RD SHARMA
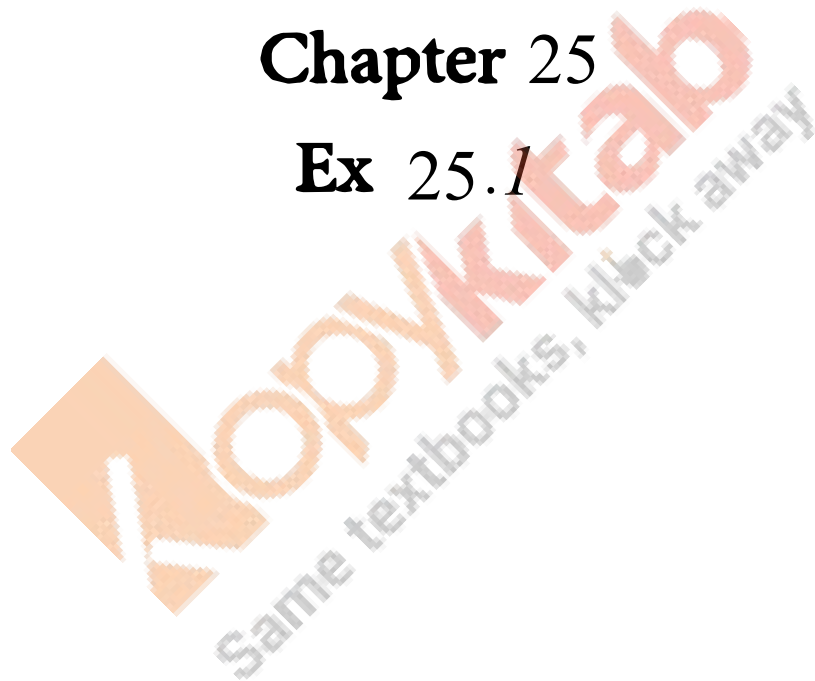
Solutions

Class 9 Maths

Chapter 25

Ex 25.1

Q1. A coin is tossed 1000 times with the following sequence: Head: 455, Tail=:545. Compute the probability of each event

Answer:

It is given that the coin is tossed 1000 times. The number of trials is 1000

Let us denote the event of getting head and of getting tails be E and F respectively. Then

Number of trials in which the E happens= 455

So, Probability of E= $\dfrac{Number of event heads}{Total no of trials}$

i.e. $P(E) = \dfrac{455}{1000}$ =0.455

Similarity, the probability of the event getting a tail = $\dfrac{Number of tails}{Total no of trials}$

i.e. $P(F) = \dfrac{545}{1000}$ =0.545

Q2. Two coins are tossed simultaneously 500 times with the following frequencies of different outcomes:

TWO HEADS: 95 times

ONE HEADS: 290 times

NO HEADS: 115 times

Find the probability of occurrence of each of these events

 Answer:

Probability (E) = $\dfrac{number of trials in which events happen}{Total no of trials}$

P(Getting two heads) = $\dfrac{95}{500}$ =0.19

P(Getting one tail) = $\dfrac{290}{500}$ =0.58

P(Getting no head) = $\dfrac{115}{500}$ =0.23

Q3. Three coins are tossed simultaneously 100 times with the following frequencies of different outcomes:

OUTCOME	NO HEAD	ONE HEAD	TWO HEAD	THREE HEAD
FREQUENCY	14	38	36	12

 If the three coins are tossed simultaneously again, compute the probability of:

1. heads coming up

2. heads coming up

3. At least one Head coming up

4. Getting more Tails than Heads

5. Getting more heads than tails

ANS:

1: Probability of 2 Heads coming up= $\dfrac{Favorable\,outcome}{Total\,outcome}$

$= \dfrac{36}{100}$ =0.36

2. Probability of 3 Heads coming up= $\dfrac{Favorable\,outcome}{Total\,outcome}$

$= \dfrac{12}{100}$ =0.12

3. Probability of at least one head coming up= $\dfrac{Favorable\,outcome}{Total\,outcome}$

$= \dfrac{38+36+12}{100}$

$= \dfrac{86}{100}$ =0.86

4. Probability of getting more Heads than Tails= $\dfrac{Favorable\,outcome}{Total\,outcome}$

$= \dfrac{36+12}{100}$

$= \dfrac{48}{100}$

5. Probability of getting more tails than heads= $\dfrac{Favorable\,outcome}{Total\,outcome}$

$= \dfrac{14+38}{100}$

$= \dfrac{52}{100}$ =0.52

Q4. 1500 families with 2 children were selected randomly, and the following data were recorded:

No of girls in a family	0	1	2
No of girls	211	814	475

If a family is chosen at random, compute the probability that it has:

1. No girl

2. 1 girl

3. 2 girls

4. At most one girl

5. More girls than boys

Answer

1. Probability of having no girl in a family= $\dfrac{no\,of\,families\,having\,no\,girl}{Total\,no\,of\,families}$

$= \dfrac{211}{1500}$ =0.1406

2. Probability of having 1 girl in a family= $\dfrac{no\,of\,families\,having\,1\,girl}{Total\,no\,of\,families}$

$= \dfrac{814}{1500}$

$= \dfrac{407}{750}$ =0.5426

3. Probability of having 2 girls in a family= $\dfrac{no\,of\,families\,having\,2\,girls}{Total\,no\,of\,families}$

$= \dfrac{475}{1500}$ =0.3166

4. Probability of having at the most one girl= $\dfrac{no\,of\,families\,having\,at\,the\,most\,one\,girl}{Total\,no\,of\,families}$

$= \dfrac{211+814}{1500}$

$= \dfrac{1025}{1500}$ =0.6833

5. Probability of having more girls than boys= $\dfrac{no\,of\,families\,having\,more\,girls\,than\,boys}{Total\,no\,of\,families}$

$= \dfrac{475}{1500}$ =0.31

Q5. In a cricket match, a batsman hits a boundary 6 times out of 30 balls he plays. Find the probability that:

1. He hit a boundary

2. He did not hit a boundary.

 Answer

Number of times the batsman hits a boundary= 6

Total number of balls played= 30

Number of times the batsman did not hit a boundary= 30-6= 24

1. Probability that the batsman hits a boundary= $\dfrac{Number\,of\,times\,he\,hit\,a\,boundary}{Total\,no\,of\,balls}$

$= \dfrac{6}{30}$

$= \dfrac{1}{5}$

2. Probability that the batsman does not hit a boundary

$\dfrac{Number\,of\,time\,he\,did\,not\,hit\,a\,boundary}{Total\,no\,of\,balls}$

$= \dfrac{24}{30}$

$= \dfrac{4}{5}$

Q6. 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	76

Find the probability that the student gets

1. More than 70% marks

2. Less than 70% marks

3. A distinction

Answer:

1: Let E be the event of getting more than 70% marks

No of times E happens=3

Probability(Getting more than 70%)= $\dfrac{Number of times student got more than 70}{Total no of exams taken}$

$= \dfrac{3}{5}$ =0.6

2. Let F be the event of getting less than 70% marks

No of times F happen= 2

Probability(Getting less than 70%)= $\dfrac{Number of times student got less than 70}{Total no of exams taken}$

$= \dfrac{2}{5}$ =0.4

3. Let G be the event of getting distinction

No of times G happen= 1

Probability(Getting distinction)= $\dfrac{Number of times student got distinction}{Total no of exams taken}$

$= \dfrac{1}{5}$ =0.2

Q7. To know the opinion of the students about Mathematics, a survey of 200 students were conducted. The data was recorded in the following table

Opinion	Like	Dislike
Number of students	135	65

Find the probability that student chosen at random:

1. Likes Mathematics

2. Does not like it.

Answer

1. Probability that a student likes mathematics= $\frac{Favorable\ outcome}{Total\ outcome}$

$= \frac{135}{200}$ = 0.675

2. Probability that a student does not like mathematics= $\frac{Favorable\ outcome}{Total\ outcome}$

$= \frac{65}{200}$ = 0.325

Q8. The Blood group table of 30 students of class IX is recorded as follows:

A, B, O, O, AB, O, A, O, B, A, O, B, A, O, O

A, AB, O, A, A, O, O, AB, B, A, O, B, A, B, O

A student is selected at random from the class from blood donation. Find the probability that the blood group of the student chosen is:

1: A

2: B

3: AB

4: O

ANSWER

BLOOD GROUP	A	B	O	AB	TOTAL
NUMBER OF STUDENTS	9	6	12	3	30

1. Probability of a student having blood group A= $\frac{Favorable\ outcome}{Total\ outcome}$

$= \frac{9}{30}$ = 0.3

2. Probability of a student having blood group B= $\frac{Favorable\ outcome}{Total\ outcome}$

$= \frac{6}{30}$ = 0.2

3. Probability of a student having blood group AB= $\frac{Favorable\ outcome}{Total\ outcome}$

$= \frac{3}{30}$

$= \frac{1}{10}$ = 0.10

4. Probability of a student having blood group O= $\frac{Favorable\ outcome}{Total\ outcome}$

$= \frac{12}{30}$ = 0.4

Q9. Eleven bags of wheat flour, each marked 5kg, 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.

ANSWER:

Number of bags weighing more than 5kgs= 7

Total no of bags= 11

Probability of having more than 10kgs of rice= $\dfrac{no\,of\,bags\,weighing\,more\,than\,5kg}{Total\,no\,of\,bags}$

= $\dfrac{7}{11}$ =0.63

Q10. The following table show the birth month of 40 students in class IX:

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
3	4	2	2	5	1	2	5	3	4	4	4

Find the probability that a student is born in October

ANSWER:

1. Probability that a student is born in the month of October= $\dfrac{no\,of\,students\,born\,in\,October}{Total\,no\,of\,students}$

= $\dfrac{6}{40}$

= $\dfrac{3}{20}$ = 0.15

Q11. Given below is the frequency distribution table regarding the concentration of SO_2 in the air in parts per million of a certain city for 30 days.

Concentration of SO_2	0.00-0.04	0.04-0.08	0.08-0.12	0.12-0.16	0.16-0.20	0.20-0.24
No of days	4	8	9	2	4	3

Find the probability of the concentration of SO_2 in the interval 0.12-0.16 on any of these days.

Answer:

Total no of days: 30

Probability of concentration of SO_2 in interval 0.12-0.16= $\dfrac{Favorable\, outcome}{Total\, outcome}$

$= \dfrac{2}{30}$

$= \dfrac{1}{15}$ = 0.06

Q12. A company selected 2400 families at random and surveys them to determine a relationship between income level and the number of vehicles in a home. The information gathered is listed below

VEHICLES PER FAMILY:

Monthly Income	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	29	25
16000 above	1	579	82	88

If a family is chosen at random find the probability that the family is:

1. Earning Rs 10000 – 13000 per month and owning exactly 2 vehicles.

2. Earning Rs 16000 or more per month and owning exactly 1 vehicle.

3. Earning less than Rs 7000 per month and does not own any vehicle.

4. Earning Rs 13000 – 16000 per month and owning more than 2 vehicles.

5. Owning not more than 1 vehicle.

6.Owning at least one vehicle

Answer:

1. The probability that the family is earning 10000-13000 and is having exactly 2 vehicles

$= \dfrac{No\, of\, families\, having\, 10000-13000\, income\, and\, 2\, vehicles}{Total\, no\, of\, families}$

$= \dfrac{29}{2400}$

2. The probability that the family is earning 16000 or more and is having exactly 1 vehicle

$$= \frac{No\,of\,families\,having\,16000\,or\,more\,income\,and\,1\,vehicle}{Total\,no\,of\,families}$$

$$= \frac{579}{2400}$$

3. The probability that the family is earning less than 7000 and is having no vehicle

$$= \frac{No\,of\,families\,having\,less\,than\,7000\,income\,and\,no\,vehicle}{Total\,no\,of\,families}$$

$$= \frac{10}{2400} = \frac{1}{240}$$

4. The probability that the family is earning 13000-16000 and is having more than 2 vehicles

$$= \frac{No\,of\,families\,having\,13000-16000\,income\,and\,more\,than\,2\,vehicles}{Total\,no\,of\,families}$$

$$= \frac{25}{2400} = \frac{1}{96}$$

5. The probability that the family is having not more than one vehicle

$$= \frac{No\,of\,families\,having\,not\,more\,than\,1\,vehicle}{Total\,no\,of\,families}$$

$$= \frac{10+0+1+2+1+160+305+535+469+579}{1200}$$

$$= \frac{2062}{2400} = \frac{1031}{1200}$$

6. The probability that the family is having atleast one vehicle

$$= \frac{No\,of\,families\,having\,atleast\,1\,vehicle}{Total\,no\,of\,families}$$

$$= \frac{160+305+535+469+579+25+27+29+29+82+0+2+1+25+88}{1200}$$

$$= \frac{2356}{2400} = \frac{589}{600}$$

Q13. The following table gives the life time of 400 neon lamps:

Life time	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
bulbs	14	56	60	86	74	62	48

A bulb is selected at random. Find the probability that the lifetime of a selected bulb:

1. Less than 400 hrs

2. between 300-800 hours

3. Atleast 700 hours

Answers:

Total number of bulbs= 400

1. Probability that the life of the selected bulb is less than 400hrs

$$= \frac{No\,of\,bulbs\,having\,life\,less\,than\,400hrs}{Total\,no\,of\,bulbs}$$

$$= \frac{14}{400} = \frac{7}{200}$$

2. Probability that the life of the selected bulb is between 300-800hrs

$$= \frac{No\,of\,bulbs\,having\,life\,less\,than\,400hrs}{Total\,no\,of\,bulbs}$$

$$= \frac{14+56+60+86+74}{200}$$

$$= \frac{290}{400} = \frac{29}{40}$$

3. Probability that the life of the selected bulb is atleast 700hrs

$$= \frac{No\,of\,bulbs\,having\,life\,atleast\,700hrs}{Total\,no\,of\,bulbs}$$

$$= \frac{74+62+48}{400}$$

$$= \frac{184}{400} = \frac{23}{50}$$

Q14. Given below is the frequency distribution of wages (in Rs) of 30 workers in certain factory:

Wages	110-130	130-150	150-170	170-190	190-210	210-230	230-250
No of workers	3	4	5	6	5	4	3

A worker is selected at random. Find the probability that his wages are:

1. Less than Rs.150

2. Atleast Rs.210

3. More than or equal to 150 but less than 210

Answer

Total number of workers=30

1. Probability that the worker wages are less than Rs.150=

$$= \frac{No\,of\,workers\,having\,wages\,below\,Rs.150}{Total\,no\,of\,workers}$$

$$= \frac{3+4}{30} = \frac{7}{30}$$

2. Probability that the worker wages are atleast Rs.210=

$$= \frac{No\,of\,workers\,having\,wages\,below\,Rs.210}{Total\,no\,of\,workers}$$

$$= \frac{4+3}{30} = \frac{7}{30}$$

3. Probability that the worker wages are more than or equal to 150 but less than 210

$$= \frac{No\, of\, workers\, having\, wages\, more\, than\, Rs.150\, but\, less\, than\, Rs.210}{Total\, no\, of\, workers}$$

$$= \frac{5+6+5}{30} = \frac{16}{30} = \frac{8}{15}$$