Problem 1a.

```
> sum(xVec == 1)/length(xVec)
[1] 0.1448551
> sum(xVec == 2)/length(xVec)
[1] 0.1298701
> sum(xVec == 3)/length(xVec)
[1] 0.5034965
> sum(xVec == 4)/length(xVec)
[1] 0.2217782
```

Problem 1b.

```
> sum(xVec == 1)/length(xVec)
[1] 0.1568432
> sum(xVec == 2)/length(xVec)
[1] 0.1408591
> sum(xVec == 3)/length(xVec)
[1] 0.5064935
> sum(xVec == 4)/length(xVec)
[1] 0.1958042
```

Changing the initial probabilities for this simulation does have a small influence on the long term outcome of the proportions. Based on my simulation, it looks like it decreasing the proportion of being in state 4 by almost .03.

Problem 2 (Chapter 2, Problem 1). An urn contains five red, three orange, and two blue balls. Two balls are randomly selected. What is the sample space of this experiment? Let X represent the number of orange balls selected. What are the possible values of X? Calculate $P\{X = 0\}$.

The sample space is $S \in \{RR, RO, RB, OO, BB, OB\}$.

R is Red, O is Orange, and B is Blue.

The number of orange balls selected is $X \in \{0, 1, 2\}$

In order to get 0 Orange balls in a draw, we have 3 options from the Sample Space, $\{RR, RB, BB\}$

$P(X = 0) = P(RR \cup RB \cup BB) = \frac{\binom{5}{2}+\binom{5}{1}\binom{2}{1}+\binom{2}{2}}{\binom{10}{2}} = \frac{21}{45} = \frac{7}{15}$