Math 741 Assignment 23 (Hand-In)

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10.5.6(H) solution: A test can be formulated,

$H_0:$ The blood pressure of children and their fathers are independent

$H_1:$ The blood pressure of children and their fathers are not independent with $\alpha = 0.05$. A table can be formulated using the given data.

Row	Column	Class(Row,Column)	Obs. Freq	Expected Freq
1	1	Lower Third, Lower Third	14	11.12
2	1	Middle Thrid, Lower Third	11	10.45
3	1	High Thrid, Lower Third	6	9.43
1	2	Lower Third, Middle Thrid	11	11.48
2	2	Middle Thrid, Middle Thrid	11	10.78
3	2	High Thrid, Middle Thrid	10	9.74
1	3	Lower Third, High Thrid	8	10.4
2	3	Middle Thrid,High Thrid	9	9.77
3	3	High Thrid, High Thrid	12	8.83

$$\chi_0^2 = \frac{(14-11.12)^2}{11.12} + \frac{(11-10.45)^2}{10.45} + \frac{(6-9.43)^2}{9.43} + \frac{(11-11.48)^2}{11.48} + \frac{(11-10.78)^2}{10.78}$$
$$+ \frac{(10-9.74)^2}{9.74} + \frac{(8-10.4)^2}{10.4} + \frac{(9-9.77)^2}{9.77} + \frac{(12-8.83)^2}{8.83} = 3.81$$
$$p - value = 1 - P(0 \leq \chi^2_{(r-1)(c-1)} \leq 3.81) = 0.43233$$

since $p-value = 0.43233 > \alpha = 0.05 \implies$ Fail to Reject H_0. Hence, there is enough evidence to say that the blood pressure of children and their fathers are independent.

10.5.8(H) solution: A test can be formulated by the given information.

H_0 : The enrollment rates are independent on the racial groups

H_1 : The enrollment rates are dependent on the racial groups

with $\alpha = 0.05$. A table can be formulated using the given data.

Row	Column	Class(Row, Column)	Obs. Freq	Expected Freq
1	1	White, Admitted	2592	2583.06
2	1	African-American, Admitted	159	150.3
3	1	Hispanic, Admitted	800	745.17
4	1	Asian, Admitted	667	676.05
1	2	White, Enrolled	1481	1428.70
2	2	African-American, Enrolled	78	83.13
3	2	Hispanic, Enrolled	375	412.16
4	23	Asian, Enrolled	399	373.93

$$\chi_0^2 = \frac{(2592-2583.06)^2}{2583.06} + \frac{(159-150.3)^2}{150.3} + \frac{(800-745.17)^2}{745.17} + \frac{(667-676.05)^2}{676.05}$$
$$+ \frac{(1481-1428.7)^2}{1428.7} + \frac{(78-83.13)^2}{83.13} + \frac{(375-412.16)^2}{412.16} + \frac{(399-373.93)^2}{373.93} = 10.29$$

$$p - value = 1 - P(0 \leq \chi^2_{(r-1)(c-1)} \leq 10.29) = 0.01626$$

since $p - value = 0.01626 < \alpha = 0.05 \implies$ Reject H_0. Hence, there is enough evidence to say that the enrollment rates are dependent on the racial groups.