1. Suppose that the posterior distribution of Δ is approximately t(11) with $\mu = 7.4$ and $\sigma = 3.9$. Fill in the shaded blanks in the tTailArea.xls spreadsheet below to compute $P(\Delta > 10 \mid \text{Data})$. Put an "X" where you think $P(\Delta > 10 \mid \text{Data})$ will appear.

Tail areas for t(df)		
		df =
		z =
Left Tail	P(t(df) ≤ z) =	
Right Tail	P(t(df) > z) =	

2. In the box below, write the SAS commands needed to read the data into a SAS file called "CIData" The five variables are called Dev, Mo, Con, Snt, Wrd.

```
C       01     78.20    100.00    76.00
C       02     64.10     67.10    40.00
          ... etc ...
C       19     80.80     95.60    74.00
C       20     69.20    100.00    46.00
N       21     20.95     13.00     8.00
N       22     46.79     59.00    22.00
          ... etc ...
N       44     23.08      3.49     2.00
N       45      7.69       .00      .00
I       46     39.74       .00      .00
I       47     42.31     45.50     6.00
          ... etc ...
I       69     33.33     19.00     2.00
I       70     32.05     11.00     2.00
```

3. Referring to the previous problem. Say what the following program computes:

```
PROC MEANS DATA=CIDATA;
        CLASS Dev;
        VAR Con;
```

a) A stemplot of the variable "Con".
b) A graph with the variable "Con" on the vertical axis and the variable "Dev" on the horizontal.
c) A table of means and standard deviations of the variable "Con" broken down by the variable "Dev".
d) A frequency table, or crosstabulation, showing a breakdown of patients according to "Dev" and "Con."

4. The winbugs code fragment reproduced below produced the following compiler error:

Made use of undefined node: ratio

```
Ratio <- mu.tilde.fem/mu.tilde.mal
pRatgt1.25 <- step(ratio-1.25)
pRatgt1.50 <- step(ratio-1.50)
```

Locate the error and say how to correct it.

5. Here is part of the output from the above,

node	mean	sd	MC error	2.5%	median	97.5%	start	sample
delta.tilde	-9.416	5.168	0.03718	-20.43	-9.157	-0.1047	1001	20000
mu.tilde.fem	26.44	4.778	0.03523	18.02	26.11	36.85	1001	20000
mu.tilde.mal	17.02	2.021	0.0136	13.25	16.92	21.27	1001	20000
pDiffgt0	0.0235	0.1515	0.00106	0.0	0.0	0.0	1001	20000
pRatgt1.25	0.8387	0.3679	0.002692	0.0	1.0	1.0	1001	20000
pRatgt1.50	0.5537	0.4971	0.003702	0.0	1.0	1.0	1001	20000
ratio	1.575	0.3425	0.00242	1.006	1.543	2.344	1001	20000

a) what is the numerical value of P(Ratio > 1.25 | Data)?
b) what is the numerical value of P(Ratio < 1.50 | Data)? *{tricky, read carefully}*
c) how accurate is a)?
d) how can you compute a) more accurately if you need to?