1.(a)Calculate a point estimate of the mean pull-of

So that point estimate of the mean pull-of is 75.35625

(b)Calculate a point estimate of the pull-of force value that separates the weakest 50% of the connection in the population from the strongest 50%

So that

(c)Calculate a point estimate of the population variance and the population standard deviation.

We have

S=

So that 832865

(d) Calculate the standard error of the point estimate found in part (a)

So that

(e) Calculate a point estimate of the proportion of all connectors in the population

whose pull-off force is less than 73 pounds

The

So that

3.(a)Show that is an unbiased estimate

We have

E(

We have E()=

We obtained

E(

So that

5.(a) Show that X¯ is an unbiased estimator of µ

We have

Then E(

Since

So that

(b).show that V(

We have

V(

By cauchy -Schwarz inequality:

(

(

So that V(

7.(a) Show that X¯2 is not an unbiased estimator for

We will show that E(

V( E(

Thus

Then E(

So that (

(b). For what value of k is the estimator X¯2 −kS2 unbiased for

We have E(=

It is unbiased

Then we obtained k=1/n

So that k=1/n

9.(a) Show that the maximum likelihood estimator for λ is λˆ = X

We have

Then p(

So lnL(x;)

If,

So that =

(b). find the maximum likelihood estimate of λ

We have

Then,

So that the point estimate of

11.(a) Show that is unbiased estimate of

We have E(

And since

Then E(

So that it is unbiased estimate of

(b).Show that variance of

We have V(

Since

Then V(

So that variance of

(c).What is a good estimate of

By Cramer-Rao inequality a good estimate must satisfied V(

I(

We have ln f(x; ;

Then

Then V(=

Conclusion a good estimate of is

Using the given data we get =3.48

So that a good estimate is 3.48

13.(a)assuming that shear strength is normally distributed estimate the tru average shear strength and standard deviation od share strength using method of maximum likelihood.

Since X

then by previous exercise we get

We have L(x;

Ln L(x;ln(

If

` =

So that

We have P(X

So, P(

So )=0.95

Then

So that estimate of strength is

15.(a)show that is unbiased estimate of p

E(=p

(b).shoe that Var(

V(np(1-p)=

(c).Show that E)=(n-p)[p(1-p)/

We have E

By previous question, E(

E

E)=(n-p)[p(1-p)/

So that E)=(n-p)[p(1-p)/

(d). find the value c

By using the c question we obtained c=

So that c=

17.(a) find the mle of

We have and the likehood function L(x;<

In order to maximum the likehood function we choose

So that the mle of

(b).letting

We have P(

We obtained P(

Since X is uniformly distributed so P(X<y)=

So that P(

So its pdf is given by

E(

Then

So that,

Find its variance

V( V(

V(

And

Thus, V(

So V((

(c).find the cramer-Rao lower bound for the variance of an unbiased estimate of

I(

=

So that the lower bound is -