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CLASS 9 MATHS NOTES

PROBABILITY

CHAPTER-15

PROBABILITY

KEY POINTS

Trials-Trial is an action which results in one or several outcomes.

Example -

- i) To toss a coin every time, is called a trial.
- ii) To throw a dice every time is called a trial.
- Probability of an event E is given by

$$P(E) = \frac{\text{Number of Favourable outcomes}}{\text{Total Number of Trials}}$$

- The probability of any event always occur between 0 and 1.
 $0 \leq P(E) \leq 1$
- The probability of any sure event is 1.
 $P(A) = 1$
- The probability of an impossible event is 0.
 $P(A) = 0$
- The sum of probability of all events is 1.
 $P(E) + P(\bar{E}) = 1$

Important Questions with Solutions

PART-A

1. What is the sum of the probabilities of happening of an event & not happening of the event?
2. What could be the probability of happening of an event E?
3. If the probability of an event to occur is 55%, then what is the probability of non occurrence of that event.
4. What is sum of the probabilities of all the possible events of a random experiment?
5. What is the probability of coming a prime number on throwing of a die?

6. A coin is tossed once, what is the probability of getting a tail?
7. A die is tossed once, what is the probability of getting an even number?
8. A bag contains 2 red, 3 green & 1 white ball, what is the probability that the ball picked up is black.
9. In the word MATHEMATICS, what is the probability of choosing a vowel?
10. Out of 35 students of a class, 21 opt automobile engineering & other financial management. What is the probability of choosing a student who took financial management?
11. During an interview for estate manager 15 candidates appeared. Out of which 8 were retired army men, 4 were retired principals & 3 others from different departments. What is the probability of selecting a retired army man for this post?
12. A bag contains slips with numbers between 3 & 32. What is the probability that a slip chosen contains multiples of 4?

PART-B

13. Below is the table showing marks secured in mathematics by students of class IX : What is

Marks secured	0-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	0	1	9	10	10	8	5	3	2

- i) Probability of getting marks less than 50%
 - ii) Probability of getting 90% & above 90%
14. Cards numbered from 7 to 49 are put in a box & mixed thoroughly. A card is drawn from the box, what is the probability that the number written on it is.
 - i) A prime number
 - ii) A multiple of 7.
15. The number of hours spent by Ashu, a school student on various activities on a working day are given below:

Activity	Sleep	school	H.W.	Tution out of home	Outdoor games	Other Acti. at home
No. of Hours	7	7	2	3	3	2

A friend Sonu came to his house to study together. What is the probability that

- i) Ashu is available at home.
- ii) Ashu's friend will play with Ashu.

16. At a traffic light on 28th April, out of 310 vehicles which crossed the light, 200 were cars, 60 were two wheelers & so were autos. 18 were fined for jumping the red light or not wearing of belt or helmet, 5 were fined for using car with odd number, four were left after giving warning. What is the probability that.

- i) A car is chosen & it bears even number.
- ii) A fine was given.

17. The following data was collected from an old age home.

Drink	Campa/Soft Drink	Shikanji	Milk	Canned Juice
No. of people	6	10	16	8

What is the probability that a person chosen likes.

- i) Natural drink
- ii) Canned Juice

18. There are 35 students in class IX A, 34 in IX-B & 33 in IX C. If even roll numbers are allotted project on chapter 2, Polynomials & odd roll number are allotted chapter-1, Number system. What is the probability that the student choosen

- i) Prepares project on chapter 1
- ii) Prepares project on chapter 2

19. If the difference between the probabilities of happening & non happening of an event E is $\frac{3}{7}$. Find the probability of happening of the event E.

20. Following table shows the birth month of 40 students of a class.

Jan	3	July	2
February	4	August	6
March	2	September	3
April	2	October	4
May	5	November	4
June	1	December	4

A student is chosen what is the probability that

- its birth month is November
- The month contains 31 days.

PART-C

21. After a medical check up for HB level of 35 students of class IX following data was recorded.

HB Level	Below 8	Below 10	Below 12	Below 14	Below 16
No. of Students	3	7	13	23	35

What is the probability that a student chosen has

- HB level less than 10.
 - HB level greater than or equal to 12 but less than 16.
22. To know the opinion of 35 students about sixth subject as automobile engineering or financial management a survey was done. The data is recorded in the following table in favour of choosing automobile engineers.

No of student like 20

Dislike 15

Find the probability that a student will opt.

- automobile engineering
 - Financial management
23. A die is thrown 100 times by a player during a game. The data is recorded in the table given below.

Outcome	1	2	3	4	5	6
Frequency	20	12	18	19	16	15

A Player will get one more chance if he gets 1 or 6 & loses his/her next chance if 3 or 5 comes.

- i) What is the probability of losing the next chance?
- ii) What is the probability of getting one more chance?

24. Following is the table showing marks obtained by 200 students out of 100 in an examination.

Marks	No. of Students
0-10	20
10-20	40
20-30	15
30-40	24
40-50	25
50-60	12
60-70	9
70-80	7
80-90	12
90-100	36

Find the probability that a student chosen.

- i) Obtained less than 40 marks.
- ii) Obtained greater than or equal to 60 but less than 80.
- iii) Obtained 80 & above.

25. Mathematics book of class IX contains 15 chapters. A maths teacher asked one of the students to write the name of each chapter on slips, One name on one slip. She mixed the slips thoroughly in a box.

She called a student to pick up one of the slips. What is the probability that the chapter written on it is from

- (i) Geometry
- (ii) Algebra

PART-D

26. ABCD is a quadrilateral whose one of the diagonal AC bisects it into two triangles equal in areas. Find the probability that the quadrilateral chosen has

- i) All the angles right angles.
 - ii) both the diagonals bisect each other.
 - iii) Diagonals are perpendicular to each other.
 - iv) Only one of the diagonal bisect the other.
27. How many pages of NCERT class IX Mathematics book of English medium contains? A page is selected at random. What is the probability that the page number contains.
- i) 9 at one's place.
 - ii) multiple of 4
 - iii) perfect square
28. The following table shows per day salary of 1000 workers.

Salary Per Day (I)	500-700	701-900	901-1100	1101-1300
No. of Workers	280	175	420	125

If a worker is chosen at random, find the probability that he is getting.

- i) at least ₹ 701 daily
 - ii) at most ₹ 900 daily
 - iii) at most ₹ 1300 daily
29.
$$\text{BMI} = \frac{\text{Mass in Kg.}}{(\text{height in metres})^2}$$

The following table shows the BMI of different categories.

S.No.	Category	BMI (kg/m ²)
1.	Under weight	16.0-18.5
2.	Normal weight	18.5-25.0
3.	Over weight	25.0-30.0
4.	Obesity	Above 30.0

Three persons x, y,z have the same height 170 cm and their masses are 70 kg., 85 kg. & 65 kg. respectively.

Find the probability that a person choosen is overweight.

30. Read the lines carefully

Horse is horse, of course, of course.

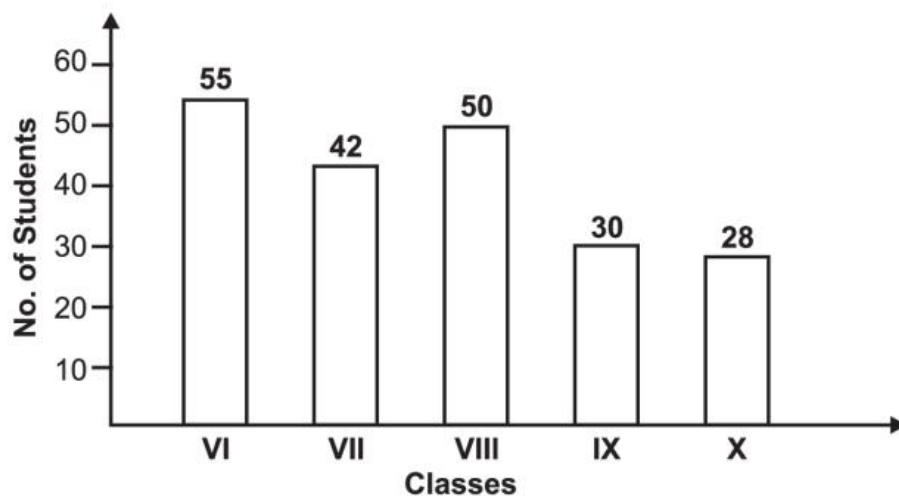
And no one can talk to horse of course.

That is, of course, unless the horse is the famous mister ID.

Find the probability of the word 'course' from the above stanza.

Name the word which has the same probability as the word 'course' has.

31. The bar graph below shows the number of students in different classes of a school.



In the annual function of primary classes, class IX & X was deputed for discipline duty, students of class VII & VIII for sitting, class VI students were to welcome the chief guests.

Find the probability that a student chosen is

- i) Deputed for sitting
- ii) a student of class X.
- iii) member of welcome committee.

32. In a park, there is a right angled triangular flower bed. It's two small sides are 5m & 12m respectively. Along its all sides at a distance of $\frac{1}{2}$ m each, plants of different types are to be planted. Rose plants are to be planted along the shortest side, Marigold plants are to be planted along the longest side & sunflower plant along the third side. At each of the vertex a different type of flower plant is to be planted. Find the probabilities of the following.

- (i) Number of flower plants on the longest side.
- (ii) Number of sun flower plants.
33. Out of 1000 small coloured bulbs $81^{3/2}$ are of white colour. 5^3 are red coloured, 2^6 are green coloured & rest are blue coloured. What is the probability that bulb chosen is.
- (i) blue coloured
- (ii) red coloured.
- (iii) white coloured.
34. In a school there are 682 students. The mode of transport used by them is as follows:

Mode of Transport	Car with Parents	Bicycle	Pedestrian	DTC Bus	Bike with Parents	Van	Auto rickshaw
No. of Students	64	52	128	100	86	172	80

A student is chosen at random. What is the probability that he comes by:

- (i) Four wheeler
- (ii) Two wheeler

CHAPTER-15

PROBABILITY

Answers

- | | | |
|--|---------------------------|--|
| 1. One | 21. i) $\frac{10}{35}$ | ii) $\frac{22}{35}$ |
| 2. $0 \leq P(E) \leq 1$ | 22. i) $\frac{20}{35}$ | ii) $\frac{15}{35}$ |
| 3. 45% | 23. i) $\frac{34}{100}$ | ii) $\frac{35}{100}$ |
| 4. One | 24. i) $\frac{99}{200}$ | ii) $\frac{16}{200}$ iii) $\frac{48}{200}$ |
| 5. $\frac{1}{2}$ | 25. i) $\frac{7}{15}$ | ii) $\frac{2}{15}$ |
| 6. $\frac{1}{2}$ | | |
| 7. $\frac{1}{2}$ | | |
| 8. Zero | 26. i) $\frac{2}{5}$ | ii) $\frac{4}{5}$ iii) $\frac{3}{5}$ |
| 9. $\frac{4}{11}$ | iv) $\frac{1}{5}$ | |
| 10. $\frac{14}{35} = \frac{2}{5}$ | 28. i) $\frac{720}{1000}$ | ii) $\frac{455}{1000}$ iii) 1 |
| 11. $\frac{8}{15}$ | 29. i) $\frac{1}{3}$ | |
| 12. $\frac{7}{28} = \frac{1}{4}$ | 30. i) $\frac{1}{7}$ | ii) Horse |
| 13. i) $\frac{20}{48}$ ii) $\frac{2}{48}$ | 31. i) $\frac{92}{205}$ | ii) $\frac{28}{205}$ iii) $\frac{55}{205}$ |
| 14. i) $\frac{11}{43}$ $\left(\begin{smallmatrix} 7, 11, 13, 17, 23, 29 \\ 31, 37, 41, 43, 47 \end{smallmatrix} \right)$ ii) $\frac{7}{43}$ | 32. i) $\frac{27}{60}$ | ii) $\frac{23}{60}$ |
| 15. i) $\frac{11}{24}$ ii) $\frac{3}{24}$ | 33. i) $\frac{82}{1000}$ | ii) $\frac{125}{1000}$ iii) $\frac{729}{1000}$ |
| 16. i) $\frac{195}{200}$ ii) $\frac{23}{310}$ | 34. i) $\frac{236}{782}$ | ii) $\frac{138}{782}$ |
| 17. i) $\frac{26}{40}$ ii) $\frac{8}{40}$ | | |
| 18. i) $\frac{52}{102}$ ii) $\frac{50}{102}$ | | |
| 19. i) $\frac{5}{7}$ | | |
| 20. i) $\frac{1}{10}$ ii) $\frac{7}{12}$ | | |

PRACTICE TEST

Time : 50 Min.

Probability

M.M. 20

1. Write the probability of an impossible event. (1)
2. Write the probability of a sure event. (1)
3. A dice is thrown once. Find the probability of getting a prime number. (2)
4. A letter of english alphabet is chosen at random. Calculate the probability that letter chosen is a vowel. (2)
5. A bag contains 15 cards numbered 1 to 15. Find the probability of drawing a card from the bag randomly. (3)
 - (i) Card has a number multiple of 3.
 - (ii) Card has a prime number.
6. One number is chosen at random from numbers 1 to 100. Find the probability that it is divisible by 4 or 6. (3)
7. In a one day international cricket match, a batsman play 50 balls. The run scored as follows

Run Scored	0	1	2	3	4	5	6
No. of Balls	13	11	9	7	6	0	4

Find the probability that batsman will score (4)

(a) 6 runs (b) 4 or 6 runs

(c) Runs less than 2 (d) 3 Runs

8. Three coins are tossed simultaneously 200 times with the following frequencies of different out comes. (4)

Outcomes	3 Head	2 Head	1 Head	No Head
Frequency	23	72	77	28

Find the probability of getting :

(a) Two heads , (b) Three heads, (iii) At least two heads

