

Activity 33

OBJECTIVE

To find experimental probability of unit's digits of telephone numbers listed on a page selected at random of a telephone directory.

MATERIAL REQUIRED

Telephone directory, note book, pen, ruler.

METHOD OF CONSTRUCTION

1. Take a telephone directory and select a page at random.
2. Count the number of telephone numbers on the selected page. Let it be 'N'.
3. Unit place of a telephone number can be occupied by any one of the digits 0, 1, ..., 9.
4. Prepare a frequency distribution table for the digits, at unit's place using tally marks.
5. Write the frequency of each of the digits 0, 1, 2, ...8, 9 from the table.
6. Find the probability of each digit using the formula for experimental probability.

DEMONSTRATION

1. Prepare a frequency distribution table (using tally marks) for digits 0, 1, ..., 8, 9 as shown below:

Digit	0	1	2	3	4	5	6	7	8	9
Tally marks Frequency	n_0	n_1	n_2	n_3	n_4	n_5	n_6	n_7	n_8	n_9

2. Note down frequency of each digit (0, 1, 2, 3,...,9) from the table.

Digits 0, 1, 2, 3, ..., 9 are occurring respectively $n_0, n_1, n_2, n_3, \dots, n_9$ times.

3. Calculate probability of each digit considering it as an event 'E' using the formula

$$P(E) = \frac{\text{Number of trials in which the event occurred}}{\text{Total number of trials}}$$

4. Therefore, respective experimental probability of occurrence of 0, 1, 2, ..., 9 is given by

$$P(0) = \frac{n_0}{N}, P(1) = \frac{n_1}{N}, P(2) = \frac{n_2}{N}, \dots, P(9) = \frac{n_9}{N}.$$

OBSERVATION

Total number of telephone numbers on a page (N) =

Number of times 0 occurring at unit's place (n_0) =

Number of times 1 occurring at unit's place (n_1) =

Number of times 2 occurring at unit's place (n_2) =

-----3 ----- (n_3) =

----- 4 ----- (n_4) =

Number of times 9 occurring at unit's place (n_9) =

Therefore, experimental probability of occurrence of 0 = $P(0) = \frac{n_0}{N} = \dots\dots\dots$,

Experimental probability of occurrence of 1 = $P(1) = \frac{n_1}{N} = \dots\dots\dots$.

$$P(2) = \frac{n_2}{N} = \dots\dots\dots, \dots,$$

⋮

$$P(9) = \frac{n_9}{N} = \dots\dots\dots$$

APPLICATION

Concept of experimental probability is used for deciding premium tables by insurance companies, by metreological department to forecast weather, for forecasting the performance of a company in stock market.

The mathematics experience of the students is incomplete if he never had the opportunity to solve a problem invented by himself.

– G. Polya