UNIT 1

HISTOGRAM

Calculate Mean, Median, Mode, Quartiles and IQR from the given Histogram.

Mean from a Histogram :

Mean $= [\sum((\frac{L+U}{2}) * f\ )/n]$ for all intervals where L is the lower bound of an interval

U is the upper bound of an interval

f is the frequency of that interval

To calculate the Median or Q_2 from a histogram you have to apply the following classical formula:

$L_m + [(\text{Position of median} - F_{m-1})/f_m] \cdot c$ Position of median = (n+1) / 2 or (0.5)*(n+1) if n is odd

Position of median = n / 2 or (0.5)*(n) if n is even

where L_m is the lower limit of the median bar,
n is the total number of observations,
F_{m-1} is the cumulative frequency of the bar preceding the median bar
(i.e. the total number of observations in all bars below the median bar),
f_m is the frequency of the median bar, and c is the median bar width.

Note : $(n/2 - F_{m-1})\ /f_m$ is the proportion of observations in the median bar that are below the median.

To calculate the First Quartile or Q_1 from a histogram you have to apply the following classical formula:

$$L_{Q1} + [(\text{Position of } Q_1 - F_{Q1-1})/f_{Q1}] \cdot c \qquad \text{Position of } Q_1 = (0.25)*(n+1)$$

where L_{Q1} is the lower limit of the First Quartile bar,
n is the total number of observations,
F_{Q1-1} is the cumulative frequency of the bar preceding the first quartile bar
(i.e. the total number of observations in all bars below the first quartile bar),

f_{Q1} is the frequency of the first quartile bar, and c is the first quartile width.

To calculate the Third Quartile or Q_3 from a histogram you have to apply the following classical formula:

$$L_{Q3} + [(\text{Position of } Q_3 - F_{Q3-1}) / f_{Q3}] \cdot c \qquad \text{Position of } Q_3 = (0.75)*(n+1)$$

where L_{Q3} is the lower limit of the Third Quartile bar,
n is the total number of observations,
F_{Q3-1} is the cumulative frequency of the bar preceding the third quartile bar
(i.e. the total number of observations in all bars below the third quartile bar),
f_{Q3} is the frequency of the third quartile bar, and c is the third quartile width.

IQR = $Q_3 - Q_1$

Mode :

1. Find the interval that contains mode.
2. Find the midpoint of that interval.
3. That midpoint is the approximate estimation of mode.