

PROBLEM 1:

- a) The Excel sheet containing the solution to the following problem is attached to the homework assignment.

$\ln(L)$ -50.5568

$$f(y) = \frac{1}{\sigma\sqrt{2\pi}} \cdot \exp\left(-\frac{1}{2} \left(\frac{y-\mu}{\sigma}\right)^2\right)$$

mu = 73.1933

sigma = 7.039402

b)

H0: The distribution of the data is normal.

H1: The data is not normally distributed

min	61.6
max	84.3
Range	22.7
n	15
Bins	4
bin width	6

OBSERVED

min	61.6
bin1	67.6 4
bin2	73.6 5
bin3	79.6 3
bin4	85.6 3

EXPECTED

bin1	0.213432	3.201476
bin2	0.309604	4.644064
bin3	0.295584	4.433766
bin4	0.18138	2.720695
bin1	0.199171	
bin2	0.02728	
bin3	0.463643	
bin4	0.028673	w 0.718767
pvalue	0.396549	

Since 95% confidence therefore alpha = 0.05

We do not reject null because P-value is greater than alpha and the data exhibits a normal distribution.

c)

$$Z_0 = 0.2566$$

$$P(X \leq 75) = 0.601276$$

$$p(X > 75) = 0.398724$$

PROBLEM 2:

a) $\lambda = 0.023915$

b) H_0 : data follows exponential distribution H_1 : data doesn't follow exponential distribution

min 1.8

max 99.1

range 97.3

n 20

bins 5

bin width 20

observed min 1.8

bin1 21.8 8

bin2 41.8 4

bin3 61.8 2

bin4 81.8 0

bin5 101.8 6

$\lambda = 0.023915$

Expected bin1 8.125559

bin2 4.514212

bin3 2.79808

bin4 1.734356

bin5 2.827793

bin1 0.00194

bin2 0.058574

bin3 0.227632

bin4 1.734356

bin5 3.55857

w 5.581072

pvalue 0.133869

95% confidence, so $\alpha = 0.05$

P-value > α , therefore we don't reject null, the data follows exponential distribution.

c) $P(y < 65) = 0.788698$