MATHS

BOOKS - NAGEEN MATHS (HINGLISH)

PROBABILITY

Example

1. A coin is tossed 100 times and head appears 46 times. Now if we toss a coin at random, what is probability of getting (i) a head (ii) a tail.

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2. Two coins are tossed simultaneous 500 times with the following frequencies of different outcomes.

Two tails = 110 times

One tail = 200 times

No tail = 190 times

Find the probability of occurrence of each events.

3. A die is thrown 250 times and the outcomes are noted as given below :

Outcomes	1	2	3	4	5	6
Frequency	60	50	40	20	30	50

If a die is thrown at random, find the probability of getting.

$(i) 1$ $(ii) 2$ $(iii) 3$ $(iv) 4$ $(v) 5$ $(vi) 6$

4. A die is thrown 560 times. The number 6 appears on the upper face 72 times. A die is thrown at random. What is the probability of getting 6.

5. 1000 families with 2 children were selected randomly and the following data were recorded.

Number of boys in a family	0	1	2
Number of families	140	560	300

If a family is chosen at random, find the probability that it has (i) no boy (ii) one boy (iii) two boys (iv) at least one boy (v) at most one boy.

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6. A survey of 300 girls of a school was conducted and it was found that 108 girls like tea and 192 dislike it. Out of these girls one girl is selected at random. What is the probability that the selected girl (i) likes tea (ii) does not like tea.
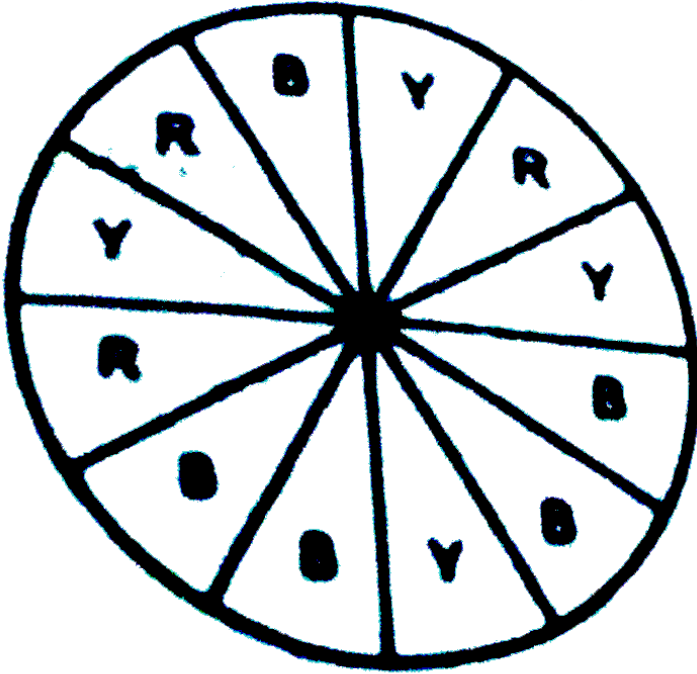
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7. A spinner is coloured by 3 different colours-yellow, blue and red in 12 equal sectors. After spinning the wheel, what is the probability that

(i) wheel stops at yellow colour.

(ii) wheel stops at red colour.

(iii) wheel stops at blue colour.

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8. A marble is chosen at random from marbles numbered 10 to 22. Find the probability of selecting a marble having number 15 and 20 on it.

A. 0

B. 0.1

C. 0.2

D. 0.3

Answer: A

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9. A marble is chosen from marbles numbered 13 to 22. Find the probability of getting a marble having number 15 or 20 on it.

A. $\dfrac{7}{10}$

B. $\dfrac{3}{10}$

C. $\dfrac{2}{5}$

D. $\dfrac{1}{5}$

Answer: D

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

(i) an even number as the sum.

(ii) the sum as a prime number.

(iii) a total of at least 10.

(iv) a doublet.

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

A. 10

B. 11

C. 13

D. 12

Answer: A

12. Suppose you drop a die at random on the rectangular region shown in Figure. What is the probability that it will land inside the circle with diameter 1m?

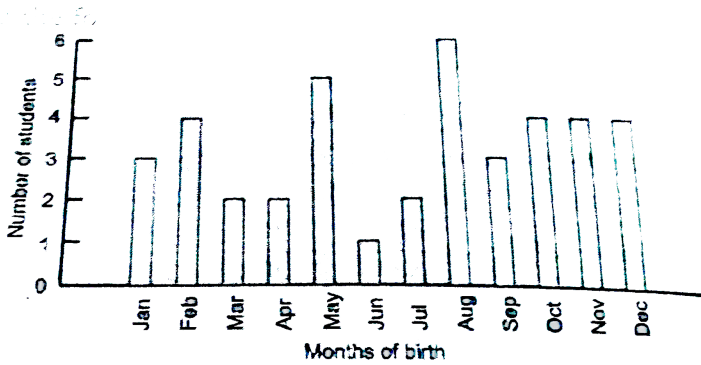A. $\dfrac{\pi}{8}$

B. $\dfrac{\pi}{6}$

C. $\dfrac{\pi}{4}$

D. $\dfrac{\pi}{24}$

Answer: D

Problems From Ncert Exemplar

1. In a particular section of class IX, 40 students were asked about the month of their birth and the following graph was prepared for the data so obtained.

Find the probability that a student of the class was born in August.

A. $\dfrac{1}{2}$

B. $\dfrac{1}{3}$

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

D. $\dfrac{3}{20}$

Answer: D

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

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

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

A. $\dfrac{8}{25}$

B. $\dfrac{3}{25}$

C. $\dfrac{9}{25}$

D. $\dfrac{7}{25}$

Answer: C

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3. An organisation selected 2400 families at random and surveyed them to determine relationship between income level and the number of vechicles 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 the probability that the family chosen is :

(i) earning Rs. 10000-13000 per month and owning exactly 2 vehicles.

(ii) earning Rs. 16000 or more per month and owning exactly 1 vehicle.

(iii) earning less than Rs. 7000 per month and does not own any vehicle.

(iv) earning Rs. 13000-16000 per month and owning more than 2 vehicles.

(v) owning not more than 1 vehicle.

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4. A teacher wanted to analysis the performance of two sections of students in a mathematics test of 100 marks. Looking performance, she found that a few students got under 20 marks and a few got 70 marks or above. So she decided to group them into intervals of varying sizes as follows :

0-20, 20-30, ..., 60-70, 70-100. Then she formed 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 – above	8
Total	90

(i) Find the probability that a student obtained less than 20 % in the mathematics test.

(ii) Find the probability that a student obtained marks 60 or above .

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5. A study was conduced to find out the concentration of sulphur dioxide in the air in parts per million (ppm) of a certain city. The data obtained for 30 days is as follow:

0.03   0.08   0.08   0.09   0.04   0.17
0.16   0.05   0.02   0.06   0.18   0.20
0.11   0.08   0.12   0.13   0.22   0.07
0.08   0.01   0.10   0.06   0.09   0.18
0.11   0.07   0.05   0.07   0.01   0.04

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.

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

B. $\dfrac{4}{15}$

C. $\dfrac{2}{15}$

D. $\dfrac{1}{15}$

Answer: D

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6. Bulbs are packed in cartons each containing 40 bulbs. Seven hundred cartons were examined for defective bulbs and the results are given in the following table :

Number of defective bulbs	0	1	2	3	4	5	6	More than 6
Frequency	400	180	48	41	18	8	3	2

One carton was selected at random. What is the probaility that it has

(i) no defective bulbs ?

(ii) defective buble from 2 to 6 ?

(iii) defective bulbs less than 4 ?

7. Over the past 200 working days, the number of defective parts produced by a machine is given in the following table :

Number of defective parts	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Days	50	32	22	18	12	12	10	10	10	8	6	6	2	2

Determine the probability that tomorrow's output will have :

(i) no defective part.

(ii) at least one defective part,

(iii) not more than 5 defective parts,

(iv) more than 13 defective parts.

Exercise

1. A coin is tossed 200 times and it was found that head appears 72 times and tail appears 128 times. If a coin is tossed at random, what is the probabiltity of getting (i) a head (ii) a tail?

2. Two coins are tossed simultaneously 125 times and it was observed that both head appeared 15 times. If two coins are tossed simultaneously at random, what is the probability of getting both heads?

3. Two coins are tossed simultaneously 300 times and it is found that two heads appeared 135 times, one head appeared 111 times and no head appeared 54 times. If two coins are tossed at random, what is the probability of getting (i) 2 heads (ii) 1 head (iii) 0 head?

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

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

Find the probabiltiy of (i) getting at most two heads (ii) getting at least two heads.

5. In a cricket match a batsman hits a boundary 6 times out of 20 balls he plays. Find the probability that he did not hit a boundary.

A. $\dfrac{7}{10}$

B. $\dfrac{3}{10}$

C. $\dfrac{2}{3}$

D. $\dfrac{1}{5}$

Answer: A

6. 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.

7. A die is thrown 260 times. Prime numbers appear on the upper face 39

times. If a dia is thrown at random, what is the probability of getting a

prime number?

A. $\dfrac{39}{260}$

B. $\dfrac{33}{260}$

C. $\dfrac{221}{260}$

D. $\dfrac{223}{260}$

Answer: A

8. A survey of 650 men showed that only 52 of them know English. Out of these men, if one is selected at random, what is the probability that the selected man knows English.

A. $\dfrac{4}{25}$

B. $\dfrac{1}{25}$

C. $\dfrac{2}{25}$

D. $\dfrac{3}{25}$

Answer: C

9. 10 packets of suger each marked 1 kg actually contained the following weights 0.6 kg, 1.050 kg, 1.1 kg, -0.98 kg, 0.92 kg, 1.3 kg, 1.4 kg, 1.00 kg, 0.94 kg, 1.03 kg. Out of these packets, one packet is chosen at random, what is

the probability that the chosen packet contain

(i) more than 1 kg sugar,

(ii) 1 kg sugar,

(iii) less than 1 kg sugar?

10. The percentage of marks obtained by a student in six units tests are given below:

Unit test	I	II	III	IV	V	VI
5% of marks obtained	53	72	28	46	67	59

A unit test is selected at random. What is the probability that the student gets more than 60% marks in the test.

A. $\dfrac{1}{2}$

B. $\dfrac{1}{3}$

C. $\dfrac{2}{3}$

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

Answer: B

11. On a particular day, at a crossing in a city, the various types of 280 vehicles going past during a time interval were observed as under:

Type of vehicle	Two wheelers	Three wheelers	Four wheelers
Frequency	91	63	126

Out of these vechicles , one is chosen at random, what is the probability that the chosen vechicle is

(i) a four wheeler

(ii) a two wheeler

(iii) a three wheeler?

12. The following table shows the blood groups of 60 students of a class :

Blood groups	A	B	O	AB
Number of students	16	12	23	9

One student of the class is chosen at random. What is the probability that the chosen student has blood group?

(i) O   (ii) AB   (iii) A   (iv) B

Revision Exercise Very Short Answer Short Answer Questions

1. What is the probability of an impossible event?

2. What is the probability of a sure event?

3. What is the sum of all probabilities of an event.

4. A die is rolled 600 times and the occurrence of the outcomes 1, 2, 3, 4, 5

and 6 given below :

Outcome	1	2	3	4	5	6
Frequency	200	30	120	100	50	100

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

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

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

D. $\dfrac{1}{5}$

Answer: A

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5. A bag contains 16 cards 1, 2, 3, ..., 16 respectively. One card is chosen at

random. What is the probability that the chosen card bears a number

which is divisible by 3.

A. $\dfrac{11}{16}$

B. $\dfrac{5}{16}$

C. $\dfrac{3}{16}$

D. $\dfrac{7}{16}$

Answer: B

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6. A coin is tossed 40 times and head appears 25 times. What is the probability of getting a tail.

A. $\dfrac{3}{8}$

B. $\dfrac{1}{8}$

C. $\dfrac{5}{8}$

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

Answer: A

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7. It is given that the probability of winning a game is $\frac{3}{7}$. What is the probability of lossing the game.

A. $\frac{4}{7}$

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

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

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

Answer: A

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8. A die is thrwon at randow. What is the probability of getting an odd number.

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

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

C. $\dfrac{5}{6}$

D. $\dfrac{2}{3}$

Answer: A

9. In a locality 100 families were chosen at random and the following data was collected:

Number of childeren is each family	0	1	2	3	4 or more
Number of families		3	40	45	12	0

If a family is chosen at random, find the probability that the chosen family has 3 or more children.

A. $\dfrac{22}{25}$

B. $\dfrac{3}{25}$

C. $\dfrac{4}{25}$

D. $\dfrac{1}{5}$

Answer: B

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10. Two coins are tossed 1000 times and the outcomes are recorded as under :

Number of heads	2	1	0
Frequency	266	540	194

A coin is thrown at random. What is the probability of getting at most one head.

A. $\dfrac{27}{50}$

B. $\dfrac{21}{50}$

C. $\dfrac{33}{50}$

D. $\dfrac{29}{50}$

Answer: A