IV. Using the answer to question III or statistics software, answer the following questions.

A) .259   B) .346 + .259 + .078 = .683   C) 1 - .683 = .317   D) 1 - .078 = .922

V. Darin wants to know how busy his complaint department is during a 20-minute period. Data shows the expected number of calls is highly skewed with an average of only 1.0 calls per 20-minute period.

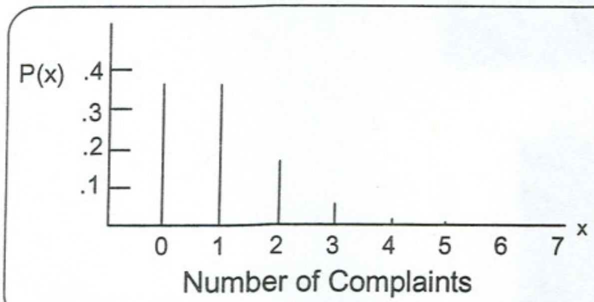
A. Assuming a Poisson probability distribution and using a formula or statistics software, is the probability of zero calls being received in a 20-minute period over or under 50%?

$$P(x) = \frac{\mu^x e^{-\mu}}{X!}$$

$$P(0) = \frac{(1.0^0)2.7183^{-1}}{0!} = \frac{(1)(0.3679)}{1} = 0.3679 = 36.8\%$$

Under

B. Using a table or statistics software, complete and draw this distribution.



Poisson Table	
x	$\mu = 1$
0	0.3679
1	0.3679
2	0.1839
3	0.0613
4	0.0153
5	0.0031
6	0.0005
7	0.0001

C. What is the probability of at least 3 calls being received in a 20-minute period?

$P(\geq 3) = .0613 + .0153 + .0031 + .0005 + .0001 = .0803 = 8.03\%$ or $P(< 3) = 1 - (.9197) = .0803 = 8.03\%$

VI. Darin wants to know the number of customers who will bounce a check. Last year only .2% of the 1,000 checks deposited from customers did not clear. This year Darin expects 1,500 customers will pay by check and with the economy being about the same, the same percent of checks should bounce.

A. Can the Poisson approximation of the binomial be used to solve this problem? Why?

$np = (1,500)(.002) = 3$

Yes because $n \geq 30$ and $np < 5$

B. What is the expected number of bounced checks for this year?

$E(x) = \mu = np = (1,500)(.002) = 3$

C. What is the probability that no one will bounce a check this year?

From Table II, P(x = 0) = .0498 or 4.98%

D. What is the probability that at least 2 checks will bounce?

$P(\geq 2) = [1 - (.0498 + .1494)] = 1 - .1992 = .8008$ or 80.08%

E. What would you think if 5 checks had bounced by the end of May?

Five checks bouncing by the end of May is unlikely according to last year's data. Last year's data might not apply to this year.

Poisson Table	
x	$\mu = 3$
0	0.0498
1	0.1494
2	0.2240
3	0.2240
4	0.1680
5	0.1008
6	0.0504
7	0.0216
8	0.0081
9	0.0027
10	0.0008
11	0.0002
12	0.0001