SOLUTIONS

King Fahd University of Petroleum & Minerals
Department of Mathematical Science
STAT319-Term041
Quiz #2 **Section: 5**

Name: **ID:** **Serial:**

Question1 :(5-Points)

At checkout customers arrive at an average of **1.5 per minute**.

a. What is the probability that **at least** 3 will arrive **within 2 minutes**?

$\lambda = 1.5$, $t = 2 \Rightarrow \lambda t = (1.5)(2) = 3$

$p(X \geq 3) = 1 - p(X < 3)$

$= 1 - p(X \leq 2) = 1 - \sum_{x=0}^{2} p(x, 3)$

$= 1 - 0.4232$

$= 0.5768$.

(3)

b. What is the probability that it takes **more than** 5 minutes until a customer arrive?

$\lambda = 1.5$, The time follow exp. dist. with $\beta = \frac{1}{1.5}$

$\therefore f(t) = 1.5\, e^{-1.5t}$, $t > 0$

$p(T > 5) = \int_5^{\infty} 1.5\, e^{-1.5t}\, dt = -e^{-1.5t} \Big]_5^{\infty}$

$= 0 - (-e^{-7.5})$

$= e^{-7.5} = 0.00055$

(2)

Question 2(5-Ponits)

In a certain city the probability that a randomly selected person has a computer is 0.6. If a four persons are selected at random, then

a. What is the probability that **at least 3** of them have no computers?

$n = 4$, $p = 1 - .6 = .4 \Rightarrow X \sim$ binomial $(x, n=4, p=.4)$

$p(X \geq 3) = 1 - p(X \leq 2) = 1 - \sum_{x=0}^{2} b(x, 4, .4)$

$= 1 - 0.8208 = 0.1792$

(3)

OR : $p(X \geq 3) = p(X=3) + p(X=4)$

$= \binom{4}{3}(.4)^3(.6)^1 + \binom{4}{4}(.4)^4(.6)^0$

$= 0.1536 + .0256 = 0.1792$

b. What is the probability that the **first person** that has a computer is the **third** one?

$X \sim$ Geometric with $p = .6$ $\quad g(x, .6) = (.6)(.4)^{x-1}$, $x = 1, 2, 3, \ldots$

$p(X = 3) = (.6)(.4)^{3-1}$

$= (.6)(.4)^2$

$= 0.096$

(2)