# Quiz-3

180041120

(1) There are 50 samples.

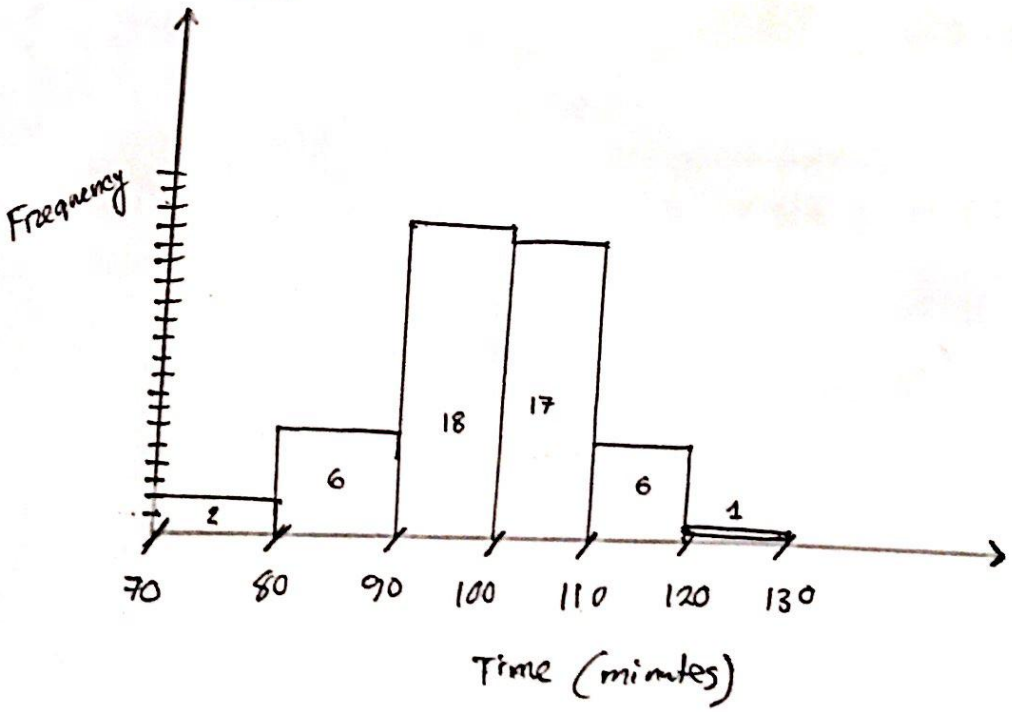
Using the thumb's rule, the no. of intervals

$$k = 1 + \log_2 50 = 6.64$$
$$\simeq 6$$

So, we take 6 intervals for this distribution.

The table for histogram is

| Intervals | Tally | Frequency | |
|---|---|---|---|
| [70, 80) | II | 2 | |
| [80, 90) | 𝍸 II | 6 | |
| [90, 100) | 𝍸 𝍸 𝍸 III | 18 | |
| [100, 110) | 𝍸 𝍸 𝍸 II | 17 | |
| [110, 120) | 𝍸 I | 6 | |
| [120, 130) | I | 1 | |



histogram.

(1) From the ~~distribution~~ we can see a symmetrical curve that is highest in the middle.
We can hypothesize that it fits the Normal Distribution.

(2)

We assume there are N IID, random variables. Here N = 50. We know, the likelihood of a distribution fitting the data is P(distribution / data)

The Normal distribution has two parameters.

$$N \sim (\mu, \sigma^2)$$

$$\hat{\mu} = \frac{\Sigma X}{n} = \frac{92.3 + 92.8 \cdots 95.9}{50} = \frac{4961.1}{50} = 99.22$$

$$\hat{\sigma} = \sqrt{\left(\frac{n-1}{n}\right) s^2(n)}$$

$$s^2(n) = \frac{\Sigma (x_i - \bar{x})^2}{n-1} = \text{~~47.88~~} \quad 127.1$$

$$\therefore \hat{\sigma} = \sqrt{\frac{49}{50} \times 127.1} = 11.16 \text{ (Ans.)}$$

$$N \sim (127.1, 11.16)$$

(3)

We know, in Chi-Test we find

$$\chi^2 = \frac{\Sigma (N_j - nP_j)}{nP_j}$$

| | $N_j$ | $P_j$ | $nP_j$ |
|---|---|---|---|
| 1 | 92.3 | | |
| 2 | 92.8 | | |
| 3 | 106.8 | | |
| 4 | 108.9 | | |
| 5 | 106.6 | | |

$H_0$ : Data fits distribution

$H_A$ : Data doesn't fit

$\alpha = 0.05$, assume

$\chi^2_{1-\alpha/2,\ k-m-1}$