Assignment1

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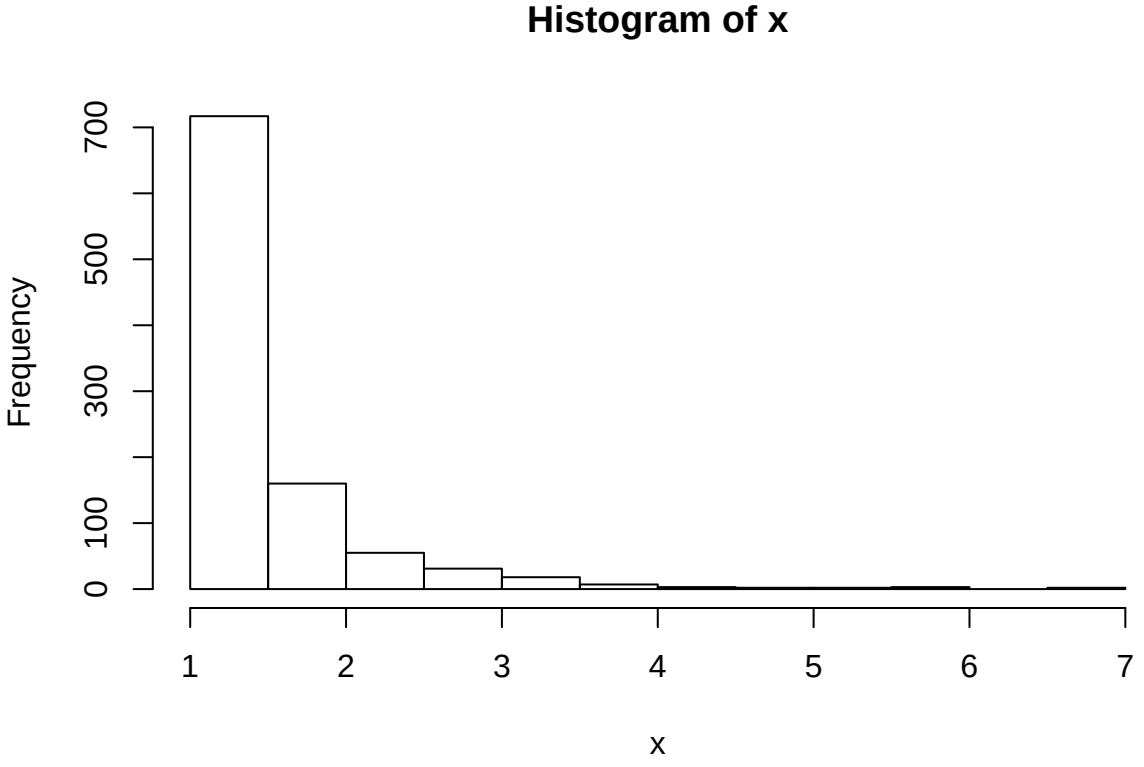
Q.1

Calculating the Sample mean and draw it's histogram:



Sample mean of X is:

```
## [1] 1.484079
```

Calculating Expected value of the distribution:

Expected value of X is:

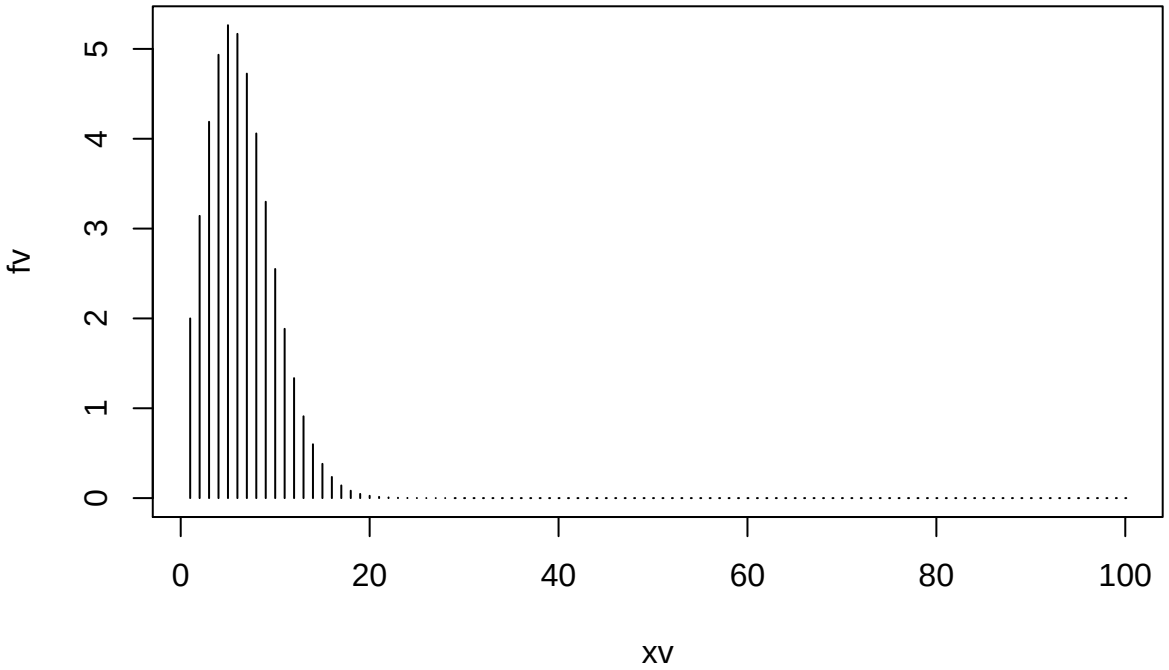
```
## 1.5 with absolute error < 1.7e-14
```

Difference between sample mean and expected value of X is:

```
## [1] -0.01592092
```

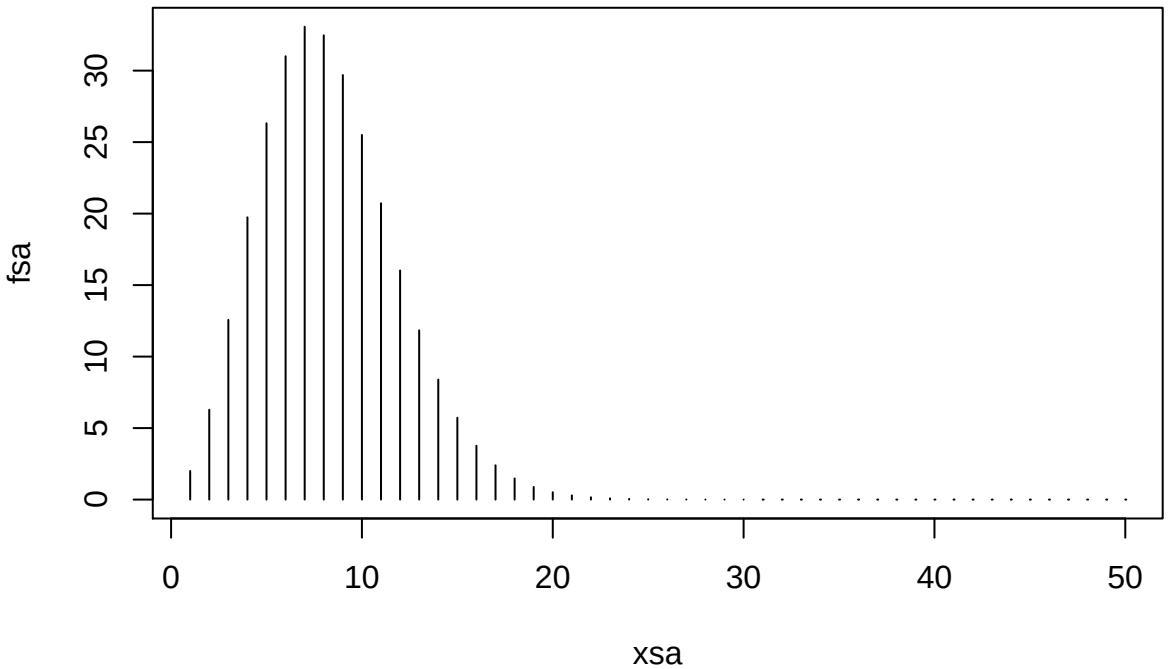
Inference : The difference between the sample mean and expected value is nearly 0.

Q.2



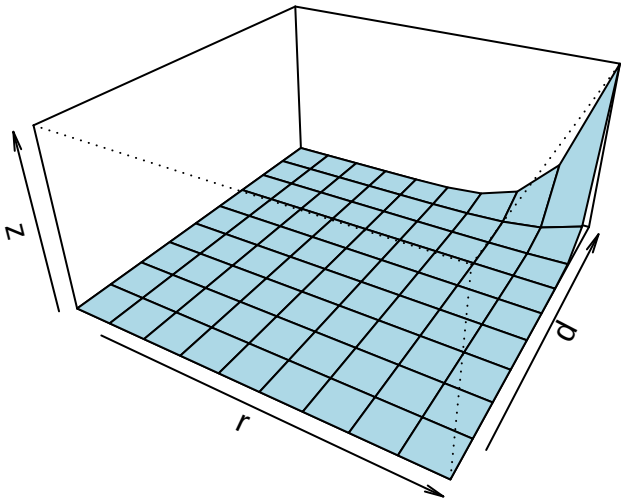
Observation: if the limit as d goes to infinity, the volume of the ball goes to zero.

Q.3



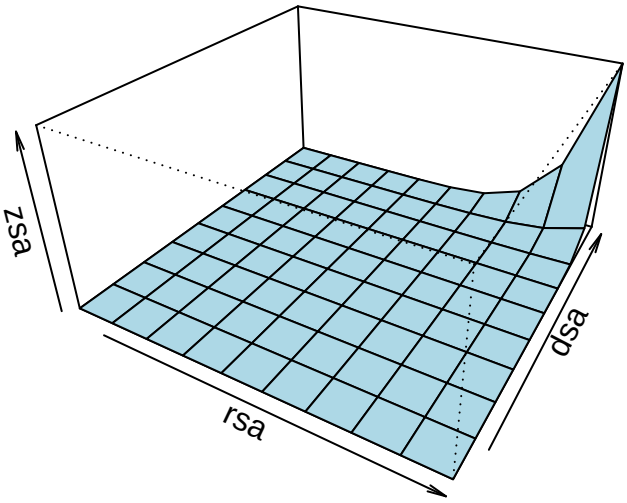
Observation: if the limit as d goes to infinity, the surface area of the ball goes to zero.

Q.4



Observation: if the limit as d and r goes to z, the volume of the ball goes to zero.

Q.5



Observation: if the limit as d and r goes to infinity, the surface area of the ball goes to zero.

Q.6

The differences in euclidean distances for the subspace projection is as follows:

```
## [1] "Subspace of dimension: 1"
## [1] 43.80967
```

```
## [1] "Subspace of dimension: 2"
## [1] 58.99056
```

```
## [1] "Subspace of dimension: 3"
## [1] 68.02603
```

```
## [1] "Subspace of dimension: 4"
## [1] 78.0375
```

```
## [1] "Subspace of dimension: 5"
## [1] 87.13731
```

```
## [1] "Subspace of dimension: 10"
## [1] 110.2311
```

Observation : As we decrease the dimension, the differences in euclidean distances for the subspace projection decreases.

Attached FIle for code