

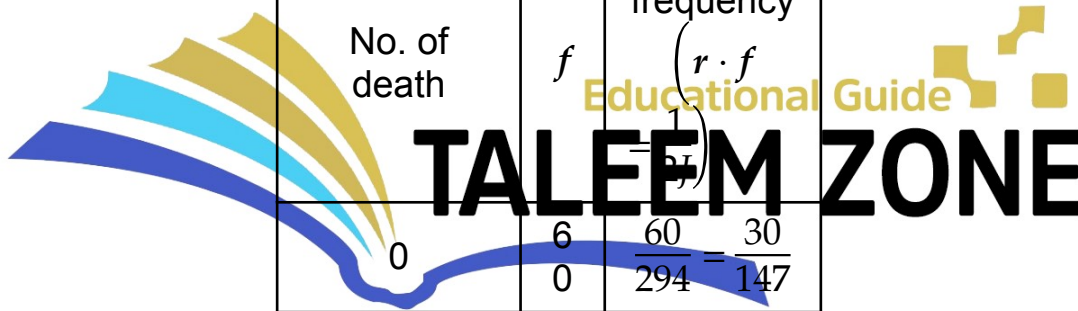
Exercise No.13.2

Q. 1 A researcher collected data on number of deaths from Horse-Ricks in Russian Army crops over to years. The table is as follows:

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

Find the relative frequency of the data.

Solution:



No. of death	f	Relative frequency $\left(\frac{r \cdot f}{\sum f} \right)$
0	60	$\frac{60}{294} = \frac{30}{147}$

1	50	$\frac{50}{294} = \frac{25}{147}$
2	87	$\frac{87}{294} = \frac{29}{98}$
3	40	$\frac{40}{294} = \frac{20}{147}$
4	32	$\frac{32}{294} = \frac{16}{147}$
5	15	$\frac{15}{294} = \frac{5}{98}$
6	10	$\frac{10}{294} = \frac{5}{147}$

	$\Sigma f = 294$	
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Q. 2 The frequency of defective products in 750 samples are shown in the following table. Find the relative frequency for the given table.

No. of defectives per sample	0	1	2	3	4	5	6	7	8
No. of sample	120	140	94	85	105	50	40	66	50

Solution:

No. of defectives per sample	No. of sample (f)	Relative frequency $r.f = \frac{1}{27}$
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	$\frac{66}{750} = \frac{11}{125}$
8	50	$\frac{50}{750} = \frac{1}{15}$

	$\Sigma f = 750$	
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Q. 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	0	1	2	3	4	5
f	10	23	15	25	18	9

Find the relative frequencies for the given data.

Solution:



x	f	$\frac{f}{\Sigma f}$
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	$\frac{9}{100}$

TALEEM ZONE

Educational Guide

	Σf = 100	
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Q. 4 A survey conducted from the 50 students of a class and asked about their favourite food. The responses are as under:

Name of food item	Biryani	Fresh juice	Chicken	Bar B.	Sweets
No. of students	40	07	21	15	25

- (i) How many percentages of students like biryani?
(ii) How many percentages of students like chicken?
(iii) Which food is the least like by the students?
(iv) Which food is the most preferred by the students?

Solution:

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Name of food item	No. of students (f)	Relative frequency $\frac{f}{\Sigma f}$	%age
Biryani.	40	$\frac{40}{108} = 0.37$	$0.37 \times 100 = 37\%$
Fresh juice	07	$\frac{7}{108} = 0.065$	$0.065 \times 100 = 6.5 \%$
Chicken	21	$\frac{21}{108} = 0.194$	$0.19 \times 100 = 19.4 \%$
Bar. B. Q	15	$\frac{15}{108} = 0.14$	$0.14 \times 100 = 14\%$
Sweet	25	$\frac{25}{108} = 0.23$	$0.23 \times 100 = 23\%$
Total	$\Sigma f = 108$		

- (i) 37% students like biryani.
- (ii) 19.4% students like chicken.
- (iii) fresh juice is liked by least students.

(iv) Biryani is most preferred by the students (6.5% only)

Q. 5 In 500 trials of a thrown of two dice, what is expected frequency that the sum will be greater than 8?

Solution:

Total trailers = $N = 500$

We know that

Expected frequency = $N \times P(A)$ (i)

When two dice are rolled once, then 36 outcomes are possible i.e.

$n(S) = 36$

Let "A" be an event of occurring sum of dots greater than 8.

$$A = \{3,6\}, \{4,5\}, \{4,6\}, \{5,4\}, \{5,5\}, \{5,6\}$$

$$\{6,3\}, \{6,4\}, \{6,5\}, \{6,6\}$$

$$n(A) = 10$$

Probability of event A in one trial

$$P(A) = \frac{n(A)}{n(S)} = \frac{10}{36} = \frac{5}{18}$$

Probability of event A in 500 trails:

$$\text{Expected frequency} = 500 \times \frac{5}{18}$$

$$\text{Expected frequency} = N \times P(A)$$

$$= \frac{2500}{18} = 138.8 \approx 139$$

Q. 6 What is the expectation of a person who is to get Rs. 120 if he obtains at least 2 heads in a single toss of three coins?

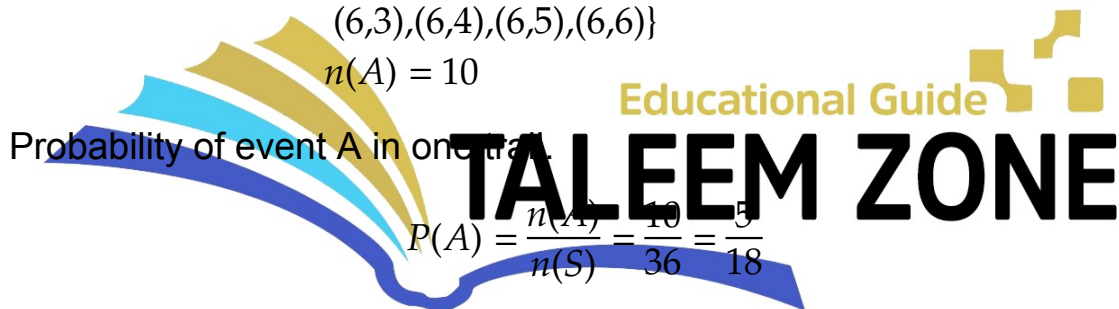
Solution:

Amount for occurring an vent of two heads = Rs. 120

Let 'A' be an event of getting at least 2 heads on tossing three coins single time. Total possible outcomes = $2^3 = 8$ i.e. $n(s) = 8$ A =

$$\{(H_1, H_2, H_3), (H_1, H_2, T_3), (H_1, T_2, H_3), (T_1, H_2, H_3)\}, n(A) = 4$$

Probability of event A :



$$P(A) = \frac{n(A)}{n(S)} = \frac{4}{8} = \frac{1}{2}$$

$$\begin{aligned}\text{Expected amount of event} &= \text{Rs. } 120 \times \frac{1}{2} \\ &= \text{Rs. } 60\end{aligned}$$

Q. 7 Find the expected frequencies of the given data if the experiment is repeated 200 times.

x	0	1	2	3	4	5	6
$P(x)$	$\frac{0.1}{1}$	$\frac{0.2}{1}$	$\frac{0.1}{7}$	$\frac{0.1}{8}$	$\frac{0.0}{9}$	$\frac{0.1}{7}$	$\frac{0.0}{7}$

Solution:

Total no. of trials = $N = 200$

x	$P(x)$	Expected frequency = $N \times P(x)$
0	$\frac{0.1}{1}$	$200 \times 0.11 = 22$
1	$\frac{0.2}{1}$	$200 \times 0.21 = 42$
2	$\frac{0.1}{7}$	$200 \times 0.17 = 34$
3	$\frac{0.1}{8}$	$200 \times 0.18 = 36$
4	$\frac{0.0}{9}$	$200 \times 0.09 = 18$
5	$\frac{0.1}{7}$	$200 \times 0.17 = 34$
6	$\frac{0.0}{7}$	$200 \times 0.07 = 14$

TALEEM ZONE

Q. 8 The probability of getting 5 sixes while tossing dice is $\frac{2}{5}$. The dice is rolled 200 times. How many times would you expect it to show 5 sixes?

Solution:

Let "A" be an event of getting 5 sixes while tossing dice.

Probability of getting 5 sixes = $P(A) = \frac{2}{5}$

Numbers of trails = $N = 200$

We know that

Expected frequency = $N \times P(A)$

$$\begin{aligned}\text{Expected frequency} &= 200 \times \frac{2}{5} \\ &= 40 \times 2 \\ &= 80\end{aligned}$$

In 200 trails, we expect it will show 5 sixes

