Assignment 2

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STAT 3600

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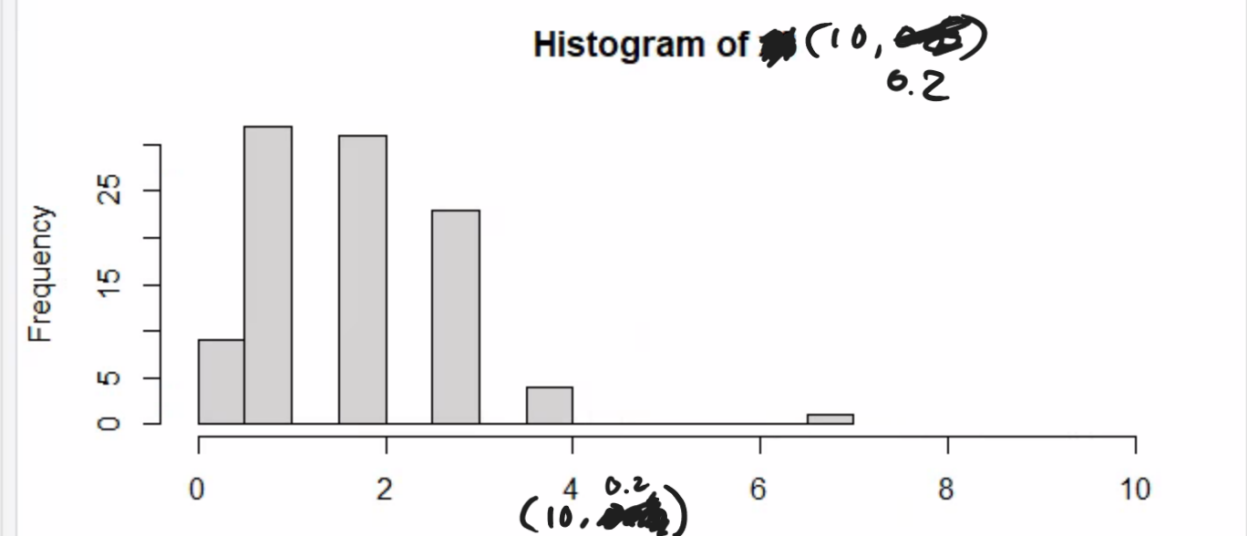
Code (0.2)

```
> #Calculate the pmf for a binomial distribution with parameters n=10 and p=.2
> x<-c(0,1,2,3,4,5,6,7,8,9,10)
> dbinom(x,10,0.2)
 [1] 0.1073741824 0.2684354560 0.3019898880
 [4] 0.2013265920 0.0880803840 0.0264241152
 [7] 0.0055050240 0.0007864320 0.0000737280
[10] 0.0000040960 0.0000001024
> #Generate a random sample of size 100 from a binomial distribution with parameters n=10 and p=.2
> x3<-rbinom(100,10,0.2)
> list(x3)
[[1]]
  [1] 1 2 2 2 2 4 3 3 3 1 2 1 0 3 1 1 1 3 3 2
 [21] 3 2 3 1 3 2 2 1 2 0 2 3 1 2 1 4 3 3 0 2
 [41] 1 2 3 3 1 1 1 3 3 3 2 2 1 0 0 2 1 1 1 1
 [61] 1 2 2 1 4 2 1 2 4 1 0 1 2 1 1 0 3 3 0 2
 [81] 1 2 7 3 2 1 2 3 2 1 0 1 1 3 2 3 1 2 2 2

> #Draw a frequency histogram of the random data from the binomial(10,.2) distribution
> hist(x3,xlim=c(0,10),breaks=10)
```

Histogram of (10, 0.2)



Code for (10, 0.5)

#Calculate the pmf for a binomial distribution with parameters n=10 and p=.5

> x<-c(0,1,2,3,4,5,6,7,8,9,10)

> dbinom(x,10,.5)

[1] 0.0009765625 0.0097656250 0.0439453125

[4] 0.1171875000 0.2050781250 0.2460937500

[7] 0.2050781250 0.1171875000 0.0439453125

[10] 0.0097656250 0.0009765625

> #Generate a random sample of size 100 from a binomial distribution with parameters n=10 and p=.5

> x3<-rbinom(100,10,.5)

> list(x3)

[[1]]

[1] 4 4 9 5 7 4 6 8 5 5 5 5 8 3 3 4 3 5 3 6 1

[22] 5 4 7 6 6 5 6 4 3 5 5 5 5 2 3 5 6 6 4 4 8

[43] 6 4 6 5 5 5 4 6 4 8 6 5 5 8 4 7 5 3 5 5 6

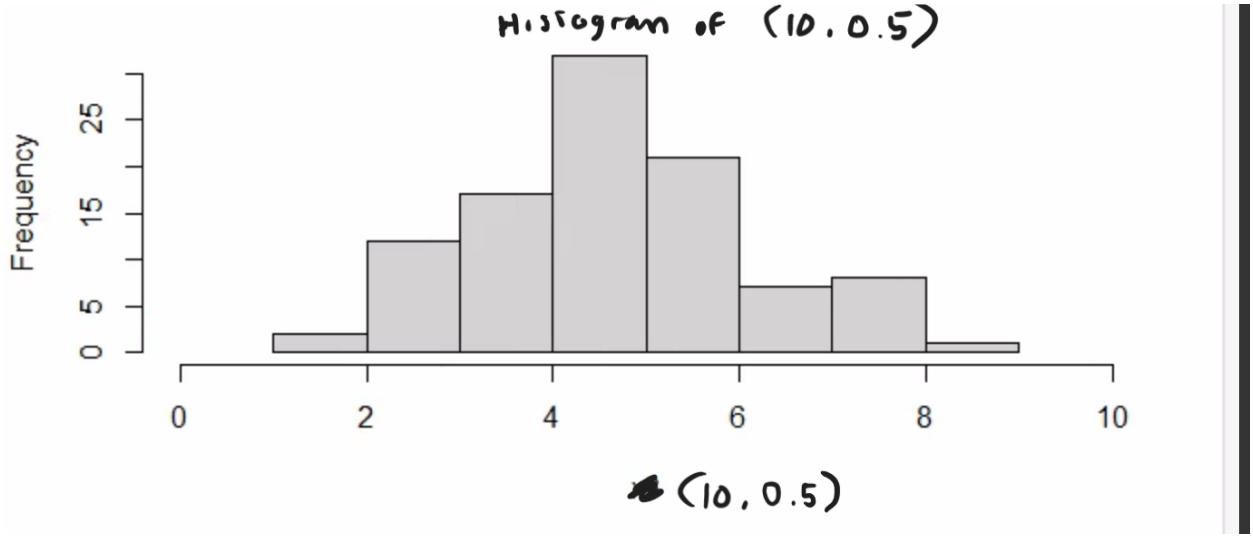
[64] 3 5 4 7 7 6 6 8 5 6 3 3 6 3 5 6 7 5 5 5 6

[85] 4 6 5 7 5 3 5 4 8 4 4 6 8 5 5 6

> #Draw a frequency histogram of the random data from the binomial(10,.5) distribution

> hist(x3,xlim=c(0,10),breaks=10)

Histogram of (10, 0.5)



Code for (10, 0.8)

#Calculate the pmf for a binomial distribution with parameters n=10 and p=.8

> x<-c(0,1,2,3,4,5,6,7,8,9,10)

> dbinom(x,10,.8)

[1] 0.0000001024 0.0000040960 0.0000737280

[4] 0.0007864320 0.0055050240 0.0264241152

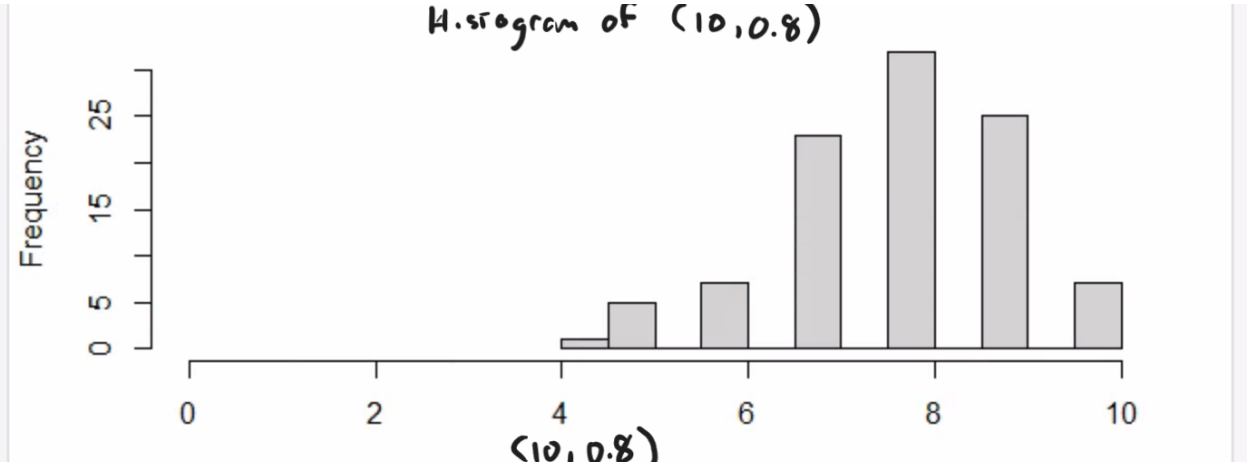
[7] 0.0880803840 0.2013265920 0.3019898880

[10] 0.2684354560 0.1073741824

```
> #Generate a random sample of size 100 from a binomial distribution with parameters n=10 and p=.8
> x3<-rbinom(100,10,.3)
> x3<-rbinom(100,10,.8)
> list(x3)
[[1]]
 [1]  7  7  9  8  9  6  8  9  9  7  7  9  5  9
[15]  6  9  8  6  8  7  8  6  8  4  5 10  8  8
[29]  7  6  7  7  7  9  7 10  7  5  8  8  7  8
[43]  7  7  8  7  6  8  7  7  9  9  8  8  9  8
[57] 10  8 10  6 10  9  8  8  9  7  5  8  5  8
[71]  9  9  9  7  8  9  9  9  9  7  8  7  8  8
[85]  7  9  9  9  8 10 10  9  8  9  8  8  8  8
[99]  7  8

> #Draw a frequency histogram of the random data from the binomial(10,.8) distribution
> hist(x3,xlim=c(0,10),breaks=10)
```

Histogram of (10, 0.8)



1. For each distribution let x = 2 and x =3, list h(x) and f(x) for those two x values. h(x) = (height of the histogram bar centered at x)/100; f(x) = P(X=x). Use the values generated by r for the pmf. You may need to estimate the height of the histogram bar

(1) $\frac{h(x)}{100}$ = pmf [P(X=x)]

for $x = 2, 3$

- (10, 0.2)

$\frac{h(2)}{100} = \frac{30}{100} = 0.3$

$\frac{h(3)}{100} = \frac{22}{100} = 0.22$

$P(X=2) = \binom{10}{2}(0.2)^3(0.8)^7 = 0.0754$

$P(X=3) = \binom{10}{3}(0.2)^3(0.8)^7 = 0.2013$

- (10, 0.5)

$\frac{h(X=2)}{100} \rightarrow \frac{10}{100} = 0.1$

$\frac{h(X=3)}{100} \rightarrow \frac{15}{100} = 0.15$

$P(X=2) = \binom{10}{2}(0.5)^3(0.5)^7 = 0.0439$

$P(X=3) = \binom{10}{3}(0.5)^3(0.5)^7 = 0.1171$

- (10, 0.8)

$\frac{h(X=2)}{100} = 0$

$\frac{h(X=3)}{100} = 0$

$P(X=2) = \binom{10}{2}(0.8)^3(0.2)^7 = 0.0002949$

$P(X=3) = \binom{10}{3}(0.8)^3(0.2)^7 = 0.0007864$

2. What is the relationship between a b(10,.2) distribution and a b(10,.8) distribution?

   - The b(10, 0.2) graph was right skewed and b(10, 0.8) graph was left skewed. They are mirror graphs of eachother