1 (a)

```
1  DATA LOOP;
2
3  DO i =1  TO 100;
4      X = 1+ 99*RANUNI(0);
5      OUTPUT;
6  END;
7
8  RUN;
9
10 PROC PRINT DATA = LOOP;
11
12 RUN;
13
14 PROC MEANS DATA = LOOP;
15 VAR X;
16 RUN;
17
```

Obs	i	X
1	1	66.8137
2	2	36.9454
3	3	2.4902
4	4	2.5249
5	5	47.0330
6	6	85.3128
7	7	25.3210
8	8	28.6151
9	9	86.6479
10	10	71.8835
11	11	14.9815
12	12	99.7151
13	13	95.6608
14	14	88.9468
15	15	90.7951
16	16	47.8415
17	17	77.3075
18	18	75.6406
19	19	11.8201
20	20	33.2981

86	86	66.6658
87	87	9.4977
88	88	83.3902
89	89	51.3731
90	90	46.2024
91	91	59.5879
92	92	31.8940
93	93	5.0345
94	94	25.3121
95	95	8.3665
96	96	90.2424
97	97	61.2146
98	98	84.7085
99	99	25.9321
100	100	51.3925

The MEANS Procedure

Analysis Variable : X				
N	Mean	Std Dev	Minimum	Maximum
100	46.8923731	27.4212452	1.9576333	99.4191720

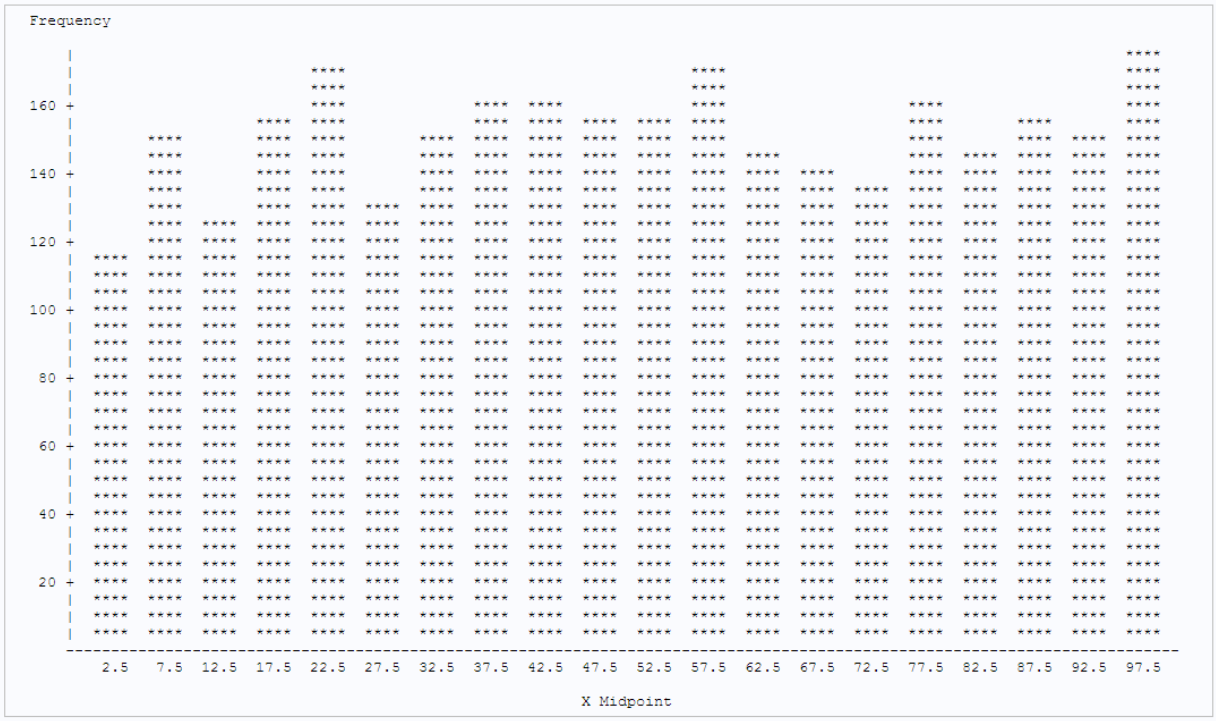
(b)

The MEANS Procedure

Analysis Variable : X				
N	Mean	Std Dev	Minimum	Maximum
3000	50.0450045	28.8409708	1.0034047	99.9639650

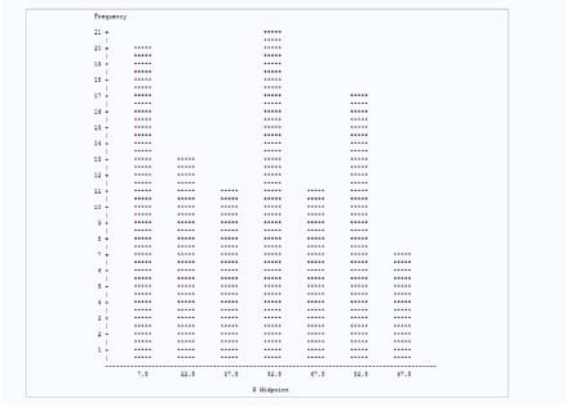
2.

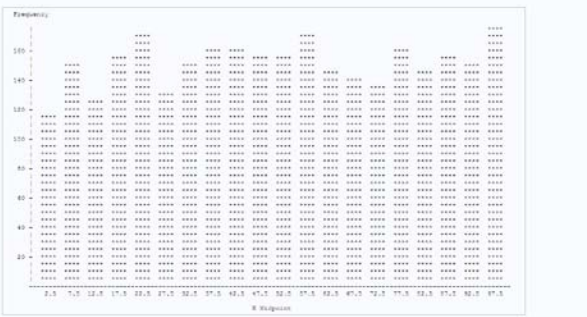
```
1  DATA LOOP;
2  DO j=1 TO 30;
3  DO i =1  TO 100;
4      X = 1+ 99*RANUNI(0);
5      OUTPUT;
6  END;
7  END;
8  RUN;
9
10 PROC MEANS DATA = LOOP;
11
12 OUTPUT OUT = TRY MEAN=MEAN STD=STD MIN=MIN MAX=MAX;
13 VAR X;
14
15 RUN;
16
17 PROC CHART DATA = LOOP;
18 VAR X;
19 RUN;
20
21 PROC PRINT DATA = TRY;
22
23 VAR MEAN STD MIN MAX;
24
25 RUN;
26
```

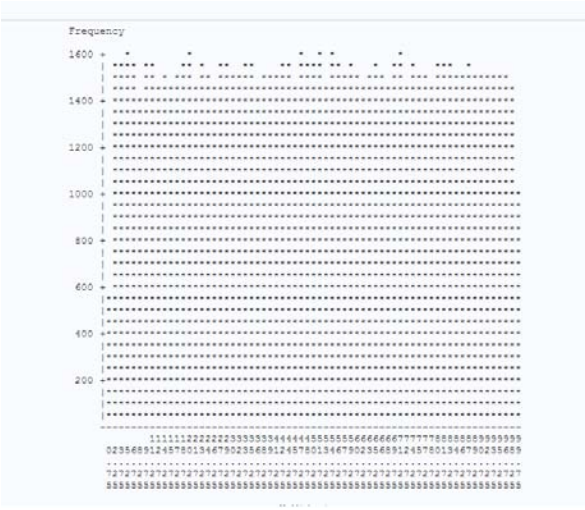


Obs	MEAN	STD	MIN	MAX
1	51.1423	28.4946	1.04017	99.9987

3-1







3-2

Since it follows uniform distribution, the mean of a sampling distribution is about same as the mean of population and the standard deviation of samples and population are same.

3-3

As the number of samples grown, the distribution histograms become resemble to the shape of uniform distribution which is used to generate the samples. The difference between the shapes of distributions based on the number of samples show that the idea of Central Limit Theorem works in this case.