MATHS

BOOKS - NAVBODH MATHS (HINGLISH)

PROBABILITY

Sums To Enrich Remember

1. A coin is tossed 1000 times with the following frequencies :

Head : 565, Tail : 435

Compute the probability for each event.

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2. Two coins are tossed simultaneously 500 times , and we get

Two heads : 150 times

One head : 250 times

No head : 100 times

Find the probability of occurrence of each of these events.

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3. A dia is thrown 1000 times with the following frequencies for outcomes 1, 2, 3, 4, 5 and 6 as given below:

Outcome	1	2	3	4	5	6
Frequency	179	150	157	149	175	190

Find the probability of happening of each outcome.

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4. On one page of a telephone directory, there were 200 telephone numbers. The frequency distribution of their unit place digit (for example, in the number 25828573, the unit place digit is 3) is given in Table: `D igi t0 1 2 3 4 5 6 7 8 9F r e q u e

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5. The record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times.

What is the probability that on a given day it was correct.

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6. The record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times.

What is the probability that it was not correct on a given day ?

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7. A tyre manufacturing company kept a record of the distance covered before a tyre needed to be replaced . The table shows the results of 1000 cases :

Distance (in km)	less than 4000	4000 to 9000	9001 to 14000	more than
Frequency	20	210	325	445

If you buy a tyre of this company , what is the probability that :

it will need to be replaced before it has covered 4000 km ?

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8. A tyre manufacturing company kept a record of the distance covered before a tyre needed to be replaced . The table shows the results of 1000 cases :

Distance (in km)	less than 4000	4000 to 9000	9001 to 14000	more than
Frequency	20	210	325	445

If you buy a tyre of this company , what is the probability that :

it will last more than 9000 km ?

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9. A tyre manufacturing company kept a record of the distance covered before a tyre needed to be replaced . The table shows the results of 1000 cases :

Distance (in km)	less than 4000	4000 to 9000	9001 to 14000	more than
Frequency	20	210	325	445

If you buy a tyre of this company , what is the probability that :

it will need to be replaced after it has covered somewhere between 4000 km and 14000 km ?

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10. The percentage of marks obtained by a student in the monthly unit tests are given below :

Unit test	I	II	III	IV	V
Percentage of mark obtained	69	71	73	68	74

Based on this data, find the probability that the student gets more than 70% marks in a unit test.

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11. An insurance company selected 2000 drivers at random (i.e., without any preference of one driver over another) in a particular city to find a relationship between age and accidents . The data obtained are given in following table :

Age of drivers (in years)	Accidents in one year				
	0	1	2	3	over 3
18 – 29	440	160	110	61	35
30 – 50	505	125	60	22	18
Above 50	360	45	35	15	9

Find the probabilities of the following events for a driver chosen at random from the city.

being 18-29 years of age and having exactly 3 accidents in one year.

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12. An insurance company selected 2000 drivers at random (i.e., without any preference of one driver over another) in a particular city to find a relationship between age and accidents . The data obtained are given in following table :

Age of drivers (in years)	Accidents in one year				
	0	1	2	3	over 3
18 – 29	440	160	110	61	35
30 – 50	505	125	60	22	18
Above 50	360	45	35	15	9

Find the probabilities of the following events for a driver chosen at

random from the city.

being 30-50 years of age and having one or more accidents in a year.

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13. An insurance company selected 2000 drivers at random (i.e., without any preference of one driver over another) in a particular city to find a relationship between age and accidents . The data obtained are given in following table :

Age of drivers (in years)	Accidents in one year				
	0	1	2	3	over 3
18 – 29	440	160	110	61	35
30 – 50	505	125	60	22	18
Above 50	360	45	35	15	9

Find the probabilities of the following events for a driver chosen at random from the city.

having no accidents in one year

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14. Consider the frequency distribution table (Table 14.3, Example 4, Chapter 14), which gives the weights of 38 students of a class. (i) Find the probability that the weight of a student in the class lies in the interval 46-50 kg. (ii) Give two eve

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15. Consider the frequency distribution table (Table 14.3, Example 4, Chapter 14), which gives the weights of 38 students of a class. (i) Find the probability that the weight of a student in the class lies in the interval 46-50 kg. (ii) Give two eve

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16. Fifty seeds were selected at random from each of 5 bags of seeds , and were kept under standardised conditions favourable to germination. After 20 days. the number of seeds which had germinated in each collection were counted and recorded as follows :

Bag	1	2	3	4	5
Number of seeds germinated	40	48	42	39	41

What is the probability of germination of

more than 40 seeds in a bag ?

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17. Fifty seeds were selected at random from each of 5 bags of seeds , and were kept under standardised conditions favourable to germination. After 20 days. the number of seeds which had germinated in each collection were counted and recorded as follows :

Bag	1	2	3	4	5
Number of seeds germinated	40	48	42	39	41

What is the probability of germination of

49 seeds in a bag ?

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18. Fifty seeds were selected at random from each of 5 bags of seeds , and were kept under standardised conditions favourable to germination. After 20 days. the number of seeds which had germinated in each collection were counted and recorded as follows :

Bag	1	2	3	4	5
Number of seeds germinated	40	48	42	39	41

What is the probability of germination of

more that 35 seeds in a bag ?

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Skill Testing Exercise

1. An unbiased coin is tossed 20 times. In this experiment , 11 heads and 9 tails were received. Calculate the probability of receiving head and the probability of receiving tail on the basis of the experiment .

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2. In his last ten innings, MS Dhoni hit century in three innings Find the probability that Dhoni did not hit a century in an innings.

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3. In an experiment , 2 unbiased coins were tossed for 200 times. During the experiment, two heads were received 25 times, one head was received 100 times and no head was received 75 times. Calculate the probability of each event on the basis of the experiment.

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4. 100 families with two children were selected randomly and the following data were recorded :

No. of girls in family	2	1	0
No. of families	12	80	8

Calculate the probability of a family chosen at random having

two girls

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5. 100 families with two children were selected randomly and the following data were recorded :

No. of girls in family	2	1	0
No. of families	12	80	8

Calculate the probability of a family chosen at random having

One girl.

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6. 100 families with two children were selected randomly and the following data were recorded :

No. of girls in family	2	1	0
No. of families	12	80	8

Calculate the probability of a family chosen at random having

no girl

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7. The following table given the marks scored by 50 students in a 100 marks test of Mathematics.

Marks	$0-20$	$20-40$	$40-60$	$60-80$
No of 3 students	12	18	10	7

A student is selected randomly from the class.

Find the probability that the selected student.

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8. The following table given the marks scored by 50 students in a 100 marks test of Mathematics.

Marks	$0-20$	$20-40$	$40-60$	$60-80$
No of 3 students	12	18	10	7

A student is selected randomly from the class.

Find the probability that selected student has scored 60 or more than 60 marks.

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Exercise 15 1

1. In a cricket match, Dhoni hits a boundary 6 times out of 30 balls he plays. Find the probability that he did not hit a boundary.

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2. 1500 families with 2 children were selected randomly , and the following data were recorded.

Number of girls in a family	2	1	0
Number of families	475	814	211

Compute the probability of a family , chosen at random , having

2 girls

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3. 1500 families with 2 children were selected randomly , and the following data were recorded.

Number of girls in a family	2	1	0
Number of families	475	814	211

Compute the probability of a family , chosen at random , having

1 girl

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4. 1500 families with 2 children were selected randomly , and the following data were recorded.

Number of girls in a family	2	1	0
Number of families	475	814	211

Compute the probability of a family , chosen at random , having

No girls. Also check whether the sum of these probabilities is 1.

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5. Refer to Example 5, Section 14.4, Chapter 14. Find the probability that a student of the class was born in August.

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6. Three coins are tossed simultaneously 200 times with the following frequencies of different outcomes :

Outcome	3 heads	2 heads	1 heads	*No* heads
Frequency	23	72	77	28

If the three coins are simultaneously tossed again , compute the probability of 2 heads coming up.

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7. An organisation selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family . The information gathered is listed in the table below

Monthly Income (in ₹)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen, Find probability that the family chosen is earning Rs 10000 - Rs 13000 per month and owning exactly 2 vehicles.

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8. An organisation selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family . The information gathered is listed in the table below

Monthly Income (in ₹)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen, Find probability that the family chosen is earning Rs 16000 or more per month and owning exactly 1 vehicle.

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9. An organisation selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family . The information gathered is listed in the table below

Monthly Income (in ₹)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen, Find probability that the family chosen is earning less than Rs 7000 per month and does not own any vehicle.

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10. An organisation selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family . The information gathered is listed in the table below

Monthly Income (in ₹)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen, Find probability that the family chosen is earning Rs 13000 - Rs 16000 per month and owning more than 2 vehicles.

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11. An organisation selected 2400 families at random and surveyed them to determine a relationship between income level and the number of vehicles in a family . The information gathered is listed in the table below

Monthly Income (in ₹)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Suppose a family is chosen, Find probability that the family chosen is owning not more than 1 vehicle.

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12. A teacher analyses the performance of two sections of students in a mathematics test of 100 marks given in the following table :

Marks	Number of students
0–20	7
20–30	10
30–40	10
40–50	20
50–60	20
60–70	15
70 and above	8
Total	90

: Find the probability that a student obtained less than 20 marks in the mathematics test.

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13. Find the probability that a student obtained marks 60 or above.

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14. To know the opinion of the students about the subject statistics , a survey of 200 students was conducted . The data is recorded in the following table :

Opinion	Number of students
Like	135
Dislike	65

Find the probability that a student chosen at random

Likes statistics

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15. To know the opinion of the students about the subject statistics , a survey of 200 students was conducted . The data is recorded in the following table :

Opinion	Number of students
Like	135
Dislike	65

Find the probability that a student chosen at random

Does not like it.

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16. Refer to Q.2, Exercise 14.2. What is the empirical probability that an engineer lives:(i) less than 7 km from her place of work?(ii) more than or equal to 7 km from her place of work?(iii) within $\frac{1}{2}km$from her place of work?

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17. Refer to Q.2, Exercise 14.2. What is the empirical probability that an engineer lives:(i) less than 7 km from her place of work?(ii) more than or equal to 7 km from her place of work?(iii) within $\frac{1}{2}km$from her place of work?

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18. Refer to Q.2, Exercise 14.2. What is the empirical probability that an engineer lives:(i) less than 7 km from her place of work?(ii) more than or equal to 7 km from her place of work?(iii) within $\frac{1}{2}km$from her place of work?

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19. Activity : Note the frequency of two - wheelers , three - wheelers and four - wheelers going past during a time interval , in front of your school gate. Find the probability that any one vehicle out of the total vehicles you have observed is a two - wheeler.

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20. Activity: Ask all the students in your class to write a 3-digit number. Choose any student from the room at random. What is the probability

that the number written by her/him is divisible by 3? Remember that a number is divisible by 3, if the sum of its digits is divisible by 3.

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21. Eleven bags of wheat flour, each marked 5 kg, actually contained the following weights of flour (in kg) :

4.97 5.05 5.08 5.03 5.00 5.06 5.08 4.98 5.04 5.07 5.00

Find the probability that any of these bags chosen at random contains more than 5 kg of flour.

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22. In sum you were asked to prepare a frequency distribution table, regarding the concentration of sulphur dioxide in the air in parts per million of a certain city for 30 days. Using this table, find the probability of the concentration of sulphur dioxide in the interval 0.12 -0.16 on any of these days.

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23. In Q.1, Exercise 14.2, you were asked to prepare a frequency distribution table regarding the blood groups of 30 students of a class. Use this table to determine the probability that a student of this class, selected at random, has blood group AB

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Multiple Choice Questions Mcqs

1. When a balanced die is thrown, the porbability of getting 3 , is .....

A. $\frac{1}{3}$

B. $\frac{1}{2}$

C. $\frac{1}{4}$

D. $\frac{1}{6}$

Answer: D

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2. A card is drawn at random from a well shuffled pack of cards . The probability of that card being a king is .....

A. $\frac{1}{52}$

B. $\frac{1}{26}$

C. $\frac{1}{13}$

D. 1

Answer: C

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3. A card is drawn at random from a well shuffled pack of cards . The probability of that card being a card other than picture cards is .....

A. $\frac{4}{13}$

B. $\frac{10}{13}$

C. $\frac{3}{13}$

D. $\frac{1}{13}$

Answer: B

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4. When an unbiased coin is tossed thrice , the probability of receiving three heads is .....

A. $\frac{1}{8}$

B. $\frac{1}{4}$

C. $\frac{1}{2}$

D. $\frac{3}{8}$

Answer: A

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5. When three unbiased coins are tossed simultaneously , the probability of receiving exactly one tail is .....

A. $\frac{1}{8}$

B. $\frac{1}{2}$

C. $\frac{1}{4}$

D. $\frac{3}{8}$

Answer: D

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6. A die is thrown. Find the probability of getting: an even number

A. $\frac{1}{6}$

B. $\frac{5}{6}$

C. $\frac{1}{2}$

D. $\frac{1}{4}$

Answer: C

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7. A die is thrown. Find the probability of getting: a prime number.

A. $\frac{2}{3}$

B. $\frac{3}{4}$

C. $\frac{1}{3}$

D. $\frac{1}{2}$

Answer: D

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8. Two dice are rolled simultaneously . Find the probability of getting a total sum of 9 .

A. $\frac{1}{9}$

B. $\frac{1}{6}$

C. $\frac{1}{3}$

D. $\frac{1}{12}$

Answer: A

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9. Out of 100 days, the forecast predicted by the wheather department proved to be true on 20 days chosen any one day from these 100 days. The probability that the forecast proved to be false is .....

A. $\frac{1}{3}$

B. $\frac{1}{4}$

C. $\frac{3}{4}$

D. $\frac{4}{5}$

Answer: D

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10. The probability of a month of January having 5 Sundays is .....

A. $\frac{2}{7}$

B. $\frac{3}{7}$

C. $\frac{5}{7}$

D. $\frac{1}{7}$

Answer: B

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