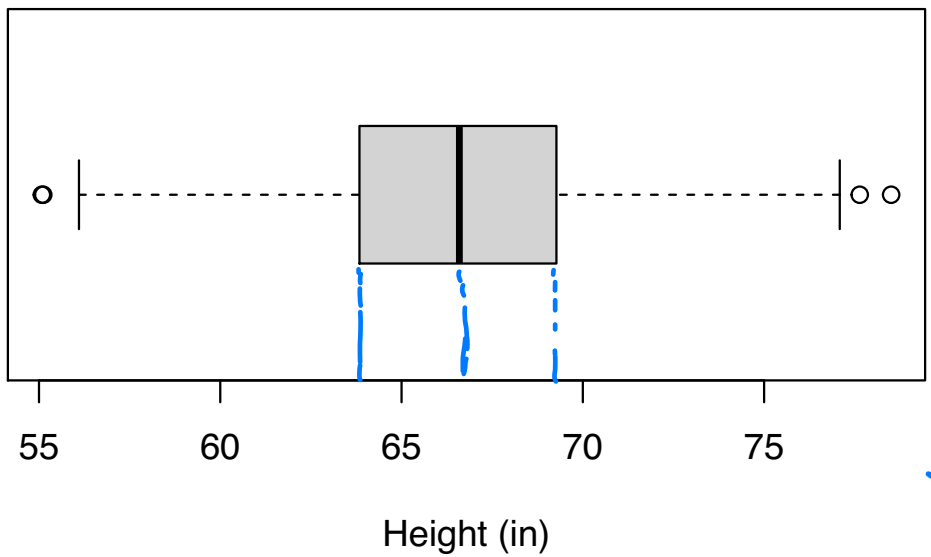
Exam 1 Practice Problems
STAT 310, Spring 2021

Exercise 1

The following is a box plot of height in inches for a random sample of people. Using the box plot, estimate the median and IQR. Are there any potential outlier in this data set?



median ≈ 67

$Q1 \approx 64$

$Q3 \approx 69$

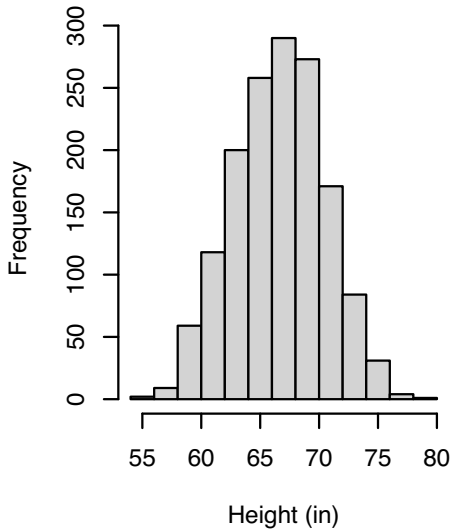
$IQR = Q3 - Q1$

$= 69 - 64 = 5$

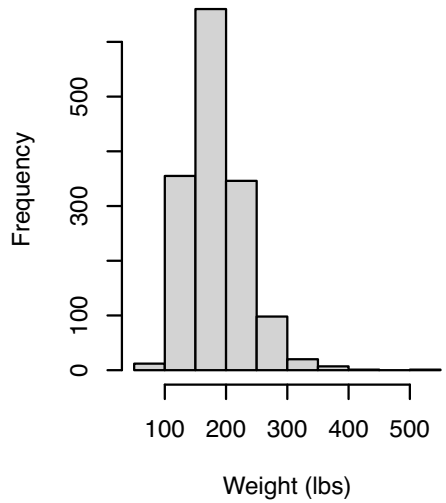
Yes, there are some potential outliers.

Exercise 2

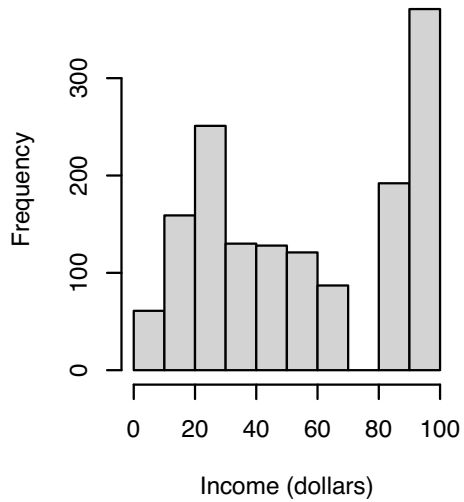
Describe the shapes of the distributions in the following histograms.



symmetric, normally distributed



right skewed



bimodal

Exercise 3

Without doing an calculations, determine whether the mean and standard deviation of Set A is larger than, smaller than, or equal to Set B. Then use R to verify.

Set A: 1, 2 , 9, 12, 13
Set B: 3, 4, 11, 14, 15 $+2$

Mean of Set A is smaller than Set B

St. dev. of Set A is equal to Set B

Exercise 4

Without doing an calculations, determine whether the mean and standard deviation of Set A is larger than, smaller than, or equal to Set B. Then use R to verify.

Set A: 1, 2 , 9, 12, 13
Set B: 2, 4, 18, 24, 26 ⤵ x2

Mean of Set A smaller than Set B

St dev of Set A smaller than Set B

Exercise 5

Josh, a student in a statistics class, scored 85 points on the first exam and 80 points on the second exam. The mean score on the first exam for all students in this course was 79 with a standard deviation of 4. The mean score on the second exam was 60 with a standard deviation of 10. The distributions of both exam scores are approximately normal.

(a) What is Josh's $z-$score on the first exam?

$$z = \frac{x-\mu}{\sigma} = \frac{85-79}{4} = 1.5$$

(b) What is Josh's $z-$score on the second exam?

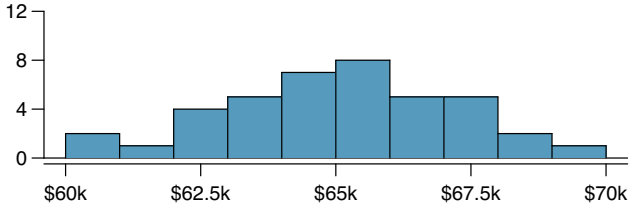
$$z = \frac{x-\mu}{\sigma} = \frac{80-60}{10} = 2$$

(c) On which exam did Josh do better when compared with other students in the class?

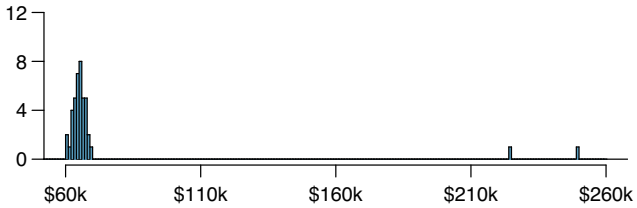
second exam, since higher z-score

Exercise 6

The first histogram below shows the distribution of the yearly incomes of 40 patrons at a college coffee shop. Suppose two new people walk into the coffee shop: one making $225,000 and the other $250,000. The second histogram shows the new income distribution. Summary statistics are also provided.



(1)



(2)

	(1)	(2)
n	40	42
Min.	60,680	60,680
1st Qu.	63,620	63,710
Median	65,240	65,350
Mean	65,090	73,300
3rd Qu.	66,160	66,540
Max.	69,890	250,000
SD	2,122	37,321

(a) Would the mean or the median best represent what we might think of as a typical income for the 42 patrons at this coffee shop?

median, since it's not affected by outliers

(b) Would the standard deviation or the IQR best represent the amount of variability in the incomes of the 42 patrons at this coffee shop?

IQR, since it's not affected by outliers