Assignment 1

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***Abstract*—This PDF contains the solution for Assignment 1 (ICSE Class 10 Maths 2017 Q.3(c))**

QUESTION:

The marks of 10 students of a class in an examination arranged in ascending order is as follows:
$13, 35, 43, 46, x, x+4, 55, 61, 71, 80.$
If the median marks is 48, find the value of x.
Hence find the mode of the given data.

Solution:

1) Finding the value of x :

Median (M) : If n be the number of entries in given sorted data (ascending or descending) then median of the data is given by ,

(i) if n = odd

$$M = \left(\frac{n+1}{2}\right)^{th} \text{ element}$$

(ii) if n = $even$

$$M = \frac{\left(\frac{n}{2}\right)^{th} element + \left(\frac{n}{2}+1\right)^{th} element}{2}$$

As here the value of n is **even**
From (ii) ,

$$M = \frac{(x)+(x+4)}{2}$$
$$M = \frac{(2x+4)}{2}$$
$$M = x+2$$

$$x = M - 2 \tag{1}$$

As $M = 48$ substituting this in equation (1) we get ,

$$x = 48 - 2$$

$$\therefore x = 46 \tag{2}$$

2) Mode of the data :

Using Histogram method to find mode of the data . Converting given set of sorted numbers (here ascending) into Class Intervals ,

DATA : $13, 35, 43, 46, 46, 50, 55, 61, 71, 80$

TABLE :

Class Interval	frequency
0-10	0
10-20	1
20-30	0
30-40	1
40-50	3
50-60	2
60-70	1
70-80	2

TABLE I
FREQUENCY DISTRIBUTION TABLE

The mode class is first obtained by identifying the interval corresponding to the maximum frequency. The mode point is then obtained as the intersection of the lines PQ and RS. The $x-$coordinate of the mode point is the desired (approximate) mode. For the given problem,

$$\mathbf{P} = \begin{pmatrix}50\\3\end{pmatrix}, \mathbf{Q} = \begin{pmatrix}40\\1\end{pmatrix}, \tag{3}$$

$$\mathbf{R} = \begin{pmatrix}40\\3\end{pmatrix}, \mathbf{S} = \begin{pmatrix}50\\2\end{pmatrix} \tag{4}$$

and from $(3), (4)$ the desired mode is

$$\mathbf{M} = \begin{pmatrix}46.667\\2.333\end{pmatrix}$$

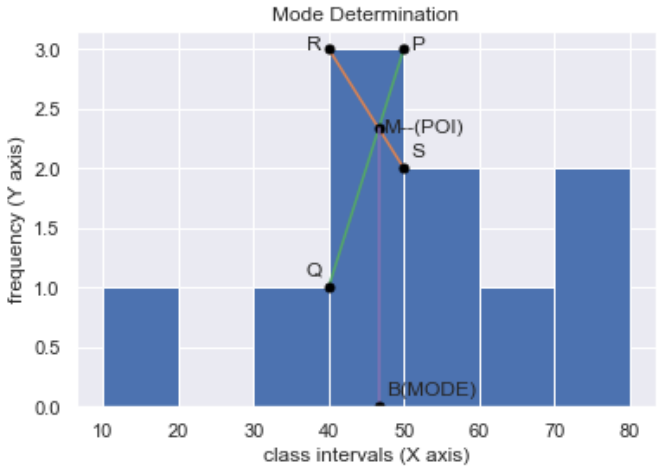

Fig. 1. Histogram of Data

Hence, Mode(approx) of given data = 46.66 i.e., **mode =** 46 **.**