# P4

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2024-09-17

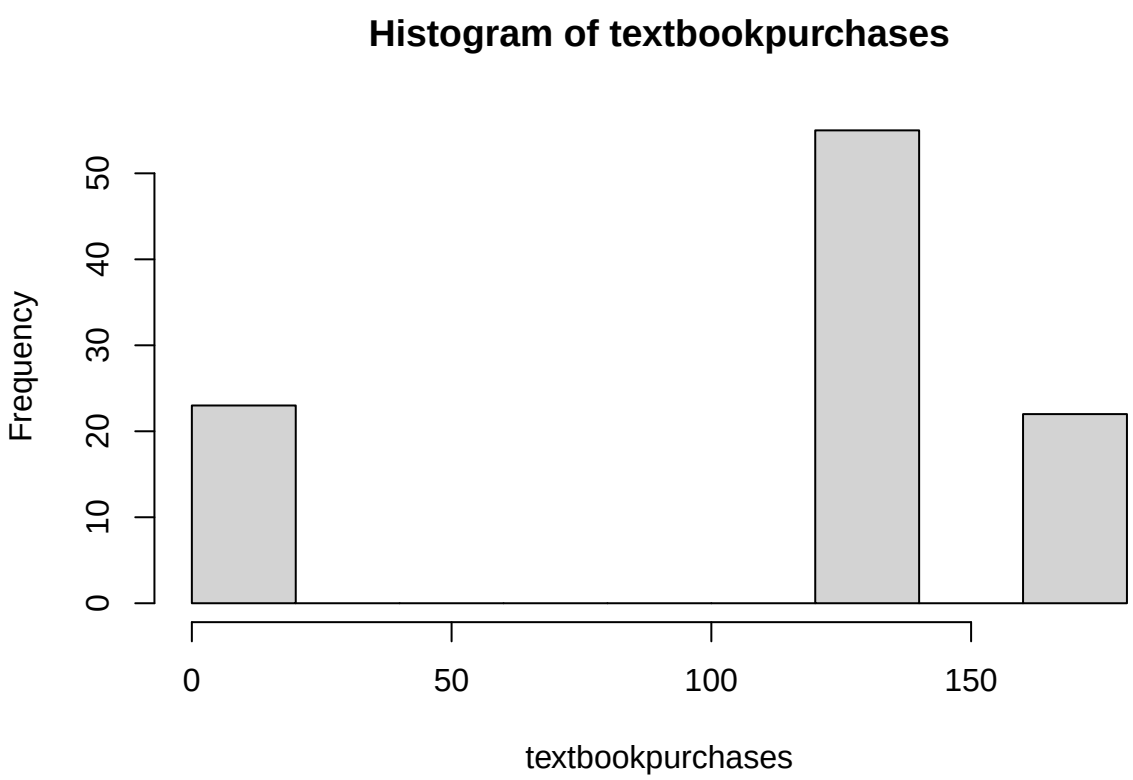
### 2.4.1

a. 105
b. $11785
c. $117.85

### 2.4.2

a. P(X = 0) = 20
b. P(X = 137) = 55
c. P(X = 170) = 25
d. E(X) = 117.85, which is the same as the answer in c.
e.

```
textbookpurchases = sample(c(0, 137, 170), 100, replace = TRUE, prob = c(0.2, 0.55, 0.25))
hist(textbookpurchases)
```



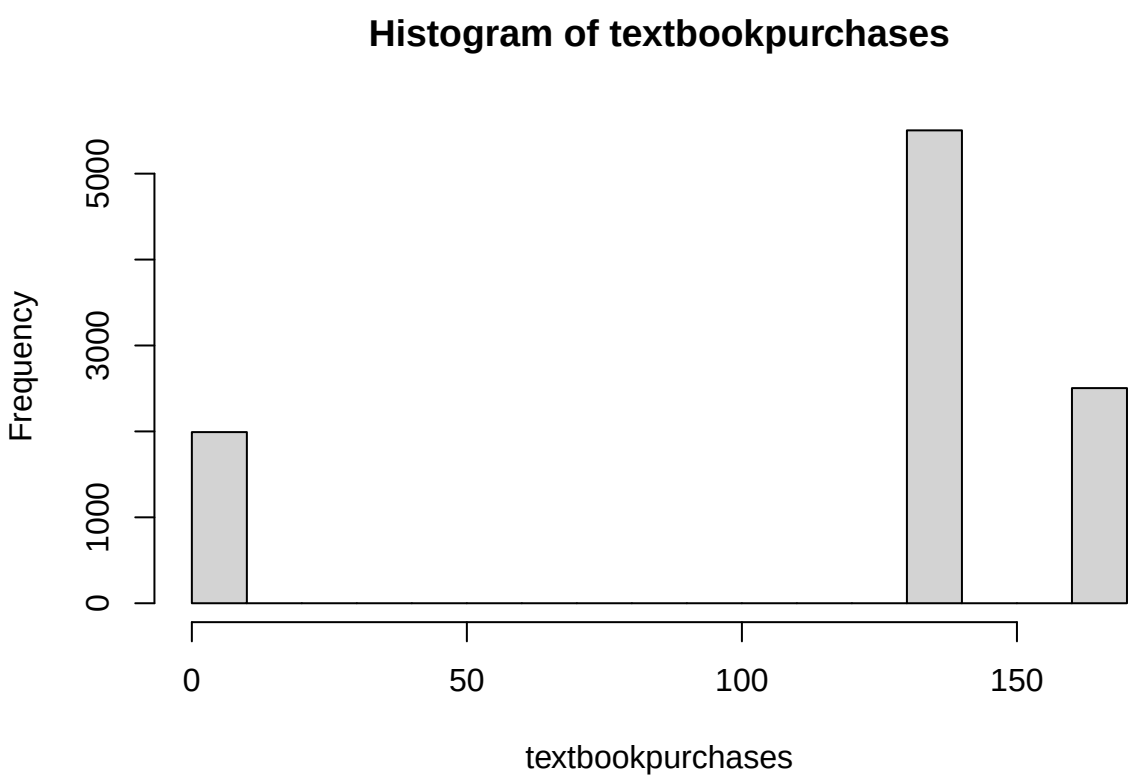

f. This number is off by 10. This is off from what I expected by a bit. 107.65

```
mean(textbookpurchases)
```

```
## [1] 112.75
```

g. The mean was off by 1. This is closer to what we calculated 118.4781

```
textbookpurchases = sample(c(0, 137, 170), 10000, replace = TRUE, prob = c(0.2, 0.55, 0.25))
hist(textbookpurchases)
```



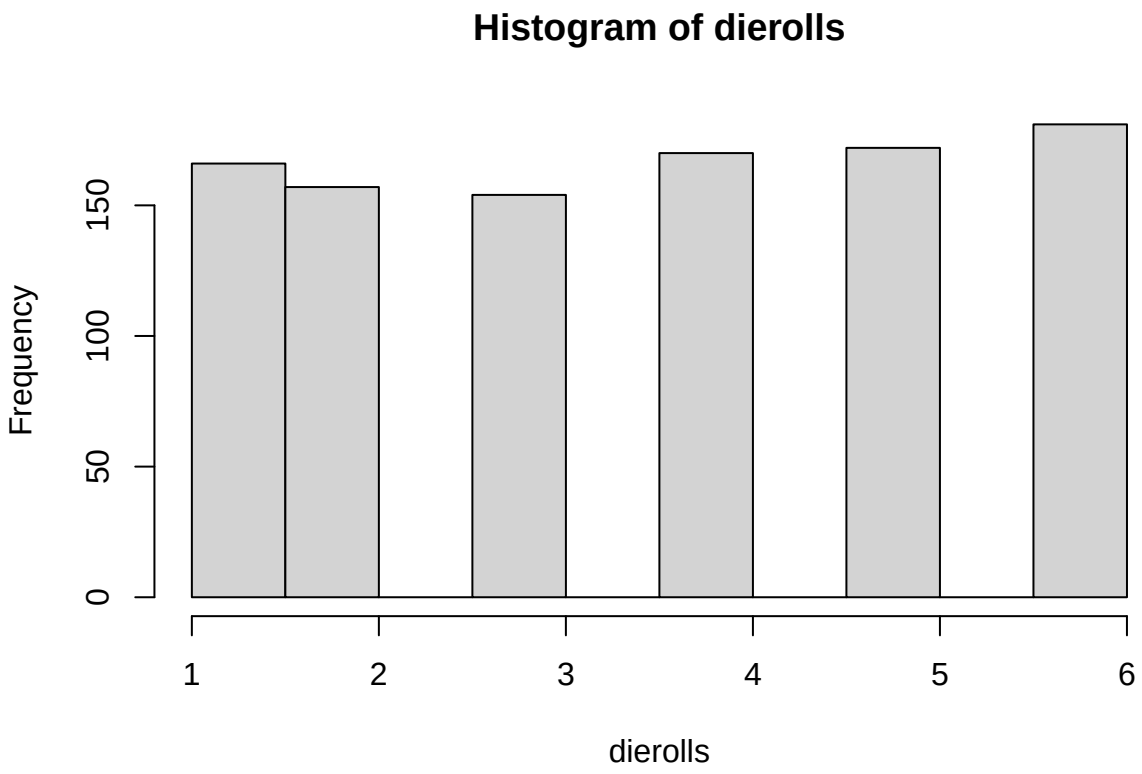

```
mean(textbookpurchases)
```

```
## [1] 117.9728
```

### 2.4.3

a. mean = 3.5. E(X) = 3.5, variance = 2.917
b.

```
dierolls = sample(c(1, 2, 3, 4, 5, 6), 1000, replace = TRUE, prob = c(1/6, 1/6, 1/6, 1/6, 1/6, 1/6))
hist(dierolls)
```




c. It is close but off by a bit.

```
mean(dierolls)
```

```
## [1] 3.568
```

```
var(dierolls)
```

```
## [1] 2.988364
```

### 2.4.4

a. The E(X) is similar to the mean. The main difference in how they are calculated is that the expected outcome takes probability into account, and is a bit more complcated. I believe that means that the expected value would be less skewed by large outliers.
b. They are similar because they both measure variation, just different types. They both have a number squared in them.

### 2.4.5

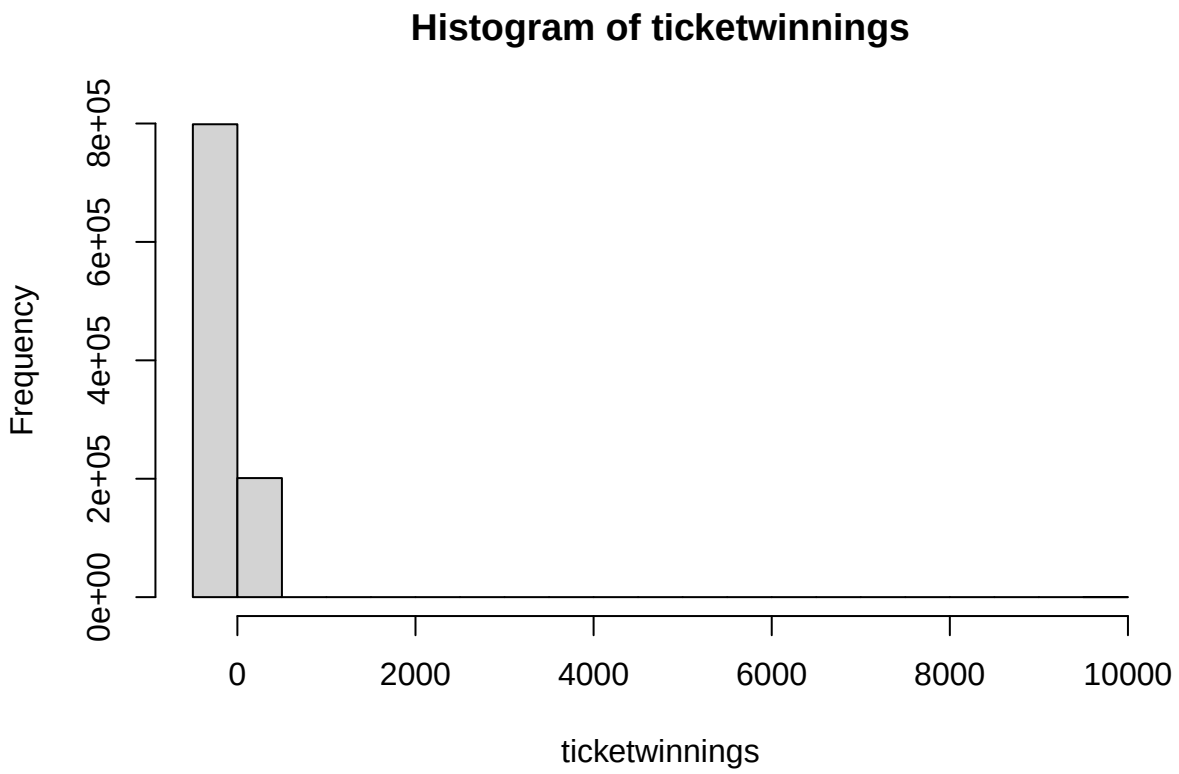
a. Everything is 1/6th
b. E(x) = 3.5
c. Var(X) = 2.914
d. These are close to the numbers in the other exercises, the variance can be explained by human error for a and b and random error for a, along with using a different formula.

### 2.4.6 SKIP

### 2.4.7

a. Xi = -2, 3, 98, 9998
b. P(X = -2) = .7989, P(X = 3) = 0.2, P(X = 98) = 0.001, P(X = 9998) = 0.00001
c. E(X) = -0.79982, Var(X) = 1016.117
d. They make money
e.

```
ticketwinnings = sample(c(-2, 3, 98, 9998), 1000000, replace = TRUE, prob = c(0.7989, 0.2, 0.001, 0.000
hist(ticketwinnings)
```




f. mean: 0.06654 var: 9710.456

```
mean(ticketwinnings)
```

```
## [1] 0.18233
```

```
var(ticketwinnings)
```

```
## [1] 10810.44
```