**a)**

> set.seed(124); *# To get same results for randomization*

> n=27;p=0.40 *#Given theoretical Parameteres*

> binom=rbinom(500,n,p);binom

[1] 7 10 11 10 9 9 11 11 14 9 13 14 13 13 10 7 11 12 14 6 12 11 7 10 10

[26] 9 13 9 13 10 13 9 10 14 8 16 9 15 8 10 8 13 12 9 10 10 15 9 10 8

[51] 10 13 11 9 9 10 9 12 9 11 11 10 7 9 11 3 11 11 10 9 12 14 13 14 11

[76] 10 9 15 10 8 10 8 15 13 11 14 12 8 10 9 11 9 8 10 10 9 11 11 13 12

[101] 10 10 10 8 9 13 11 14 10 9 10 8 11 14 9 9 9 9 11 14 11 11 16 15 8

[126] 13 7 16 14 11 9 10 10 10 13 6 13 16 13 12 10 10 9 11 7 8 12 12 10 14

[151] 11 13 14 9 16 17 13 10 12 11 11 12 14 16 12 9 9 8 5 8 9 11 13 14 13

[176] 13 16 13 10 8 8 9 12 11 13 11 11 8 12 10 10 11 13 9 14 10 6 11 14 8

[201] 10 14 8 15 14 9 10 11 10 13 9 10 11 9 11 13 10 16 10 15 12 10 11 15 8

[226] 14 10 13 13 11 10 11 9 10 11 11 9 12 15 10 12 9 14 13 11 13 12 8 13 11

[251] 11 8 12 7 7 14 12 9 16 10 14 7 7 9 9 13 8 10 5 9 15 12 9 15 8

[276] 12 14 8 12 11 11 11 10 7 12 11 14 7 10 7 7 12 8 8 10 11 8 16 13 12

[301] 9 13 7 13 10 9 9 9 9 13 11 9 10 12 8 12 12 11 6 11 10 11 13 12 12

[326] 13 12 15 11 13 9 11 8 12 15 12 9 13 12 5 7 8 13 10 11 10 12 11 12 12

[351] 9 13 12 7 8 10 13 13 11 13 14 11 11 5 10 11 9 13 13 14 10 11 8 12 9

[376] 11 14 14 8 9 12 5 10 15 10 10 7 9 11 13 9 9 11 12 13 7 6 14 15 14

[401] 15 9 10 13 10 7 11 12 12 9 14 13 8 10 12 9 9 13 10 11 11 9 12 14 10

[426] 15 9 14 8 8 4 9 10 11 10 14 12 11 11 8 13 7 15 9 4 12 9 13 10 12

[451] 10 11 11 14 17 7 10 4 13 9 10 14 13 12 17 8 11 13 18 11 7 14 11 10 6

[476] 8 10 8 10 14 9 12 10 7 11 10 13 9 17 10 12 10 11 7 13 12 13 13 7 11

**b)** We know that,

If x->B(n,p) then

Mean(x)=np , and var(x)=npq where q=1-p

Given that,

n=27, p=0.40 & q=0.60

**Threfore the theoretical mean=27\*0.40=10.8 &**

**variance=27\*0.40\*0.60=6.48**

The sample mean and sample variances are,

> m=mean(binom);m

[1] 10.812

> v=var(binom);v

[1] 6.120898

**Sample mean=10.812**

The sample mean is 10.812 . This result is also approximately equal to the theoretical mean of the binomial distributuion.

**and Sample variance=6.120898**

The sample variance is 6.120898. This result is also approximately equal to the theoretical variance of the binomial distributuion.

**c) Theoretical Probbaility distribution**

> n=27;p=0.40;x=0:n

> px=dbinom(x,n,p);

>plot(x,px,"h",main="Binomial Probability distribution",xlab="X",ylab="p(x)")

> points(x,px,pch=16);

> legend(locator(1),legend=c("Binomial(n=27,p=0.40"))

