

### Answer on Question #42914 – Math - Statistics and Probability

A sample of 400 students of undergraduate and 400 students of post graduate classes were taken to know their opinion about autonomous college. 290 of the undergraduate and 310 of the post graduate students favoured the autonomous status. Present these fact in the form of a table and test at 5% level, that the opinion regarding autonomous status of college are independent of the level of classes of students.

#### Solution

	Students favoured the autonomous status	Students who have a different opinion	Total
Undergraduate	290	110	400
Post graduate	310	90	400
Total	600	200	800

	Students favoured the autonomous status	Students who have a different opinion	Total
Undergraduate	a	b	a+b
Post graduate	c	d	c+d
Total	a+c	b+d	a+b+c+d

$H_0$ : The opinion regarding autonomous status of college is independent of the level of classes of students.

$H_1$ : The opinion regarding autonomous status of college is dependent of the level of classes of students.

L. O. S. = 5%.

Test statistic (see <http://math.hws.edu/javamath/ryan/ChiSquare.html> )

$$\chi^2 = \frac{N(ad - bc)^2}{(a + b)(c + d)(a + c)(b + d)} = \frac{800(290 \cdot 90 - 110 \cdot 310)^2}{(290 + 110)(310 + 90)(290 + 310)(110 + 90)} = 2.67.$$

Table value:

$$\chi_{(2-1)(2-1)df}^2 = \chi_{(1)df}^2 = 3.84 \text{ at } 5\% \text{ L. O. S.}$$

Inference

$$\chi_{calc}^2 < \chi_{tab}^2$$

We accept the null hypothesis. The opinion regarding autonomous status of college is independent of the level of classes of students.