

Department of Mathematics
MTL 390 (Sampling Distribution)
Tutorial Sheet No. 5
(Answers to Selected Problems)

1. $H_0 : \mu \geq 180$, $H_1 : \mu < 180$ Decision: Reject H_0 .
2. $H_0 : \mu = 8.2$, $H_1 : \mu \neq 8.2$ (a) Decision: Reject H_0 . (b) Decision: Reject H_0 .
3. $H_0 : \mu \leq 40$, $H_1 : \mu > 40$ Decision: Reject H_0 .
4. $H_0 : \sigma^2 \geq 1.2^2$, $H_1 : \sigma^2 < 1.2^2$ Decision: Do not Reject H_0 .
5. $H_0 : \mu_1 = \mu_2$, $H_1 : \mu_1 \neq \mu_2$ Decision: Do not reject H_0 at both 1% and 5% level of significance.
6. $F_0 = 14.76$ Decision: Reject H_0 .
7. $H_0 : \sigma_D^2 \geq \sigma_B^2$, $H_1 : \sigma_D^2 < \sigma_B^2$
 $F_0 = \frac{S_D^2}{S_B^2} = .3086$
Reject H_0 if $F_0 < F_{1-\alpha, 10-1, 10-1}$
 $F_{1-\alpha, 10-1, 10-1} = \frac{1}{F_{\alpha, 10-1, 10-1}} = \frac{1}{3.18} = .314$
 $F_0 < F_{1-\alpha, 10-1, 10-1}$ Decision: Reject H_0 .
8. $H_0 : \sigma_A^2 \geq \sigma_B^2$, $H_1 : \sigma_A^2 < \sigma_B^2$
 $n_1 = n_2 = 10$
Decision: Do not Reject H_0 .
9. (a) $H_0 : \sigma_A^2 = \sigma_B^2$, $H_1 : \sigma_A^2 \neq \sigma_B^2$ Decision: Reject H_0 .
(b) $H_0 : \mu_B - \mu_A = .1$, $H_1 : \mu_B - \mu_A \neq .1$ Decision: Do not Reject H_0 .
10. H_0 : Given data follows poisson distribution.
 H_1 : Given data does not follows poisson distribution.
Decision: H_0 is rejected.
11. H_0 : Earthquake is equally likely to occur on any of the 7 days of the week.
 H_1 : Earthquake is not equally likely to occur on any of the 7 days of the week.
Decision: Do not reject H_0 .
12. (Goodness of fit) $D_0^2 = 3.2465$. Decision: Do not reject H_0 .
13. H_0 : Die is fair.
 H_1 : Die is not fair.
Decision: Do not reject H_0 .
14. H_0 : Having a cellular phone in your car and being involved in an accident are independent.
 H_1 : Having a cellular phone in your car and being involved in an accident are not independent.
Decision: Do not reject H_0 .
15. H_0 : Smoking and lung cancer are independent.
 H_1 : Smoking and lung cancer are not independent.
Decision: Reject H_0 .
16. $H_0 : p \leq 0.6$, $H_1 : p > 0.6$, $z_0 = -.4$ Decision: Do not reject H_0 .
17. $z_0 = -1.7852$. Decision: Do not reject H_0 .
18. (test for proportions) $D_0^2 = 34.005$. Decision: Reject H_0 .
19. $F_0 = 2.769$ Decision: Do not reject H_0 .

20. $D_0^2 = 3 * 10^{-7}$. Decision: Do not reject H_0 .
21. $H_0 : \mu_1 = \mu_2, H_1 : \mu_1 \neq \mu_2$ Decision: Reject H_0 .
22. $H_0 : \sigma_1^2 = \sigma_2^2, H_1 : \sigma_1^2 \neq \sigma_2^2$ Decision: Do not Reject H_0 .
23. $H_0 : \mu \geq .15, H_1 : \mu < .15$ Decision: Reject H_0 .
24. $z_0 = -1.84676$. Decision: Do not reject H_0 .
25. $F_0 = 3.88$ Decision: Do not reject H_0 .
26. $F_0 = 3.22$. Decision: Reject H_0 .
27. $F_0 = 4.26$ Decision: Reject H_0 .

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