Department of Mathematics
MTL 390 (Sampling Distribution)
Tutorial Sheet No. 7
(Answers to Selected Problems)

1. Decission:Do not reject H_0.

2. Decission:Do not reject H_0.

3. $\alpha = .05$ In this question, we are given frequencies corresponding to different age groups for men and women. Hence, we have the following table

Age	Men	Women	$F_1(x)$	$F_2(x)$	Difference
21-22	4	7	$\frac{4}{80} = 0.05$	$\frac{7}{62} = 0.1129$	0.0629
23-24	11	4	$\frac{15}{80} = 0.1875$	$\frac{11}{62} = 0.1774$	0.01008
25-26	5	1	0.25	0.193548	0.056452
27-28	7	11	0.3375	0.370968	0.033468
29-30	0	12	0.3375	0.564516	0.227016
31-32	5	4	0.4	0.629032	0.229032
33-34	9	2	0.5125	0.66129	0.14879
35-36	13	4	0.675	0.725806	0.050806
37-38	20	8	0.675	0.725806	0.070161
39-40	6	9	1	1	0
Total	80	62			

Here,

$$D_0 = \sup_x |F_1(x) - F_2(x)| = 0.2290$$

Now, $D_{80,62,\alpha} = 0.2301$. Hence, do not reject.

4. (a) Sign test will be used.
(b) $H_0 : M \geq 750,\ H_1 : M < 750$
$p = .9824 \not\geq .05$
Decission: Do not Reject H_0.
(It is the bank managers claim which is tested by the teller, the teller himself is not claiming, therefore $H_1 : M < 750$: the bank managers claim.)

5. (a)$D_0 = 1.3714$ Decission:Do not reject H_0.
(b) Here,

x	Brand A	Brand B	$F_1(x)$	$G_1(x)$	$\lvert F_1(x) - G_1(x)\rvert$
30	2	0	$\frac{2}{6}$	0	$\frac{2}{6}$
40	2	1	$\frac{4}{6}$	$\frac{1}{6}$	$\frac{3}{6}$
45	1	1	$\frac{5}{6}$	$\frac{2}{6}$	$\frac{3}{6}$
50	0	2	$\frac{5}{6}$	$\frac{4}{6}$	$\frac{1}{6}$
55	1	1	1	$\frac{5}{6}$	$\frac{1}{6}$
60	0	1	1	1	0

$$D_0 = \sup_x |F_1(x) - F_2(x)| = 0.5$$

Now, $D_{6,6,\alpha} = 0.6667$. Hence, do not reject. (Step 1: Take the union of all the x values and make first column of the table. Step 2: Compute frequencies for each value coresponding to Brand A and Brand B. Step 3: Based on the frequencies find the $F(x)$ and $G(x)$ values as done in question 3.)

10. (a)$\rho_0 = 1, \rho_1 = 5/7, \rho_2 = 3/7$.

11. Take $\mu = 0$.

$$\gamma_k = \begin{cases} \beta^2\sigma^2, & k = 0 \\ 0 & k > 0 \end{cases}$$

12. The roots are $-2.5,\ 2$, which are greater than 1 in magnitude. Therefore, the given process is stationary.