Lab_5

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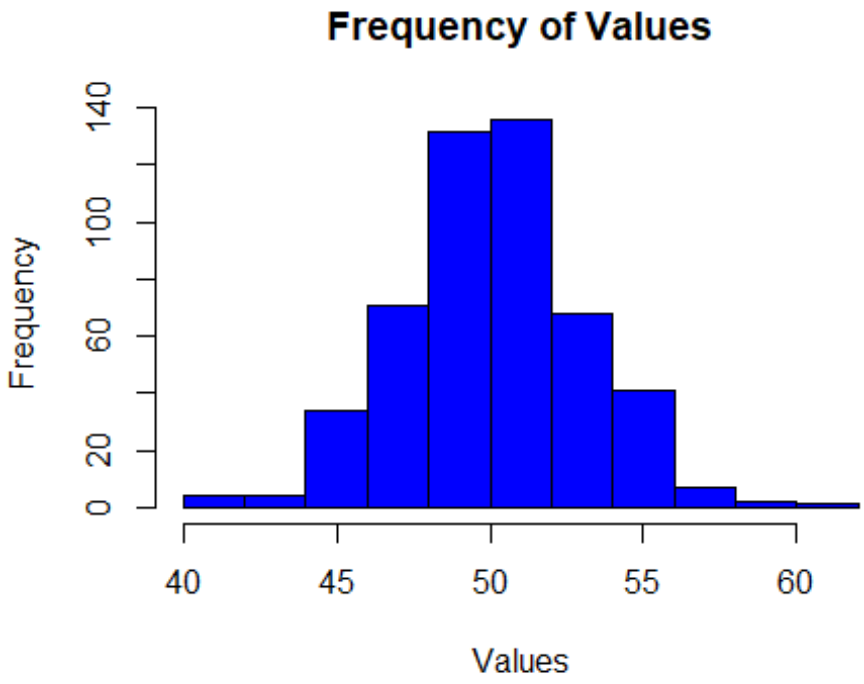
02/03/2022

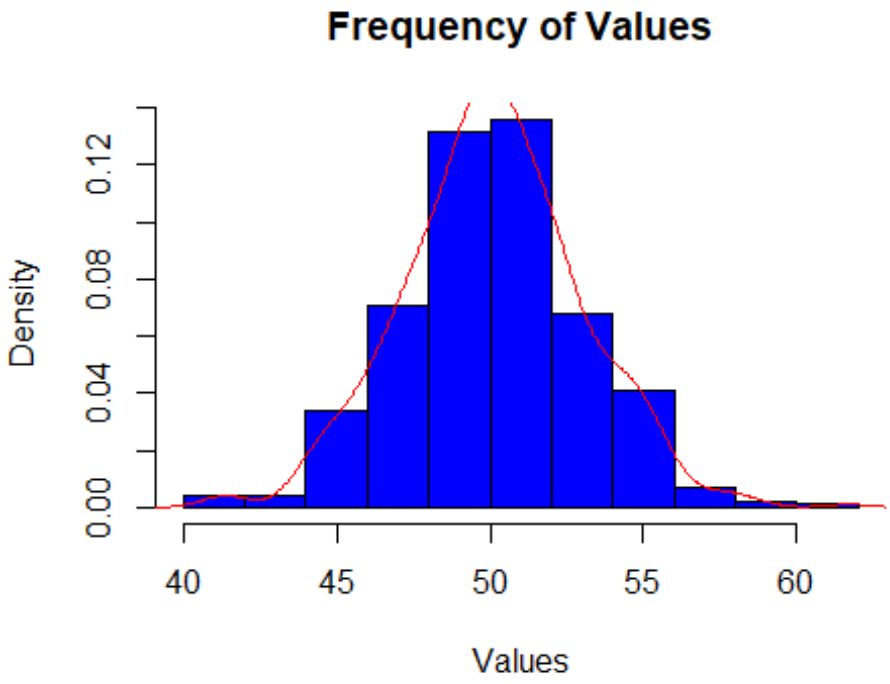
Question 1:

```
# a
d5 = d5[,2]


#b
min(d5)

## [1] 40.88721

max(d5)

## [1] 61.65908

#c
floor(min(d5))

## [1] 40

ceiling(max(d5))

## [1] 62

bks = seq(40, 62, by = 2)

#d
hist(d5, main="Frequency of Values",
     xlab = "Values", breaks = bks, col="blue", border = "black")
```



Questoin 2:

```
# (2.a)
hist(d5, main="Frequency of Values",
     xlab = "Values", breaks = bks, col="blue", border = "black", prob =
TRUE)

lines(density(d5), col = "red")
```




```
mean(d5)

## [1] 50.096

median(d5)

## [1] 50.09486
```

Yes! This histogram seems largely normally distributed, we can see that the curve is largely symmetric and bell shaped with most of our values towards the center. We also see that both the mean and median are in the center of the curve.

```
#(2.b)
qlow = quantile(d5, 0.025)
qhigh = quantile(d5, 0.975)

qlow

##     2.5%
## 44.37995

qhigh

##    97.5%
## 55.59352

#(2.c)
μ = mean(d5)
```

```
std = sd(d5)

(μ - (2*std))

## [1] 44.24484

(μ + (2*std))

## [1] 55.94717
```

c) Question 'c' is terribly worded but Steve says this is how we should solve this. This question does not make sense as written.

Here we see that our histogram meets the 68-95-99.7 rule. Where any normally distributed variable X, approximately:

68% of observations fall within 1 standard deviations of the mean $((\mu-1\sigma)and(\mu+1\sigma)$

95% of observations fall within 2 standard deviations of the mean $((\mu-2\sigma)and(\mu+2\sigma)$

99.7% of observations fall within 3 standard deviations of the mean$((\mu- 3\sigma)and(\mu+ 3\sigma)$

Here we see that our qlow and qhigh (which represent 2.5% and 97.5% respectively) match up perfectly with our expectation that 95% of our observations fall within 2 standard deviations of the mean. Meaning when we apply the formula given and match those with the outputted values from 2.b (both of which would represent 2.5% and 97.5% if normally distributed) . Since we know this rule only applies to normally distributed histograms this supports our answer to 2.a that our histogram is in fact normally distributed.