Stat 235

Lab 3

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Lab EL12

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1

As λ increases, the distribution shifts to the right, since λ is the mean value of the distribution. We also see that as this distibution shifts to the right, the curve flattens as a result of the mean probability decreasing while the spread increases. Since Poisson distributions measure the number of successes in an interval, and in this case a "success" is a flaw in a plastic panel, we can clearly see that as λ increases, the number of flaws in the plastic panels also increase.

2

2.a

Assuming $\lambda = 0.5$, the probability that there are no flaws in a randomly selected panel is $P(X = 0)$. Using the *Poisson Probabilities* worksheet, we find this number to be 0.6065, or 60.65% of the panels are in perfect condition

2.b

The percentage of panels with 2 or more flaws can be found as shown below:

$$P(X \geq 2) = 1 - P(X < 2) = 1 - P(X \leq 1)$$

Using the *Poisson Probabilities* worksheet, we find $P(X \leq 1) = 0.9098$, so

$$P(X \geq 2) = 1 - 0.9098 = 0.0902$$

So, 9.02% of the panels would need to be scrapped.

2.c

From 2.b, we know the probability of a single panel not being defective is $P(X \leq 1) = 0.9098$. For ten panels,

$$P(X \leq 1)^{10} = 0.9098^{10} = 0.38856110447...$$

Therefore, the probability that a random sample of 10 panels not containing a defective panel is approximately 0.389.

3

3.a

3.b

4

4.a

4.b

4.c

q4.png

Figure 1: INSERT CAPTION HERE

4.d

5

5.a

q5.png

Figure 2: INSERT CAPTION HERE

5.b