Harshit Mawandia 2020CS10348

1) $P(X=k) = e^{-16} \times \frac{16^k}{\lfloor k}$ $k = 0, 1, 2 \dots, \infty$

T.P.T

a) $P\{X \leq 8\} \leq \frac{1}{4}$

$= \sum_{k=0}^{8} P(X=k) = \sum_{k=0}^{8} e^{-16} \times \frac{16^k}{\lfloor k}$

b) $\sum_{k=32}^{\infty} P(X=k) = \sum_{k=32}^{\infty} e^{-16} \times \frac{16^k}{\lfloor k}$

~~Now~~ 32

By Markov inequality

$< \frac{E(x)}{32}$

$\Rightarrow < 16 \sum_{k=1}^{\infty} \frac{e^{-16}\, 16^{k-1}}{32 \lfloor k-1} \leq \frac{1}{2}$

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$$P\{|X-16| \geq K\} \leq \frac{\sigma^2}{K^2}$$

$$\sigma^2 = E(x^2) - E(x)^2$$

$$= \frac{e^{-16}\, 16^k\, k^2}{\lfloor k}$$

$$\Rightarrow \frac{e^{-16}\, 16^k\, k}{\lfloor k-1}$$

$$\Rightarrow \sum \frac{e^{-16}\, 16^k}{\lfloor k-2} + \sum \frac{e^{-16}\, 16^k}{\lfloor k-1}$$

$$= (16^2) + 16 - (16)^2 \longrightarrow (E(x))^2$$

term

$$\Rightarrow P(|X-16| \geq 16\} \leq \frac{1}{16}$$

Now $X \geq 0$

So $P(X - 16 \geq 16\} \leq \frac{1}{16}$

$P\{X \geq 32\} \leq \frac{1}{16}$