606-HW3

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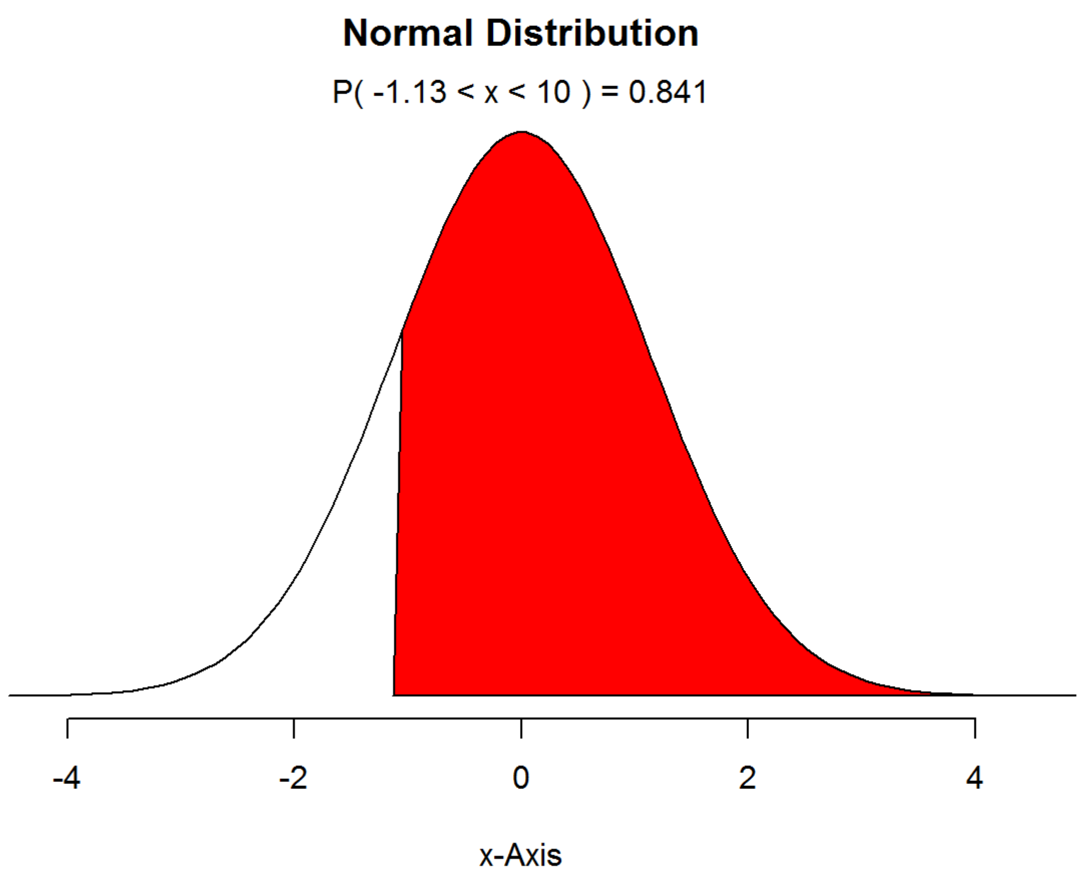
3.2

a. Z > ???1.13

```
1-pnorm(-1.13)
```

```
## [1] 0.8707619
```

```
normalPlot(sd=1.13, bounds = c(-1.13,10))
```

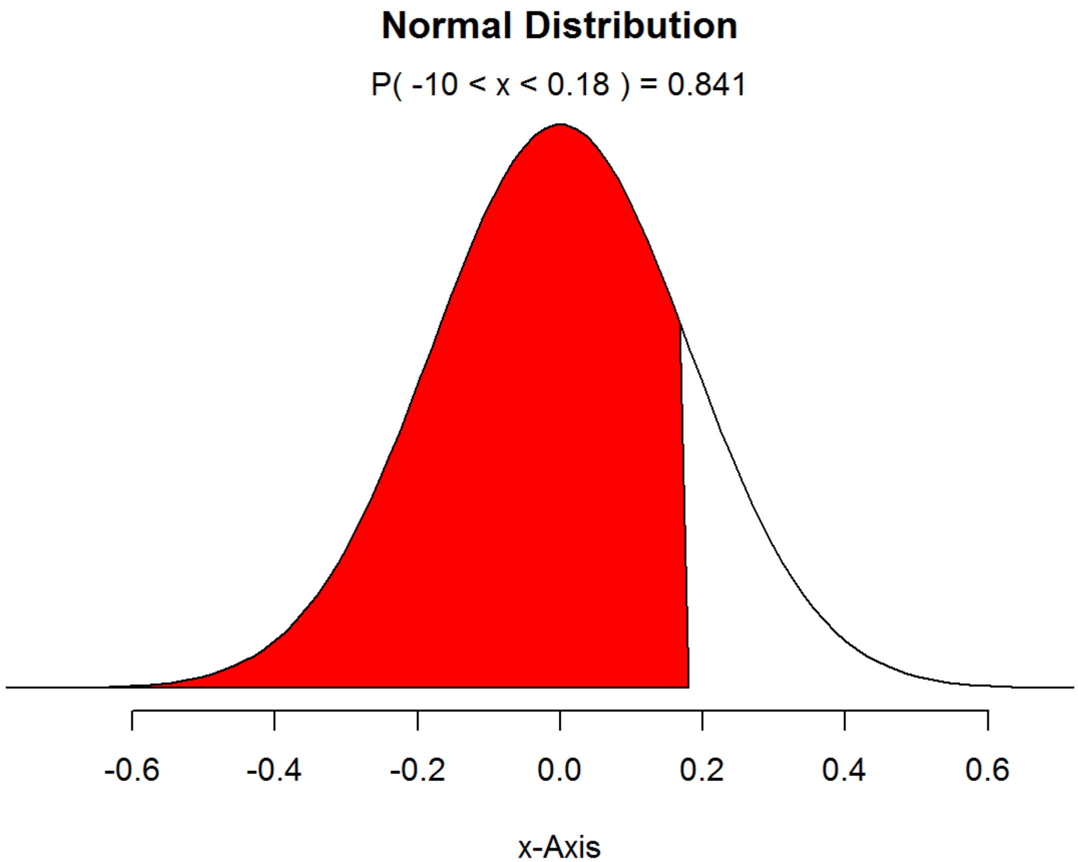


b. Z < 0.18

```
pnorm(0.18)
```

```
## [1] 0.5714237
```

```
normalPlot(sd=0.18, bounds = c(-10,0.18))
```

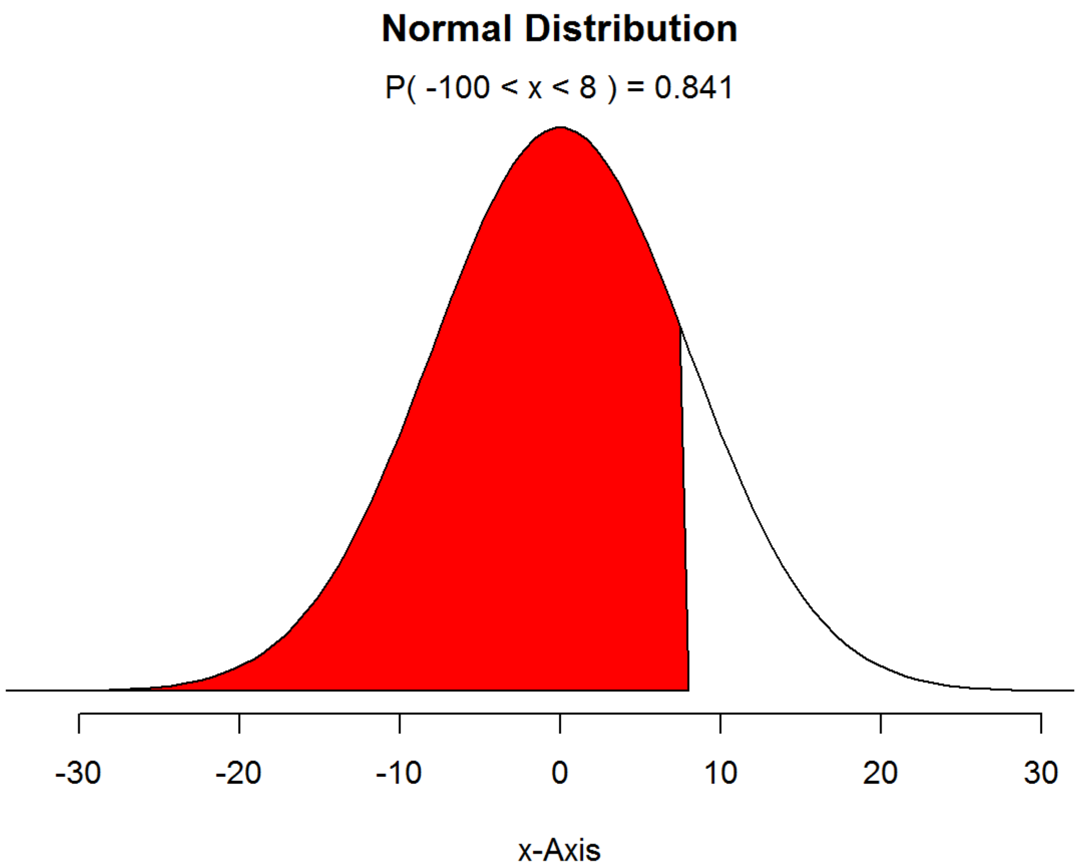


c. Z > 8

```
pnorm(8)
```

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

```
normalPlot(sd=8, bounds = c(-100,8))
```

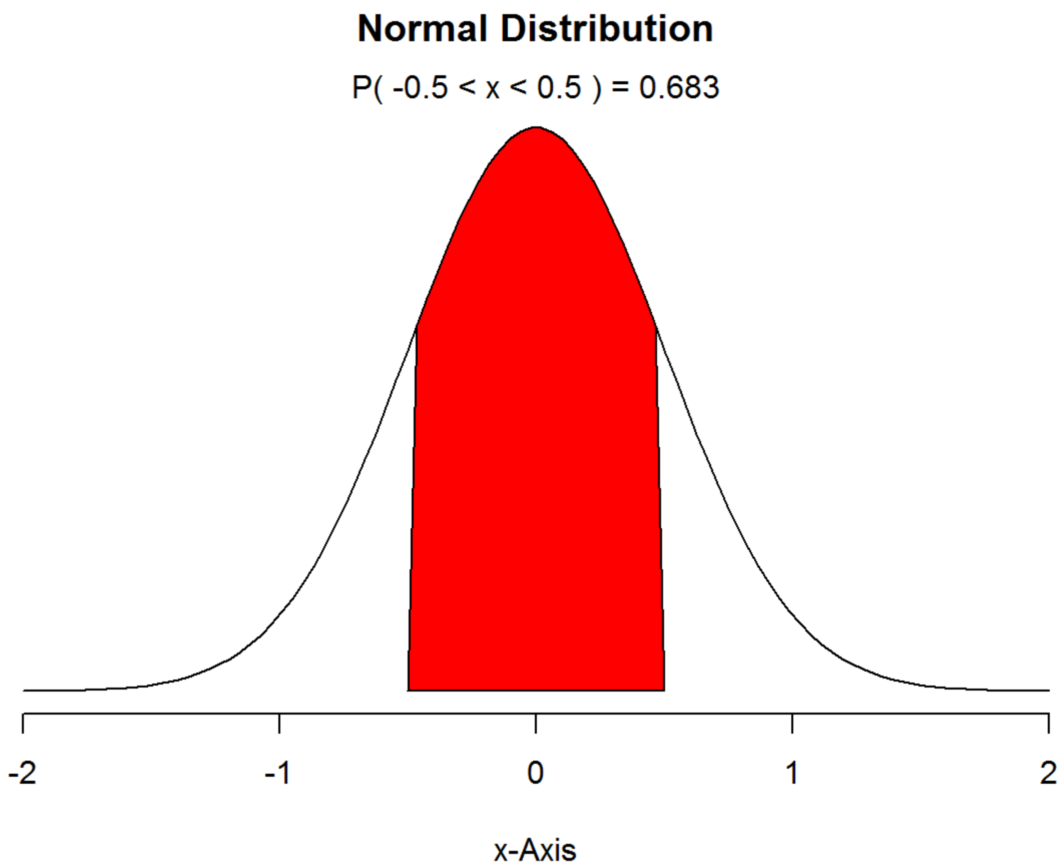


d. |Z| < 0.5

```
(1-pnorm(0.5))*2
```

```
## [1] 0.6170751
```

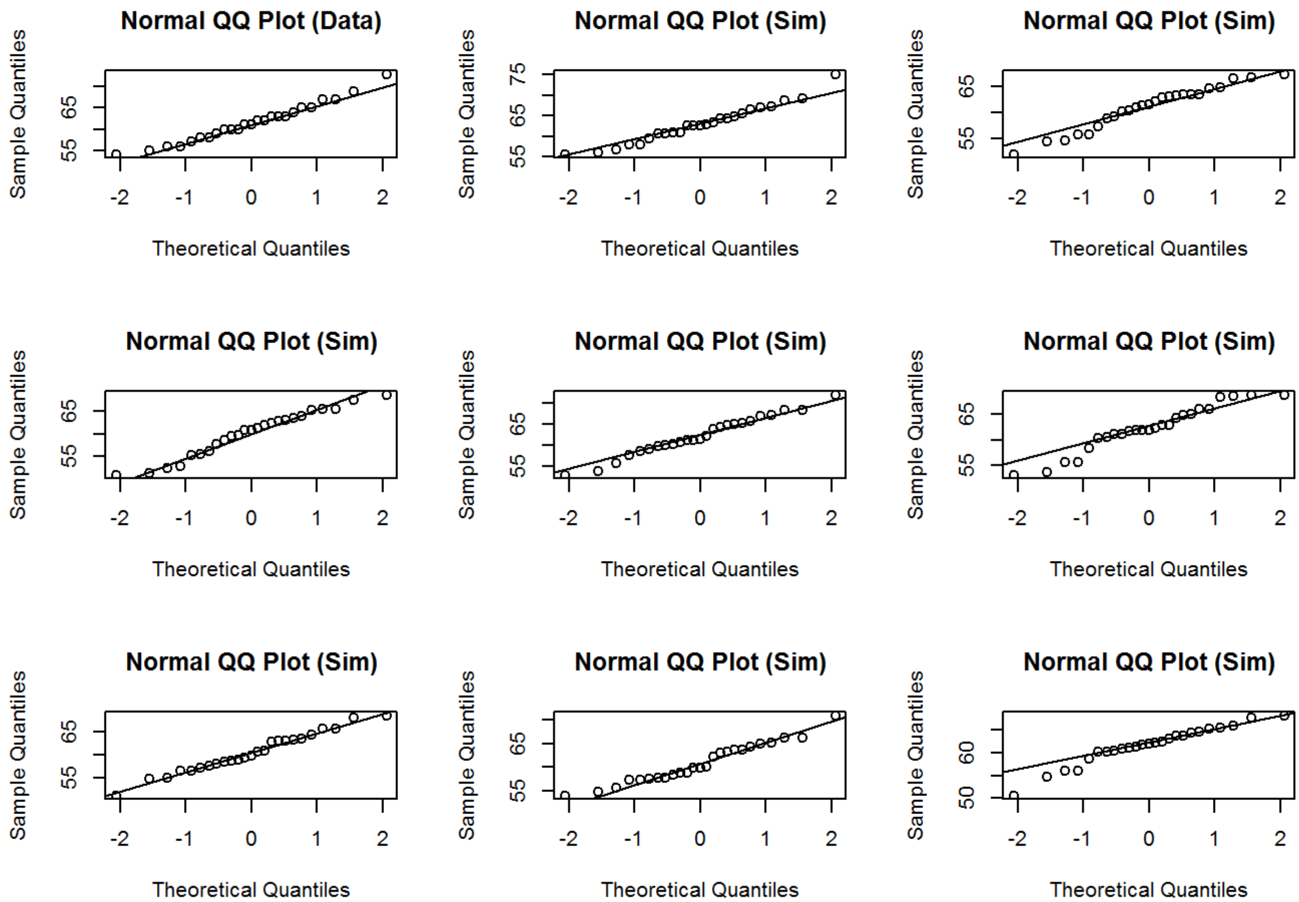
```
normalPlot(sd=0.5, bounds = c(-0.5,0.5))
```



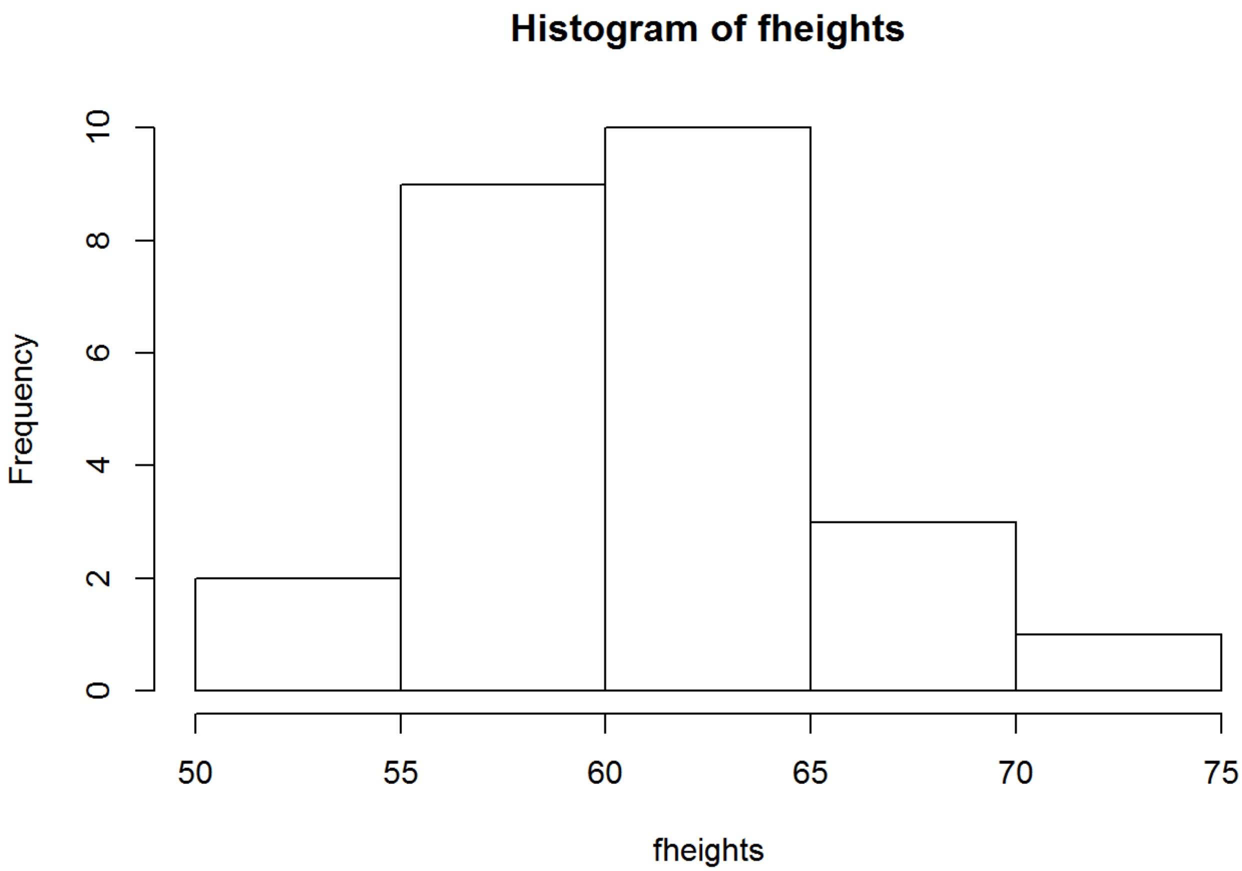
3.4

a. N(4313,583), N(5261,807) b)(4948-4313)/583 = 1.09, (5513-5261)/807=0.312 This means Leo is 1.09 SD away from mean and Mary is 0.312 Sd away from the mean
b. mary ran better in her respective group. Since she is only .312 SD behind the mean and Lary is 1.09 SD behind the mean we can say that she is much closer to the mean of her group then Lary is to th mean of his group.
c. 1-pnorm(1.09) = 0.1378566 or 13.8%
d. 1-pnorm(0.312) = 0.3775 or 37.8%
e. Z scores would change, but the relative performance still would make sense.

```
fheights= c(54, 55, 56, 56, 57, 58, 58, 59, 60, 60, 60, 61, 61, 62, 62, 63, 63, 63, 64, 65, 65, 67
 67, 69, 73)
qqnormsim(fheights)
```




```
hist(fheights)
```



3.18

a. 1SD range = 61.52+4.58=66.1 and 56.94 and covers heights 5-21 or 17 out of 25 or 68%. Which is exactly a 1SD range 2SD range = 61.52+2*4.58=70.68 and 61.52-2*4.58=52.36 and covers 1-24 heights or 24 out of 25 or 96% whch is also pretty close to required 95% 3SD range = we can tell from above calculations that is covers all 100% if we add once more SD to the above ranges. heights approximately do follow the the rule SD rule.

b. Based on qqnormsim and histogram we can say that data is approximately normally distributed.

3.22

a. .98**9*.02 = 0.017
b. .98**100 = 0.133
c. 1/.02=50 sd=sqrt(.98/(.02**2)) = 49.5
d. 1/.05=20 sd=sqrt(.95/(.05**2)) = 19.5
e. Wait time drops.

3.38

a. dbinom(2, size=3, prob=.51) = 0.38
b. All combinations: GGG, BGG, GBG, GGB, BBG, BGB, GBB, BBB All 2Boy combinations: BBG, BGB, GBB 3*(.51*.49*.51) = 0.38
c. Instead of manually looking for every possible comnination choose(8,3) = 56 and then calculating probabilities and adding trhem up, we simply plug into 1 formula and get the final awnser.

3.42

a. dbinom(3, size=10, prob=0.15) = 0.1298337 ~0.13

b. 0.15

c. dnbinom(10,3,0.15) = 0.04385377 ~ 0.44