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| MATH 1350 | **Statistics for Information Technology** |  |

**Lab # 5 – Binomial and Poisson Distributions**

Answer/Grading Sheet

| **Stage:** | **Answer** |
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| 1 | Question 1 (Applied Problem: Type 2 Diabetes) a) 0.0431  b) 0.9307  c) 0.0006  d) 0.7275  e) 0.9849  f) 2.2951e-22  g) 0.3569  h) True it is unusual  i) 94  j) 9.2284 |
| 2 | Question 2 (Applied Problem: Fiber Optic Cable) a) 0.0194  b) 0.0276  c) 0.6172 |
| 2 | Question 3 (Applied Problem: Network Printer) a) 0.0536  b) 0.8571  c) 0.0474 |
|  | Paste your Python code here.  It should contain all the commands you used to complete the lab. from scipy.stats import binomfrom math import sqrt# a. probability that exactly 94 of the adults will have diabetesx = 94p = 0.094n = 1000q = 1 - 0.094print(str(binom.pmf(x, n, p))[:6:])# b. probability that more than 80 will have diabetesx = 80print(str(1-binom.cdf(x, n, p))[:6:])# c. probability that not more than 65 will have diabetesx = 65print(str(binom.cdf(x, n, p))[:6:])# d. probability that fewer than 100 will have diabetesx = 99print(str(binom.cdf(x, n, p))[:6:])# e. probability that at least 75 will have itx = 74print(str(1-binom.cdf(x, n, p))[:6:])# f. probability that fewer than 20 will have diabetesx = 19print(str(binom.cdf(x, n, p)))# g. probability that between 50 and 90 (inclusive) will have diabetesx = 90print(str(binom.cdf(x, n, p)-binom.cdf(50, n, p))[:6:])# h. Suppose that of the 1000 tested only 32 were found to have type 2 diabetes. What# conclusions might you make? Answer by finding the appropriate probability. Calculate it# and enter it on your worksheetnp = n\*pnq = n\*qnpq = sqrt(n\*p\*q)is\_unusual = Falseif np >= 5 and nq >= 5:    z = (32-np)/npq    if not (2 > z > -2):        is\_unusual = Trueprint(f"{is\_unusual} it is unusual")# i. calculate the meanprint(np)# calculate std deviationstd\_dev = sqrt(n\*p\*(1-p))print(str(std\_dev)[:6:])from scipy.stats import poisson# The number of flaws in a fiber optic cable follows# a poisson process with an avg of 1.1 per 1000ft.lam = 1.1\*(200/1000)print(str(poisson.pmf(2, lam))[:6:])# The probability of exactly 1 flaw in the first 500 ft and exactly 2 in the second 500ftlam = 1.1\*(500/1000)first5 = poisson.pmf(1, lam)secondn5 = poisson.pmf(2, lam)print(str(first5\*secondn5)[:6:])# The probability of betweem 5 and 10 flaws (inclusive) in a 5000-foot cablelam = 1.1\*5print(str(poisson.cdf(10, lam)-poisson.cdf(4, lam))[:6:]) from scipy.stats import poisson  # The probability that 2 jobs will arrive at any given minute  lam = 0.4  print(str(poisson.pmf(2, lam))[:6:])  # The probability that at most 3 jobs will arrive during a 5 minute interval  lam = 0.4\*5  print(str(poisson.cdf(3, lam))[:6:])  # The probability that atleast 3 jobs will arrive in a 2 minute interval  lam = 0.4\*2  print(str(1-poisson.cdf(2, lam))[:6:]) |

**Stage 3: Pencil and Paper Problems**

Paste your hand calculations here

A paper with writing on it

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