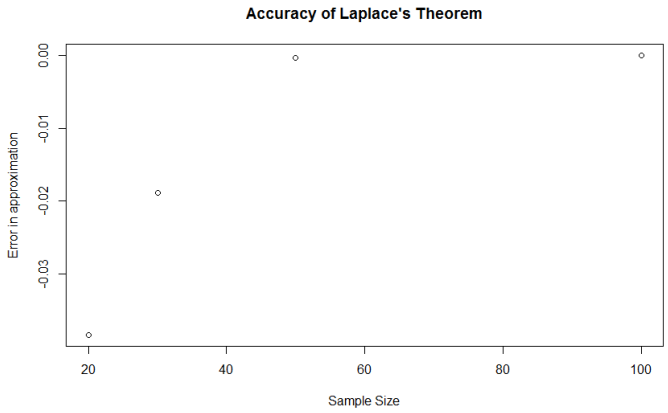
1)

i.

```
> pbinom(8.25, 20, .4)
[1] 0.5955987
> pbinom(8.25, 30, .4)
[1] 0.09401122
> pbinom(8.25, 50, .4)
[1] 0.0002305229
> pbinom(8.25, 100, .4)
[1] 5.431127e-13
```

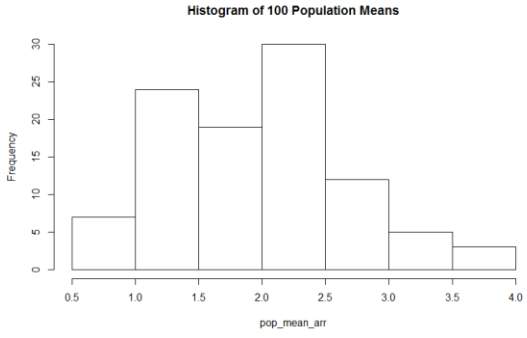
ii. `[1] 6.339474e-01 1.129087e-01 5.819235e-04 8.919414e-11`

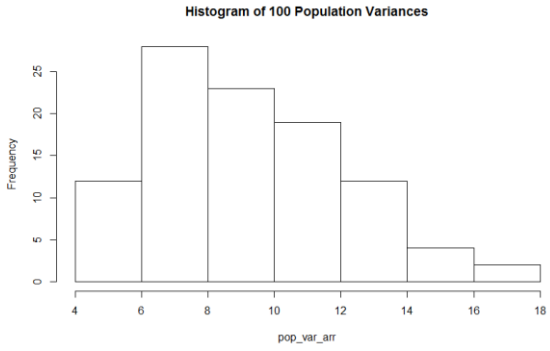
iii.

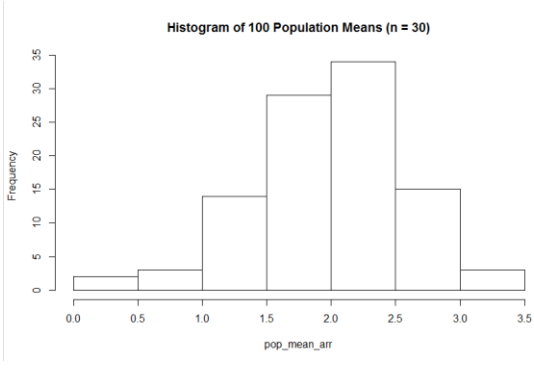


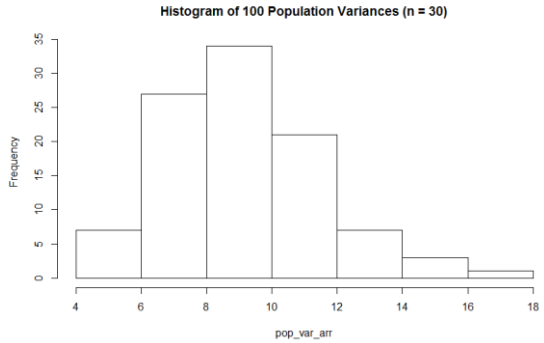
iv. As sample size increases, the difference between Laplace's Theorem's approximation and the actual binomial distribution gets smaller and smaller, meaning the theorem's approximations become more and more accurate.

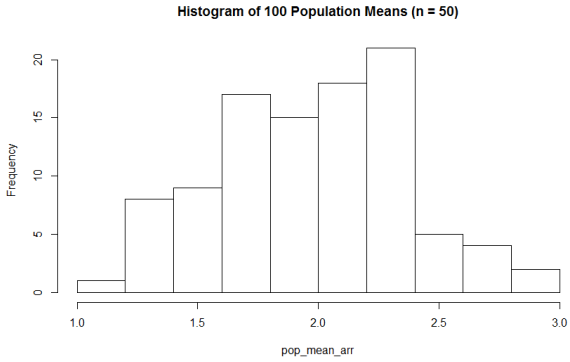
2 i.

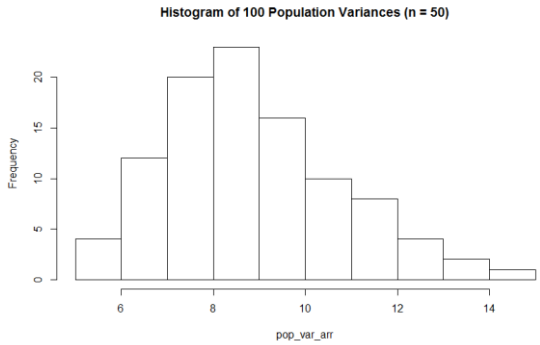




ii. 



iii. 



iv. As population size increases, the frequencies of mean and standard deviation approach the given values – the most common mean centers around 2, and the most common variation is 3^2, or 9. Testing this for n = 100 only continues to prove this.