Pseobability and Statistics Assignment -3 (Solution)

$$E(X) = \{ \{ x_i \}_{i=1}^{n} \}_{i=1}^{n}$$

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$$E(X^{2}) = \sum_{i=0}^{2} p(x_{i})$$

$$= \frac{1}{10} \left[\frac{1^{2} + 2^{2} + \cdots + q^{2}}{10} \right]$$

$$= \frac{1}{10} \cdot [285] = 28.5$$

$$E(Y^2) = E(\frac{81}{4}X^2) = \frac{81}{4}E(X^2) = 577.125$$

 $Vas(Y) = E(Y^2) - (E(Y))^2 = 577.125 - (20.8)^2$
 $= 167.0625$

$$f(x) = \begin{cases} 1 & 0 < x < 1 \\ 0 & 0 \end{cases}$$

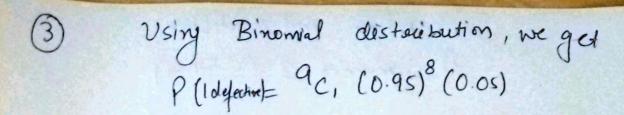
$$E(y) = \begin{cases} y f(x) dx \\ -2 \log x dx = -2 \end{cases}$$

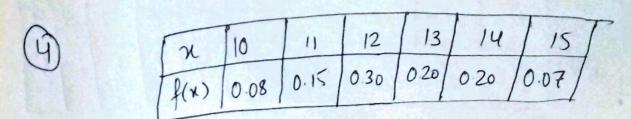
$$=\int_{-2\log x} dx = -2\left(x\log x - x\right)_{0}^{1}$$

$$= 2$$
Median(x) = $\frac{1}{2}$ ($\frac{1}{2}$ is median $\frac{1}{6}$ 0 to 1)

Median(Y) = -2 log (Median X) \ = -2 log (1/2) = 2 log 2

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$$E(x) = 2xif(xi)$$

$$= 10x0.08 + 11x0.05 + 12x0.30 + 13x0.20 + 14x0.20 + 15x0.07$$

$$= 12.5$$

$$E(x^2) = E x_1^2 f(n_i)$$

$$= 100 \times 0.08 + 121 \times 0.15 + ... +225 \times 0.07$$

$$= 158.1$$

$$Var(X) = 158.1 - (12.5)^2 = 158.1 - 156.25$$

= 1.86

(5) If
$$P(X=122) = 122$$
 passingers showed up

All $= P(X \le 120) = 1 - P(X=121) - P(X=122)$

got $= 1 - \frac{122}{120}(0.9)^{121}(0.1) - \frac{122}{120}(0.9)^{122}$

that means $= 1 - 0.00003545 - 0.0000026$

Passingers $= 1 - 0.00003805 = 0.9999$

Probability of car being defective is \$50 = 0.05 In binomial distrubution Mean = np = 20x 0.05 = 1 Valiance = np(1-p) = 20x0.05 x 0.95 = 0.95 f(x)= Ke=[1x-2] As to tal of perobability diskibution should be one only If (x) dx = 1 |x-2| = |2-x x<2 |x-2| = |x-2 x72 e-~->0 $\int Ke^{-\frac{1}{2}|x-2|} dx = 1$ $\int_{0}^{2} Ke^{-\frac{1}{2}(2-x)} dx + \int_{0}^{2} ke^{-\frac{1}{2}(x-2)} dx = 1$ $\frac{|x - \frac{1}{2}(2 - x)|^2}{|x - \frac{1}{2}(x - 2)|^2} + \frac{|x - \frac{1}{2}(x - 2)|^2}{|x - \frac{1}{2}(x - 2)|^2} = 1$ 2K [1-0] = 2K [0-1] = 1 1K= 4 Question is werong they have asked P(X7,4) and finding out P(x=4) For P(x 7,4) = 1-P(x=2) -P(x=3) = 1- (0.15)2 - 20, (0.85) (0.15)2 FOR P(X=4) = 4C2 (0.85)2 (0.15)2 - 3C2 (0.85)2 (0.15)2

Because genes can not be detected
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Probability for 3 showing up = P(x=3) = 1 (9) Prob of at 3 showed up at finet attempt = 1 = 3-1

and 5:6 ment warming and 5;6 prot snowing on fist attempt = $\frac{1}{2} \times \frac{1}{6}$ third attempt = 1 x 1 x 1 fourta -= = 1 x 1 x 2 x 1/6 So Perobability required = 1 + 1x1 + 1x1x1 + --= = = [1 + \frac{1}{2} + (\frac{1}{2})^2 + (\frac{1}{2})^3 - - \infty] $= \frac{1}{6} \left(\frac{1}{1 - \frac{1}{2}} \right) = \frac{1}{6} \times 2 = \frac{1}{3} \left(\frac{\text{Sum } fGP = a}{1 - x} \right)$ It is question of Bernoulle distribution (10) number of calls needed for the successe of 1 succes = 1 $=\frac{1}{0.03}=\frac{100}{3}$