

S2S Lab 5 Task Solutions

1 Welcome!

2 Sampling Distribution of \bar{X}

What is the mean of the random variable X ?

3.5

What is the variance of the random variable X ?

2.9167

2.1 Sampling with replacement

What is the mean of the sampling distribution for \bar{X} ?

```
means_w <- unique(samples_w$Mean)
mean_Xbar_w <- sum(means_w*samplingdist_mean_w)
mean_Xbar_w
```

```
## [1] 7/2
```

What is the variance of the sampling distribution for \bar{X} ?

```
means_w <- unique(samples_w$Mean)
var_Xbar_w <- sum(means_w^2*samplingdist_mean_w)-(mean_Xbar_w)^2
var_Xbar_w
```

```
## [1] 35/24
```

What is the mean of the sampling distribution for S^2 ?

```
vars_w <- unique(samples_w$Variance)
mean_S2_w <- sum(vars_w*samplingdist_var_w)
mean_S2_w
```

```
## [1] 35/12
```

2.2 Sampling without replacement

What is the mean of the sampling distribution for \bar{X} , when sampling without replacement?

```
means_wo <- unique(samples_wo$Mean)
mean_Xbar_wo <- sum(means_wo*samplingdist_mean_wo)
mean_Xbar_wo
```

```
## [1] 7/2
```

What is the variance of the sampling distribution for \bar{X} , when sampling without replacement?

```
means_wo <- unique(samples_wo$Mean)
var_Xbar_wo <- sum(means_wo^2*samplingdist_mean_wo)-(mean_Xbar_wo)^2
var_Xbar_wo
```

```
## [1] 7/6
```

What is the expected value of the sampling distribution for S^2 , when sampling without replacement?

```
vars_wo <- unique(samples_wo$Variance)
mean_S2_wo <- sum(vars_wo*samplingdist_var_wo)
mean_S2_wo
```

```
## [1] 7/2
```