes $n(S) = 4$ .                                             |
| 9      | Option C       | At least one head = $\{HH, HT, TH\}$ , $n(E) = 3$ . $P(\text{At least 1 head}) = 3/4$ .            |
| 10     | Option C       | Three coins tossed: total outcomes = $2^3 = 8$ outcomes.                                           |
| 11     | Option B       | Outcomes with exactly 2 Heads = $\{HHT, HTH, THH\}$ , $n(E) = 3$ . $P = 3/8$ .                     |
| 12     | Option A       | Total balls = $3 + 2 + 5 = 10$ . Blue balls = 2. $P(\text{Blue}) = 2/10 = 1/5$ .                   |
| 13     | Option B       | Total balls = 10. Not red = blue balls = 7. $P(\text{Not Red}) = 7/10$ .                           |
| 14     | Option A       | Primes in $\{1..10\}$ are $\{2, 3, 5, 7\}$ , $n(E) = 4$ . $P(\text{Prime}) = 4/10 = 2/5$ .         |
| 15     | Option B       | Numbers $> 4$ are $\{5, 6\}$ , $n(E) = 2$ . $P(>4) = 2/6 = 1/3$ .                                  |
| 16     | Option B       | The probability of any event always lies between 0 and 1 inclusive: $0 \leq P(E) \leq 1$ .         |
| 17     | Option B       | Relative Frequency = $15/50 = 3/10 = 0.30$ .                                                       |
| 18     | Option B       | Number of Tails = $100 - 56 = 44$ . Experimental $P(\text{Tails}) = 44/100 = 0.44$ .               |
| 19     | Option B       | Each roll of a fair die is an independent event. Previous rolls do not affect $P(4) = 1/6$ .       |
| 20     | Option B       | Believing a streak forces a change in independent random events is the Gambler's Fallacy.          |
| 21     | Option B       | Tree diagrams represent multi-stage outcomes as branching paths to list all possible pairs/tuples. |
| 22     | Option C       | Basket A has 3 fruits, Basket B has 2 fruits. Total pair outcomes = $3 \times 2 = 6$ .             |
| 23     | Option B       | Sample proportion = $8/30$ . Expected count = $(8/30) \times 600 = 8 \times 20 = 160$ .            |
| 24     | Option D       | Days follow a fixed order; Monday following Sunday is 100% certain (Rank = 1).                     |
| 25     | Option A       | Mumbai has a tropical climate where July snowfall is impossible (Rank = 0).                        |