Unit No. 13

Probability

Exercise No. 13.2

Question No. 1

No. of death	0	1	2	3	4	5	6
Frequency	60	50	87	40	32	15	10

Find the relative frequency of the given data.

Solution:

No. of deaths	Frequency	Relative Frequency
0	60	$\dfrac{60}{294} = \dfrac{30}{147}$
1	50	$\dfrac{50}{294} = \dfrac{25}{147}$
2	87	$\dfrac{87}{294} = \dfrac{20}{98}$
3	40	$\dfrac{40}{294} = \dfrac{30}{147}$
4	32	$\dfrac{32}{294} = \dfrac{16}{147}$
5	15	$\dfrac{15}{294} = \dfrac{5}{98}$
6	10	$\dfrac{10}{294} = \dfrac{5}{47}$
	$\Sigma f = 294$	

Question No. 2

The frequency of defective products in 750 samples are shown in the following table.

No. of defective per sample	No. of samples
0	120
1	140
2	94

3	85
4	105
5	50
6	40
7	66
8	50

Solution:

No. of defective per sample	No. of samples	Relative Frequency
0	120	$\frac{120}{750} = \frac{4}{25}$
1	140	$\frac{140}{750} = \frac{14}{75}$
2	94	$\frac{94}{750} = \frac{47}{375}$
3	85	$\frac{85}{750} = \frac{17}{150}$
4	105	$\frac{105}{750} = \frac{21}{150}$
5	50	$\frac{50}{750} = \frac{1}{15}$
6	40	$\frac{40}{750} = \frac{4}{75}$
7	66	$\frac{66}{750} = \frac{33}{375}$
8	50	$\frac{50}{750} = \frac{1}{15}$
	$\Sigma f = 750$	

Question No. 3

A quiz competition on general knowledge is **conducted. The number of corrected answers out of 5 questions for 100 sets of questions is given below.**

X	f
0	10
1	23
2	15
3	25
4	18
5	9

Find the relative frequencies for the given data.

Solution:

X	f	Relative Frequency
0	10	$\frac{10}{100} = \frac{1}{10}$
1	23	$\frac{23}{100}$
2	15	$\frac{15}{100} = \frac{3}{20}$
3	25	$\frac{25}{100} = \frac{1}{4}$
4	18	$\frac{18}{100} = \frac{9}{50}$
5	9	$\frac{9}{100}$
	$\Sigma f = 100$	

Question No. 4

A survey was conducted from the 50 students of a class and asked about their favourite food. The responses are as under:

Name of food item	No. of Students
Biryani	40
Fresh Juice	07
Chicken	21
Bar. B. Q	15
Sweets	25

(i)   How many percentages of students like biryani?
Solution:

Total no. of students = 40 + 07 + 21 + 15 + 25 =108
Percentage of students who like Biryani = (40 / 108) ×100% = **37.04%**

(ii) How many percentage of students like chicken?
Solution:

Percentage of student who like chicken = (21 / 108) ×100%= **19.44%**

(iii) Which food is the least liked by the students?
Solution:

Fresh juice is liked by least no. of students.

(iv) Which food is the most prefer by the students?
Solution:

Biryani is most preferred by the students.

Question No. 5

In 500 trials of a thrown of two dice, what is expected frequency that the sum will be greater than 8?

Solution:

Possible outcomes = (1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6),(2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6),(3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)

No. of favourable outcomes (sum greater than 8) = n(A) = 10,

Total possible outcomes = n(S) = 36

Expected frequency = (10 / 36) × 500 = **138∙88 = 139**

Question No. 6

What is the expectation of a person who is to get Rs.120 if he obtains at least 2 heads in single toss of three coins?
Solution:

Sample space.

HHH. HHT, HTH, THH, HTT, THT, TTH, TTT

Total no. of sample space is 8. Now you have to understand that what does at least mean. It means you have to consider, the value with 2 heads or more. For at least two heads

HHH, HHT, HTH, THH

Total no. of outcomes = 4

Probability (at least two heads) = (No. of outcomes) / (Total no. of possible outcomes)

$$= 4 / 8 = 1 / 2$$

Expectation of a person to get = $1 / 2 \times 120 = 60$

Question No. 7

Find the expected frequencies of the given data if the experiment is repeated 200 times.

x	P(x)
0	0.11
1	0.21
2	0.17
3	0.18
4	0.09
5	0.17
6	0.07

Solution:

Experiment is repeated 200 times.

x	P(x)	Expected frequencies
0	0.11	$0.11 \times 200 = 22$
1	0.21	$0.21 \times 200 = 42$
2	0.17	$0.17 \times 200 = 34$
3	0.18	$0.18 \times 200 = 36$
4	0.09	$0.09 \times 200 = 18$
5	0.17	$0.17 \times 200 = 34$
6	0.07	$0.07 \times 200 = 14$