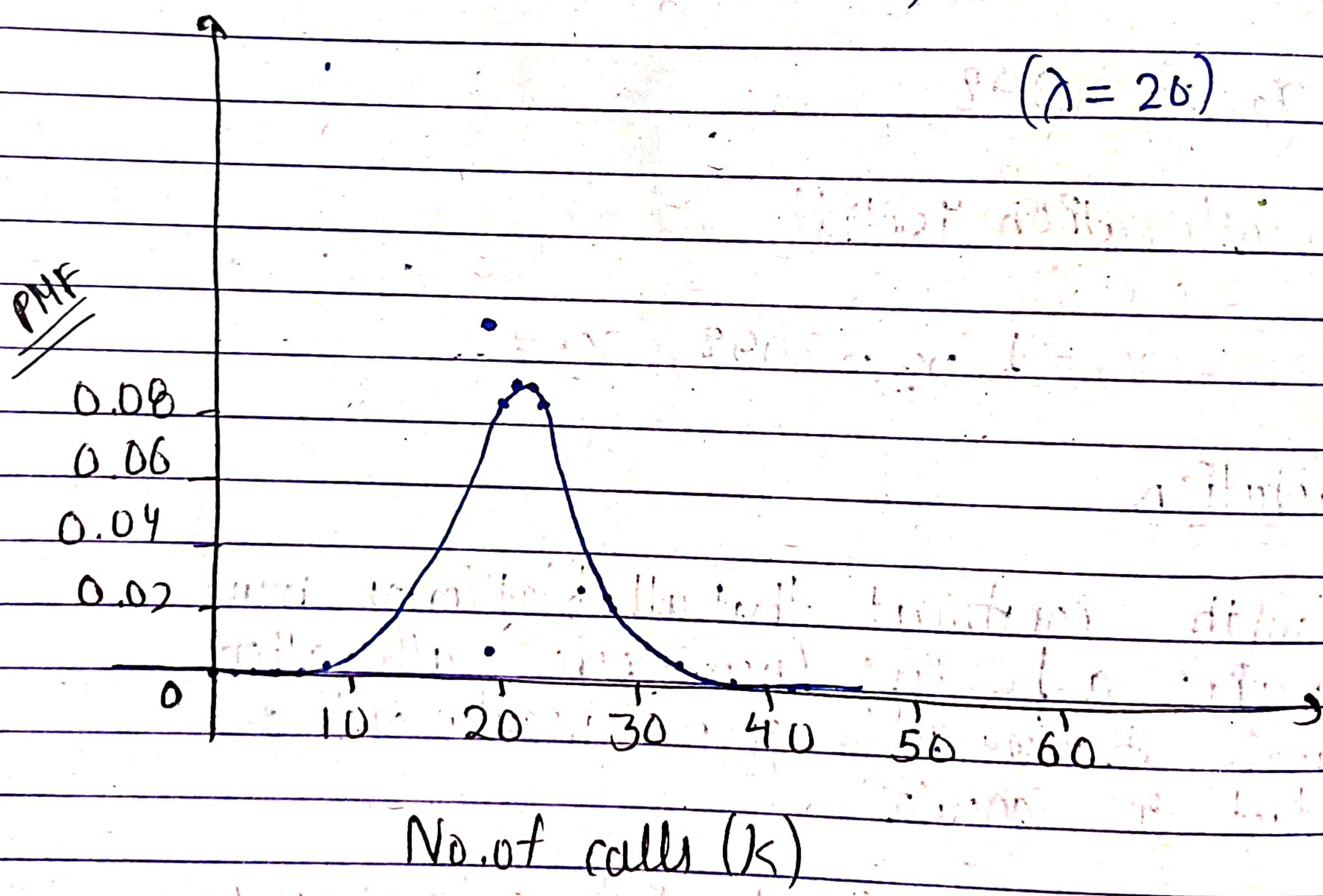
1). Predicting Call center Workload –

Dataset

• No.of calls per hour (Discrete Distribution): (X)

$X \sim \text{Poisson}(\lambda = 20 \text{ calls/hour})$



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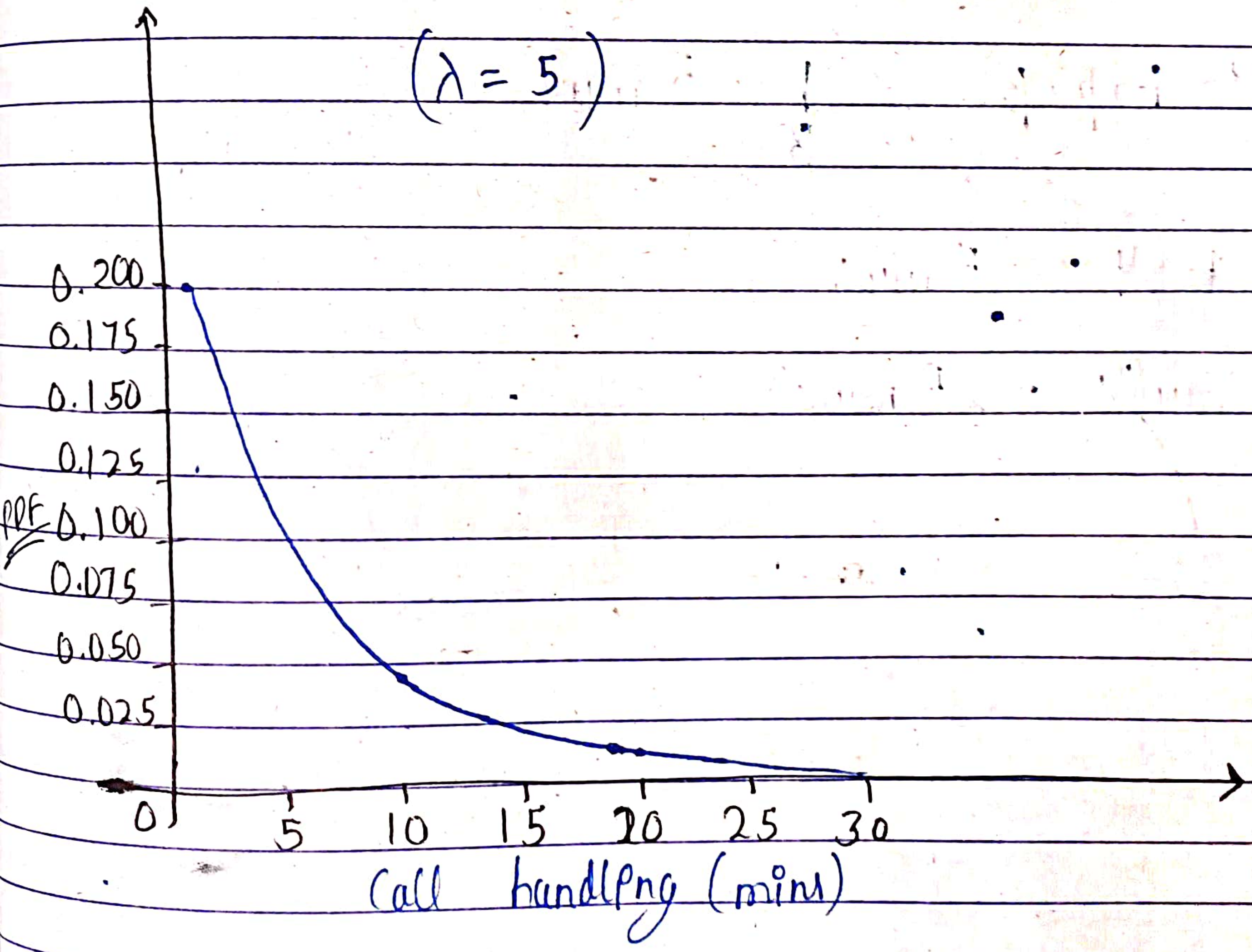
- Call handling time ~ (Continuous Distribution): (Y)

$Y \sim \text{exponential}\ (\lambda = 5 \text{ mins / call})$

or 12 calls / hour

$\beta = \frac{1}{5}$



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Tasks

1. Calculate expected total call Handling time per hour

- no. of calls per hour (X), $\lambda = 20$

  $E(X) = 20$

- Call handling time

  $E(Y) = 5$ min

- total call handling time in an hour

$$T = E(X) \cdot E(Y)$$

$$= 20 . 5 = 100 \text{ mins per hour.}$$

1.67 hours of call handling time in every hour.

2. Compute Variance of total call handling time

- $E(X) = 20$, $Var(X) = 20$
- $E(Y) = 5$, $Var(Y) = 25$.

$$Var(\text{total call handling time}) = E(X)\,Var(Y) + (E(Y))^2\,Var(X)$$

$$= 20 \times 25 + 25 \times 20$$
$$= 1000 \text{ min}^2$$

S.D. of Total call handling time $= \sqrt{1000}$
$= 31.62$ mins

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Business Interpretation

1. Average workload is 100 mins of call handling / hour.

⇒ Call center needs atleast 1.67 staff members (≈ 2 members) worth of labor hours each hour just to hande the calls.

2. standard deviavifation 31.6 mins, indicate hour to hour fluctuations

$$100 - 31.6 \ (68.4) \ (\text{min. expected workload})$$
$$100 + 31.6 \ (131.6) \ (\text{max. expected workload})$$

⇒ staff multiple people ~~to~~ or plan strategies

• (part-time staff)

to handle potential spikes.

3. Min. required call handling / hour on avg.
= 1.67 hours

X ———————— X