

P5

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2.5.1

- a. $Y = 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12$
- b. $P(Y = 2) = 1/36, P(Y = 3) = 2/36, P(Y = 4) = 3/36, P(Y = 5) = 4/36, P(Y = 6) = 5/36, P(Y = 7) = 6/36, P(Y = 8) = 5/36, P(Y = 9) = 4/36, P(Y = 10) = 3/36, P(Y = 11) = 2/36, P(Y = 12) = 1/36$
- c. $E(Y) = 7, \text{Var}(Y) = 5.94$. These numbers are a bit different from the numbers in the other problem, but fit their data in the same way. Interestingly, the mean and the median are almost the same in both data sets.
- d.

```
bluedierolls = 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))
greendierolls = 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))
diesum=bluedierolls+greendierolls
hist(diesum)
```



e. These are extremely close to what I calculated

```
mean(diesum)
```

```
## [1] 7.137
```

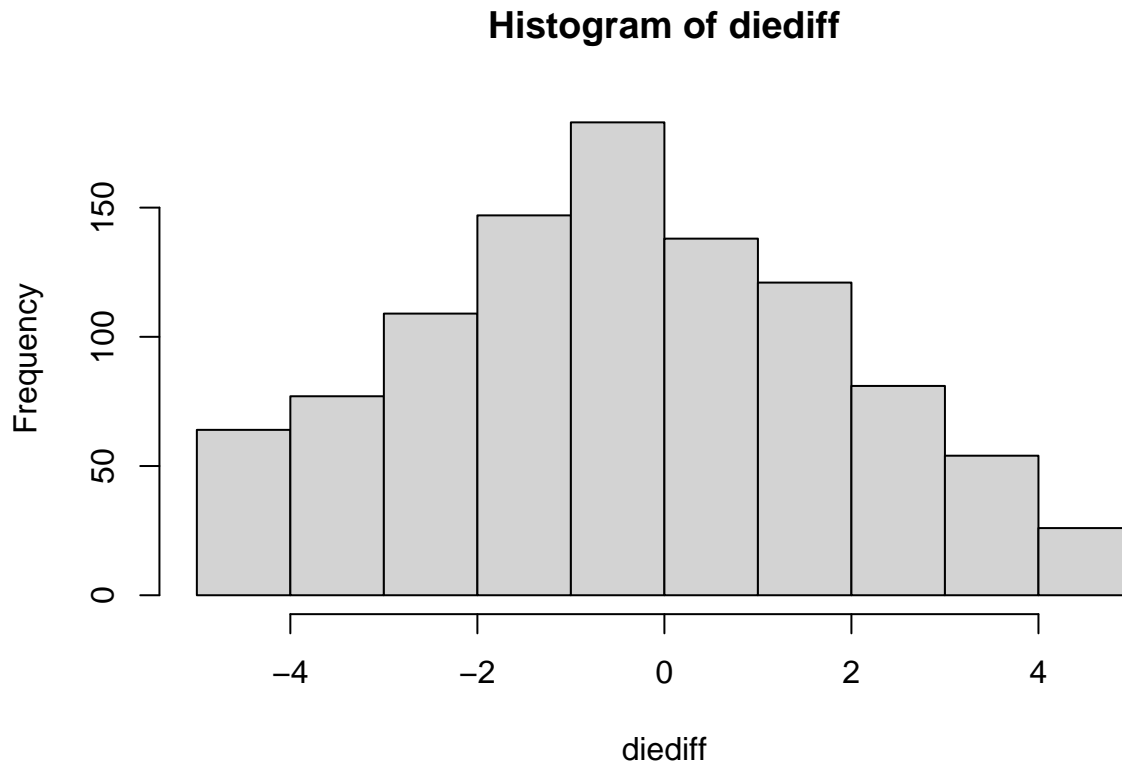
```
var(diesum)
```

```
## [1] 5.888119
```

2.5.2

- $E(X_b - X_g) = 0$
- $\text{Var}(X_b - X_g) = 5.828$
-

```
bluedierolls = 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))
greendierolls = 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))
diediff=bluedierolls-greendierolls
hist(diediff)
```



d.

```
mean(diediff)
```

```
## [1] 0.102
```

```
var(diediff)
```

```
## [1] 5.294891
```

They are close but off by a bit due to randomness/miscalculation.

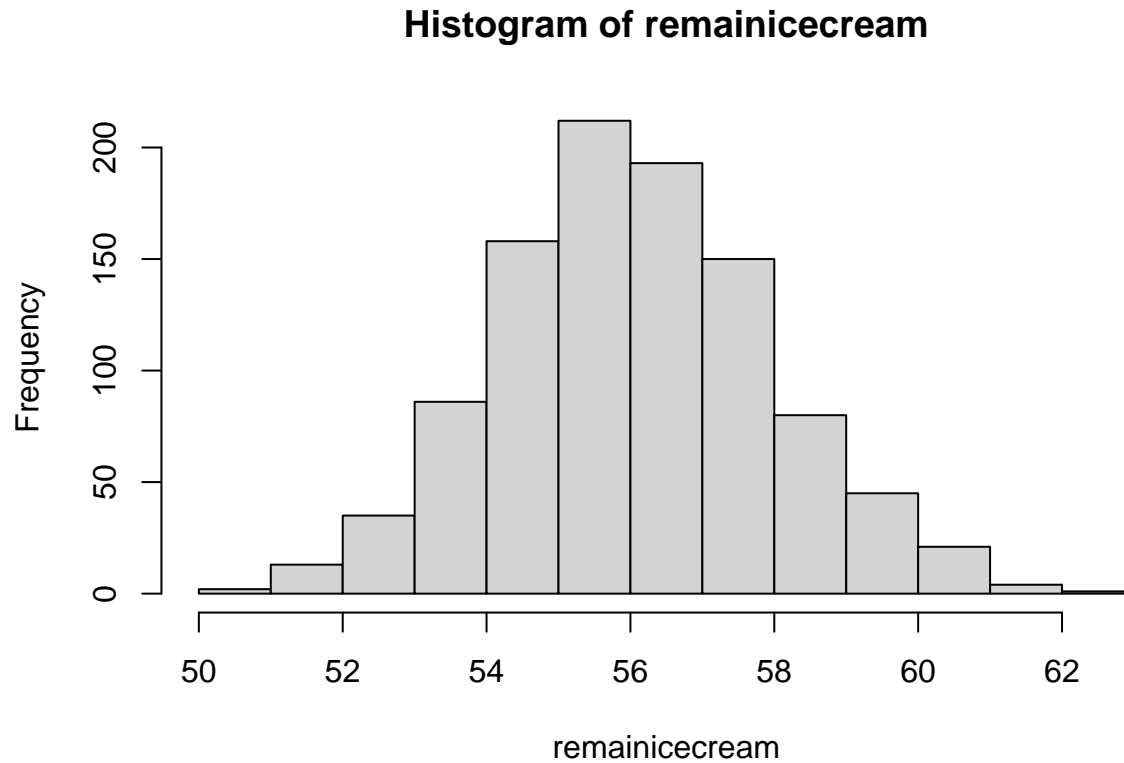
2.5.3 SKIP

2.5.4

- a. $\text{Var}(B) = 4$, $E(B) = 60$
- b. $\text{Var}(S) = 0.0225$, $E(S) = 3$
- c. $\text{Var}(R) = 4.045$, $E(R) = 54$
- d.

```
boxoz=rnorm(1000, mean = 60, sd = 2)
scooponeoz=rnorm(1000, mean = 2, sd = .15)
scooptwooz=rnorm(1000, mean = 2, sd = .15)
```

```
remainicecream=boxoz-scooponeoz-scooptwooz  
hist(remainicecream)
```



e. The numbers are off, but they are close enough, especially given the somewhat large variations.

```
mean(remainicecream)
```

```
## [1] 56.04849
```

```
var(remainicecream)
```

```
## [1] 3.60959
```