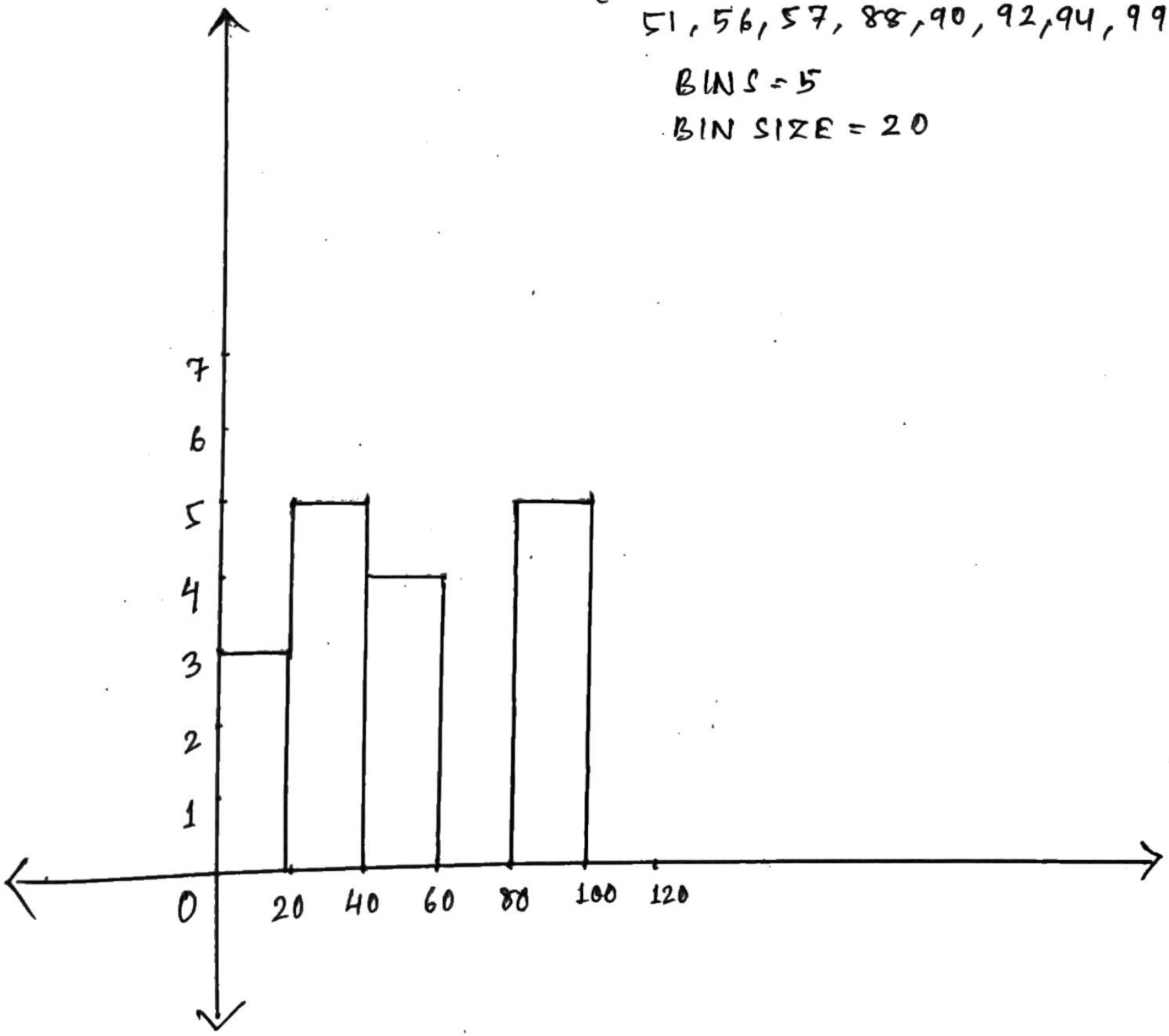
Histogram

eg :- {10, 13, 18, 22, 27, 32, 38, 40, 45
51, 56, 57, 88, 90, 92, 94, 99}

BINS = 5

BIN SIZE = 20



Q1. Here, $\sigma = 100$, $n = 25$, $\bar{x} = 520$

$CI = 80\%$, so $\alpha = 0.2$

Now,

$$\text{Lower bence} = \bar{x} - Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= 520 - Z_{0.1} \frac{100}{\sqrt{25}}$$

$$= 520 - 1.29 \times 20$$

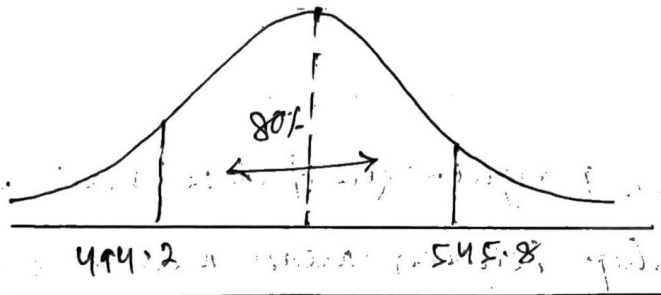
$$= 494.2$$

$$\text{Higher bence} = \bar{x} + Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= 520 + Z_{0.1} \frac{100}{\sqrt{25}}$$

$$= 520 + 1.29 \times 20$$

$$= 545.8$$



Q2. $H_0 : P_0 \geq 60\%$

$H_1 : P_0 < 60\%$

Here, $n = 250$, $x = 170$

$q_0 = 1 - P_0 = 1 - 0.6 = 0.4$

Here,

$\alpha = 0.1$ $CI = 1 - 0.1 = 0.9$

Z test value $= -1.29$

$$Z\text{-test} = \frac{\hat{p} - P_0}{\sqrt{\frac{P_0 \times q_0}{n}}}$$

$$= \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}} = \frac{0.08}{0.0309} = 2.588$$

So, 2.588 is greater than -1.29 and +1.29 reject the null hypothesis.

Q4. value = { 2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12 }

value of 99 percentile = $\frac{99}{100}(n+1)$

$= \frac{99}{100} \times 21$

$= 20.79^{th}$ index

$= 12$

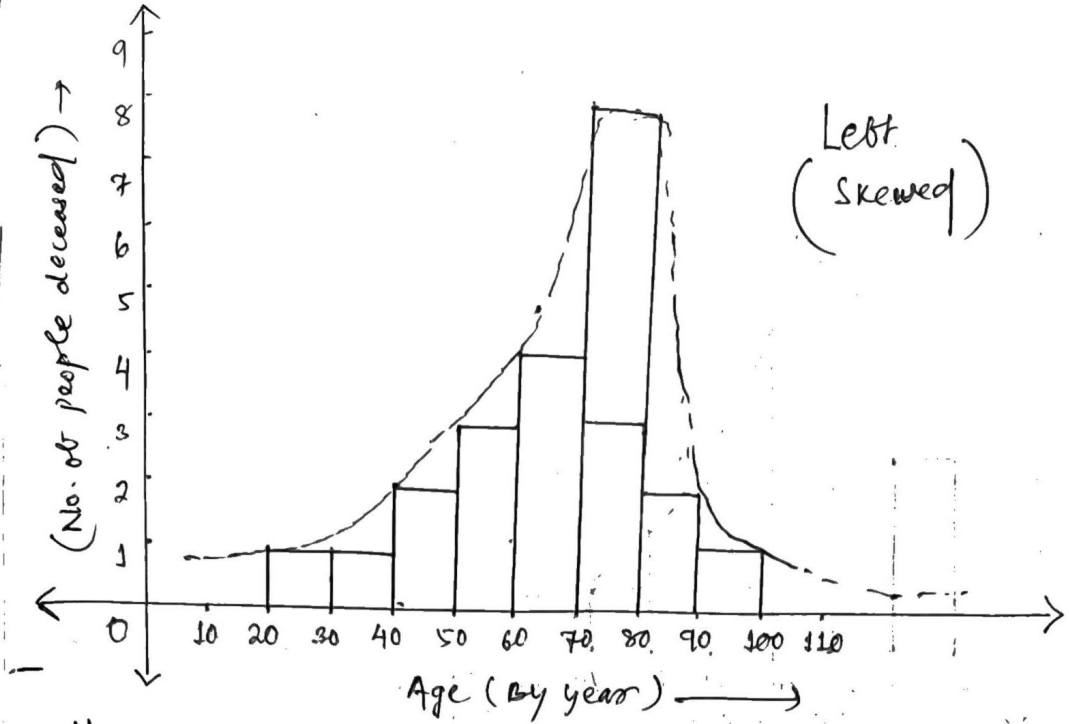
So, 99 percentile will be 12.

Q5. In left & right-skewed data, what is the relationship between mean, median & mode?

→ For Left-skewed data

example - Deaths in our surroundings by years.

value$^{(n)}$ = { 25, 32, 42, 44, 51, 53, 55, 61, 63, 64, 66, 71, 72, 73, 74, 77, 77, 97, 79 82, 85, 87, 92, 95, 103 }



Here, Mean = 68

$$\text{Median} = \frac{50}{100} \times 26$$

$$= 13^{\text{th}} \text{ index} = 72$$

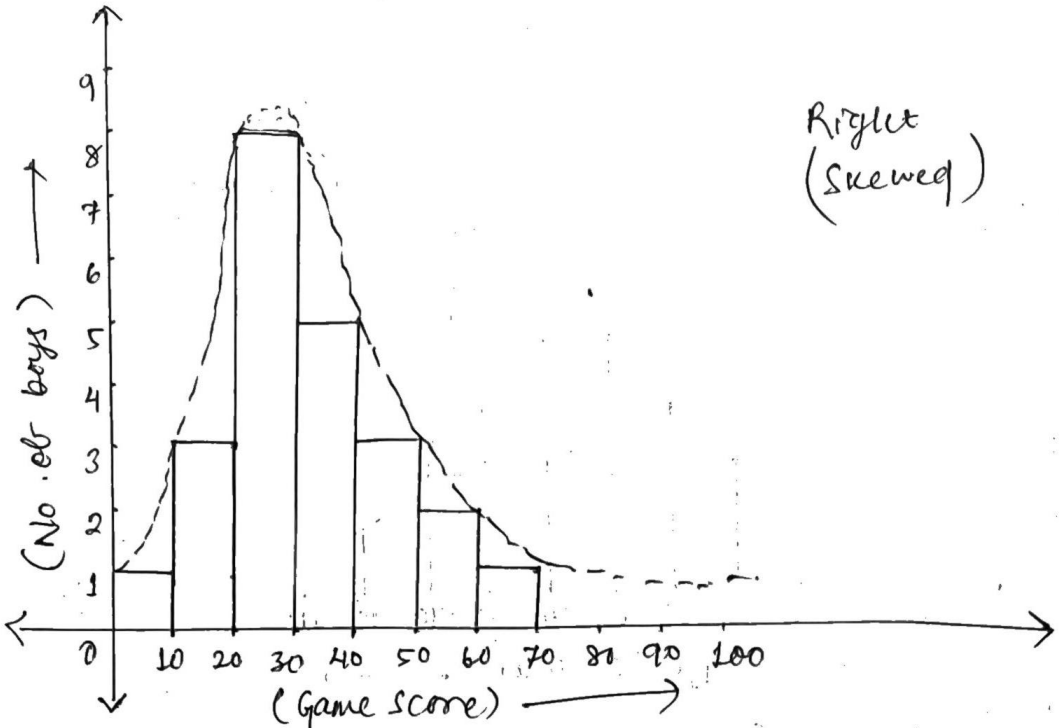
Mode = 77

relation = Mode > Median > Mean

For right-skewed data

example - distribution of scores on any particularly difficult game.

value(x) = { 9, 15, 18, 12, 21, 23, 25, 25, 25, 26
28, 29, 32, 34, 36, 37, 39, 43, 47,
48, 55, 57, 63 }



Here, Mean = 32.47

$$\text{Median} = \frac{50}{100} \times 24$$

$$= 12^{th} \text{ index}$$

$$= 29$$

Mode = 25

Relation = Mean > Median > Mode