Homework 4

Write a `HW4.Rmd` file to answer these questions. Start by pasting this outline to help the grader find your answers:

```
(Your Name Here)

# 1 QQ plots

## 1a

## 1b

## 1c

# 2 Fiber

## 2a

## 2b

# 3 Bulls
```

Knit your `.Rmd` file to an `.html` file along the way. Turn in the `.html` to Canvas.

1. For each of the three samples, make a normal QQ plot. Look at the QQ plot and say whether the data are plausibly from a normal population or whether they are evidence against a normal population. (Hint: In each case, to get some context for your decision, make a few QQ plots from samples of the same size that did come from a normal population. Please do not include these context plots in your submission.)

   (a) `data = c(7,13.2,8.1,8.2,6,9.5,9.4,8.7,9.8,10.9,8.4,7.4,8.4,10,9.7,8.6,12.4,10.7,11,9.4)`

   (b) `data = c(2.5,1.8,2.6,-1.9,1.6,2.6,1.4,0.9,1.2,2.3,-1.5,1.5,2.5,2.9,-0.1)`

   (c) `data = c(3.3,1.7,3.3,3.3,2.4,0.5,1.1,1.7,12,14.4,12.8,11.2,10.9,11.7,11.7,11.6)`

2. A maker of dietary fiber supplement tablets claims its bottles contain, on average, 250 g of the supplement, with a standard deviation of 2 g.

   (a) Find the probability a randomly selected bottle weighs between 246 and 254 g. To do this, suppose the bottle weights are approximately normally distributed. Hint: Standardizing a random single weight requires subtracting its mean μ and dividing by its standard deviation σ.

   (b) 100 bottles are selected randomly. Find the probability that their average weight is less than 250 g. Do not assume any longer that the bottle weights are normally distributed. Hint: Standardizing a random sample mean weight requires subtracting its mean μ and dividing by its standard deviation $\sigma/\sqrt{n}$.

3. The Hereford Cattle Society says that the mean weight of a one-year-old Hereford bull is 1135 pounds, with a standard deviation of 97 pounds. Suppose 40 bulls are randomly selected and loaded on a train car. Find the probability their combined weight exceeds 46000 pounds. (Hint: The combined weight exceeds 46000 pounds if the average weight exceeds $\frac{46000}{40} = 1150$ pounds.)