# Statistics - 3

## Additional_Exercise_18.11442

**Soln 1)**

$P = 0.3$

$\because$ this is a binomial distribution where $n = 6, r = 2$

$$P(x! = 2) = {}^6C_2 \cdot (0.3)^2 (0.7)^4$$

$$= \frac{6 \times 5 \times 4 \times 3 \times 2 \times 1}{2 \times 1 \times 4 \times 3 \times 2 \times 1} (0.09)(0.2401)$$

$$= 15 (0.09)(0.2401)$$

$$= 0.3241$$

and $\mu = np = 6(0.3) = 1.8$

$$\sigma = \sqrt{np(1-p)} = \sqrt{6(0.3)(0.7)}$$

$$= \sqrt{1.26} = 1.229$$

**Soln 2:** $P_{\text{gamma}} = 0.75$, $n = 8$ $\therefore P_{\text{gamma}}(x! = 5) = {}^8C_5 (0.75)^5 (0.25)^3$

$$= \frac{8(7)(5!)}{5!\,3!} (0.2373)(0.0156)$$

$$= 42 (0.2373)(0.0152)$$

$$= 0.1557$$

$P_{\text{blacks}} = 0.45$, $n = 12$, $P_{\text{blacks}}(x! = 5) = {}^{12}C_5 (0.45)^5 (0.55)^7$

$$= (99)(8)(0.018)(0.015)$$

$$= 0.2224$$

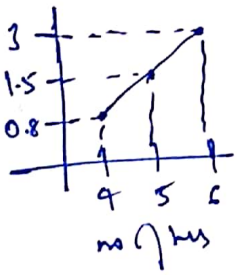
$P_{Gamar}(x! = 4) = {}^{8}C_4 (0.75)^4 (0.25)^4$

$= 70 \times 0.3164 \times 0.0039$

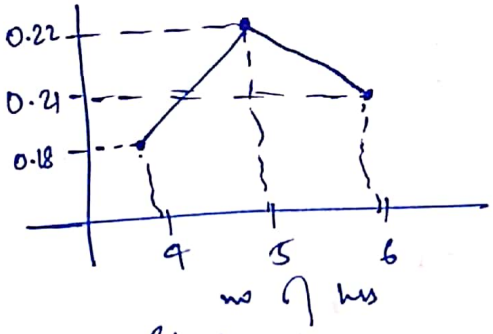
$= 0.0865$

$P_{Blanka}(x! = 6) = {}^{12}C_6 (0.45)^6 (0.55)^6$

$= 0.2123$




Gamar




Blanka

Sol 3| 72 | hr

$\lambda$ (fun/min) $= \frac{72}{60} = 1.2$

$\lambda$ (4 time/week) $= 1.2 \times 4 = 4.8$.

(a) 5 costumers $\frac{e^{-4.8}(4.8)^5}{5!} = \frac{20.967}{120} = 0.1747$.

(b) not more than 3

$x=0$ $\frac{e^{-4.8}(4.8)^0}{0!} = 0.0082$ | $x=1$ $\frac{e^{-4.8}(4.8)^1}{1} = 0.0394$ | $x=2$ $\frac{e^{-4.8}(4.8)^2}{2} = 0.0979$

$x=3$ $\frac{e^{-48}(4.8)^3}{3!} = 0.1516$ | $P(x! \leq 3) = \sum_{i=0}^{3} x_i$ $= 0.2941$

(c) More than 3 costumers

$x=4$ $\frac{e^{-4.8}(4.8)^4}{4!} = 0.1820$ | $x=5$ $\frac{e^{-4.8}(4.8)^5}{5!} = 0.1747$ | $x=6$ $\frac{e^{-4.8}(4.8)^6}{6!} = 0.1397$

$\therefore P(x! > 3) = \sum_{i=4}^{6} x_i = 0.4964$

**Sol 4**

6 error/hr
$77 \times 60$ words/hr

$\therefore$ 1 error/word $= \frac{6}{77 \times 60} = \frac{1}{770}$

$\mu = \frac{455}{770} = 0.591$

$P(x_i = 2) = \frac{(e^{-(0.591)})(0.591)^2}{2!}$

$= 0.09671$

$\mu_2 = \frac{1000}{770} = 1.2987$

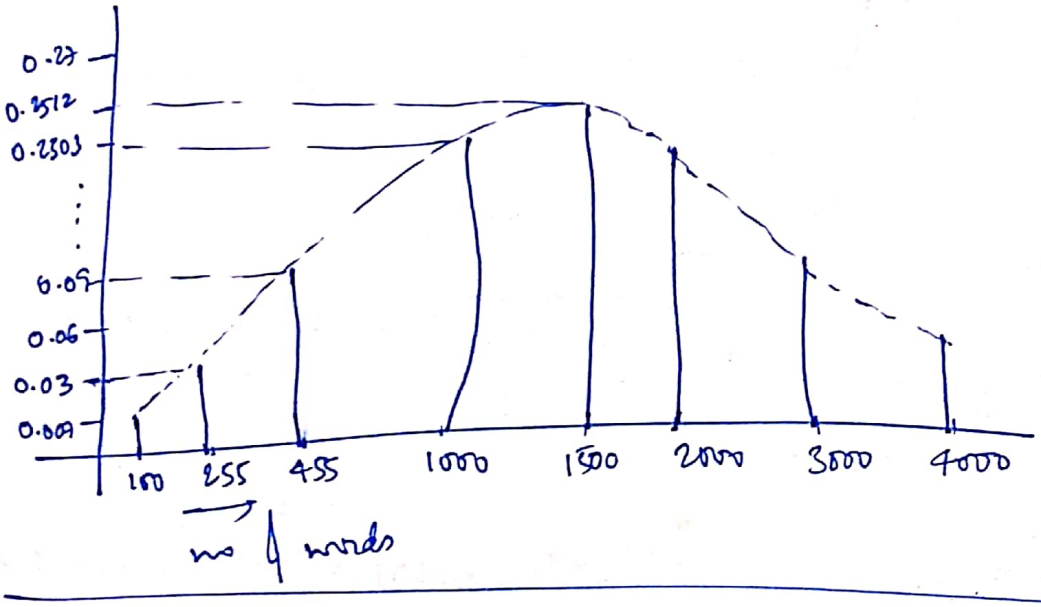
$P(x_i = 7) = \frac{e^{-1.2987}(1.2987)^2}{2}$

$= 0.2303$

$\mu = \frac{255}{770} = 0.3311$

$P(a_1 = 2) = \frac{e^{-0.3311}(0.3311)}{2}$

$= 0.03936$




**Sol 5**

$f(x) = 0.05$ for $0 \le x \le 20$

$\int_{i=0}^{10} f(x)\,dx = \int_{0}^{10} 0.05 = (0.05)_0^{10} = 0.5$