

NCERT SOLUTIONS

CLASS - 9th



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Class : 9th
Subject : Maths
Chapter : 15
Chapter Name : Probability

Exercise 15.1

Q1 In a cricket match, a batswoman hits a boundary 6 times out of 30 balls she plays. Find the probability that she did not hit a boundary.

Answer. Number of times the batswoman hits a boundary = 6

Total number of balls played = 30

Number of times that the batswoman does not hit a boundary = $30 - 6 = 24$

$$p(\text{she does not hit the boundary}) = \frac{\text{Number of times when she does not hit boundary}}{\text{Total number of balls played}}$$

$$= \frac{24}{30} = \frac{4}{5}$$

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Q2 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

(i) 2 girls (ii) 1 girl (iii) no girl

Also check whether the sum of these probabilities is 1.

Answer. Total number of family = $475 + 814 + 211 = 1500$

(i) number of families of 2 girls = 475

$$p_1(\text{she does not hit the boundary}) = \frac{\text{Number of families having 2 girls}}{\text{Total number of balls played}}$$

$$= \frac{475}{1500} = \frac{19}{60}$$

(ii) Number of families having 1 girl = 814

$$p_2(\text{she does not hit the boundary}) = \frac{\text{Number of families having 1 girl}}{\text{Total number of balls played}}$$

$$= \frac{814}{1500} = \frac{407}{750}$$

(iii) Number of families having no girl = 211

$$p_3(\text{she does not hit the boundary}) = \frac{\text{Number of families having no girl}}{\text{Total number of balls played}}$$

$$= \frac{211}{1500}$$

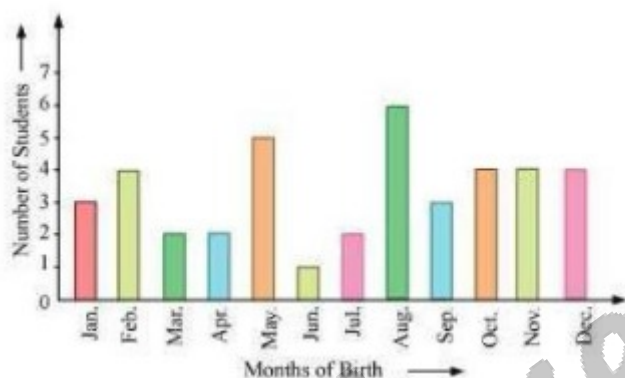
$$\text{Sum of all these probabilities} = \frac{19}{60} + \frac{407}{750} + \frac{211}{1500}$$

$$= \frac{475+814+211}{1500}$$

$$= \frac{1500}{1500} = 1$$

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Q3 Refer to Example 5, Section 14.4, Chapter 14. Find the probability that a student of the class was born in August.



Answer. Number of students born in the month of August = 6

Total number of students = 40

$$P(\text{Students born in the month of August}) = \frac{\text{Number of students born in August}}{\text{Total number of students}}$$

$$= \frac{6}{40} = \frac{3}{20}$$

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Q4 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,

Answer. Number Of times 2 heads come up = 72

Total number Of times the coins were tossed = 200

$$P(2 \text{ heads will come up}) = \frac{\text{Number of times 2 heads come up}}{\text{Total number of times the coins were tossed}}$$

$$= \frac{72}{200} = \frac{9}{25}$$

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Q5 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 Rs)	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

- earning Rs 10000 – 13000 per month and owning exactly 2 vehicles.
- earning Rs 16000 or more per month and owning exactly 1 vehicle.
- earning less than Rs 7000 per month and does not own any vehicle.
- earning Rs 13000 – 16000 per month and owning more than 2 vehicles.
- owning not more than 1 vehicle.

Answer. Number of total families surveyed = $10 + 160 + 25 + 0 + 0 + 305 + 27 + 2 + 1 + 535 + 29 + 1 + 2 + 469 + 59 + 25 + 1 + 579 + 82 + 88 = 2400$

(i) Number of families earning Rs 10000 - 13000 per month and owning exactly 2 vehicles = 29

Hence, required probability, $p = P = \frac{579}{2400}$

(ii) Number Of families earning Rs 16000 or more per month and owning exactly 1 vehicle = 579

Hence, required probability, $p = \frac{10}{2400} = \frac{1}{240}$

(iii) Number of families earning less than Rs 7000 per month and does not own any vehicle = 10

Hence, required probability, $p = \frac{10}{2400} = \frac{1}{240}$

(iv) Number of families earning Rs 13000 - 16000 per month and owning more than 2 vehicles = 25

Hence, required probability, $p = \frac{25}{2400} = \frac{1}{96}$

(v) Number of families owning not more than 1 vehicle = $10 + 160 + 0 + 305 + 535 + 2 + 469 + 1 + 579 = 2062$

Hence, required probability, $p = \frac{2062}{2400} = \frac{1031}{1200}$

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Q6 Refer to Table 14.7, Chapter 14.

(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.

Answer. Total number Of students born in the year = $3 + 4 + 2 + 2 + 5 + 1 + 2 + 6 + 3 + 4 + 4 + 4 = 40$

Number of students born in August

\therefore Probability that a student of the class was born in August = $\frac{6}{40} = \frac{3}{20}$.

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Q7 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.

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

Find the probability that a student chosen at random

(i) likes statistics,

(ii) does not like it.

Answer. Total number of students = $135 + 65 = 200$

(i) Number of students liking statistics = 135

$P(\text{student liking statistics}) = \frac{135}{200} = \frac{27}{40}$

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Q8 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 1 2 km from her place of work?

Answer. (i) Total number of engineers = 40

Number of engineers living less than 7 km from their place of work = 9

Hence, required probability that an engineer lives less than 7 km from her place Of

$$P = \frac{9}{40}$$

(ii) Number of engineers living more than or equal to 7 km from their place of work = $40 - 9 = 31$

Hence, required probability that an engineer lives more than or equal to 7 km from

Her place of work, $P = \frac{31}{40}$

Hence, required probability that an engineer lives within $\frac{1}{2}$ km from her place of work, $P = 0$

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Q9 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.

Answer. DIY

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Q10 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.

Answer. DIY

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Q11 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.

Answer. Number of total bags = 11

Number of bags containing more than 5 kg of flour = 7

Hence ,required probability $P = \frac{7}{11}$

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Q12 In Q.5, Exercise 14.2, 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.

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

Answer. Number days for which the concentration Of sulphur dioxide was in the interval Of 0.12 - 0.16 = 2

Total number Of days = 30

Hence,required probability $P = \frac{2}{30} = \frac{1}{15}$

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Q13 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.

Blood group	Number of students
A	9
B	6
AB	3
O	12
Total	30

Answer. Number of students having blood group AB=3

Total number of students = 30

Hence,required probability $P = \frac{3}{30} = \frac{1}{10}$

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