Question 1 part (a)

```
# Use c() to define the following:
X <-  c(1, 2, 3, 4, 5)
prob <- c(0.12, 0.23, 0.34, 0.25, 0.15)
```

Question 1 part (b)

```
a <- c(1,2,3)
b <- c(4,5,6)

# multiplying `a` and `b` results in "position-wise" multiplication:
a*b
```

```
## [1]  4 10 18
```

```
# squaring `a` results in squaring each value of `a`:
a^2
```

```
## [1] 1 4 9
```

```
# applying `sum()` to `a` adds up the values of `a`:
sum(a)
```

```
## [1] 6
```

```
# applying `sqrt()` to `sum(a)` adds up the values of `a` and determines the square root:
sqrt(sum(a))
```

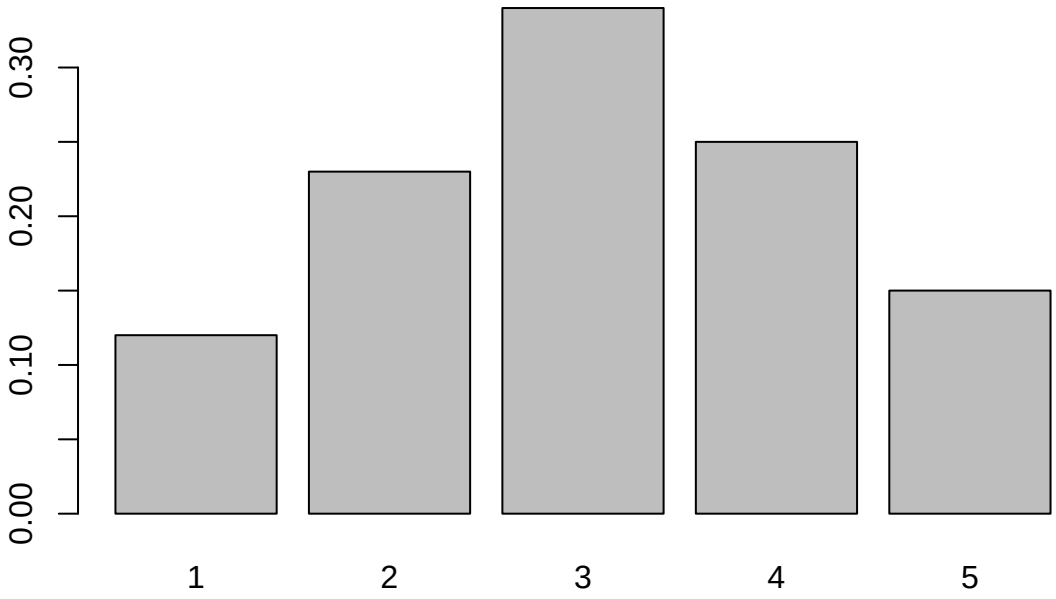
```
## [1] 2.44949
```

Question 1 part (c)

```
expect <- sum(X * prob)
vari <- sum((X^2) * prob) - expect^2
stand <- sqrt(vari)
```

Question 1 part (d)

```
# barplot has a names.arg option for labeling purposes.
barplot(prob,names.arg = X)
```



Question 2

```
# (a) NOTE: In R, `c(3,4,5,6,7,8)` and `3:8` will produce the same result.
#           `a:b` can be used to produce integers from `a` to `b`.
X1 <- 0:5
# (b)
prob_b <- dbinom(X1, size = 5, prob = 0.5)
# (c)
prob_3 <- 1 - pbinom(3, size = 5, prob = 0.5)
# (d)
sim_disc <- rbinom(1000, size = 5, prob = 0.5)
# (e)
mean(sim_disc)
```

```
## [1] 2.527
```

Question 2

```
hyper_prob <- phyper(1, m = 1000, n = 9000, k = 10)
```

Question 3

```
# (a)
prob_60_64 <- pnorm(64, mean = 64.5, sd = 2.5) - pnorm(60, mean = 64.5, sd = 2.5)
# (b)
prob_67 <- 1 - pnorm(67, mean = 64.5, sd = 2.5)
# (c)
p_90 <- qnorm(0.9, mean = 64.5, sd = 2.5)
# (d)
sim_cts <- rnorm(1000, mean = 64.5, sd = 2.5)
# (e)
mean(sim_cts)
```

```
## [1] 64.50572
```

Submission Instructions

1. Save this file. (Quick key combo for that is "control" (or "command" on a Mac) and "s")
2. Run the following code chunk to produce a pdf.
3. Both of these files are likely in the "Downloads" folder (unless you moved them). Check the contents of each file and upload both the Rmd and pdf files to Gradescope.