

Stat 3011 Midterm 1 (Computer Part)

Problem 1

(a)

```
Rweb:> pnorm(0, mean=25, sd=10)
[1] 0.006209665
```

(b)

```
Rweb:> pnorm(30, mean=25, sd=10) - pnorm(25, mean=25, sd=10)
[1] 0.1914625
```

(c)

```
Rweb:> qnorm(0.90, mean=25, sd=10)
[1] 37.81552
```

Problem 2

(a)

```
Rweb:> 1 - pnorm(6.5, mean = 5.31, sd = 0.58)
[1] 0.02009824
```

(b)

```
Rweb:> pnorm(6.5, mean = 5.31, sd = 0.58)
[1] 0.9799018
```

(c)

```
Rweb:> 1 - pnorm(6.5, mean = 11.74, sd = 3.50)
[1] 0.932822
```

(d)

```
Rweb:> pnorm(6.5, mean = 11.74, sd = 3.50)
[1] 0.06717805
```

Problem 3

(a) You want either a histogram or a stem and leaf plot. They show pretty much the same thing. The histogram is just prettier. The R default stem and leaf plot is

```
Rweb:> "your name here"  
[1] "your name here"  
Rweb:> stem(sally)
```

The decimal point is at the |

```
-0 | 5  
0 | 3  
1 | 16789  
2 | 111224444566789999  
3 | 00022333334455555566777789999  
4 | 0000111122244445555666667778888999  
5 | 000001111122223333333334445556677778888899  
6 | 000111112222333445566778999  
7 | 000133333444444555667789  
8 | 000234579  
9 | 059  
10 | 11237  
11 | 057799  
12 | 01456679999  
13 | 13444566679999  
14 | 00111112334444556666889999  
15 | 003466889  
16 | 1223344678899  
17 | 01245677789  
18 | 00269  
19 |  
20 | 3  
21 |  
22 | 6
```

(b) Skewed. Long right tail (positive skewness). Bimodal. Maybe the 20.3 and 22.6 are outliers, but this is better described as just the long right tail.

(c)

```
Rweb:> mean(sally)  
[1] 8.396367
```

(d)

```
Rweb:> median(sally)
[1] 6.39
```

(e)

```
Rweb:> sd(sally)
[1] 5.001011
```

(f)

```
Rweb:> IQR(sally)
[1] 8.8875
```

(g) The mean goes with the standard deviation like ham and eggs. Similarly the median goes with the IQR.

Thus one sensible answer is mean (estimate of center) and standard deviation (estimate of spread). And another sensible answer is median (estimate of center) and IQR (estimate of spread). An argument can be made for either of these. No argument can be made for any other answer.

For this particular problem, neither is really satisfactory. A bimodal distribution really has two “centers” so no single measure of “center” can be satisfactory.