W3 Formulae

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$$\text{Conditional Probability} = \frac{\text{Joint Probability}}{\text{Marginal Probability}}$$

Bayes' Rule

$$P(X \mid Y) = \frac{P(Y \mid X) \times P(X)}{P(Y)}$$

- Two variables are independent if conditional distributions on one of them is identical to each category of the other.

$P(Y \mid X)$

	Y1	Y2	Y3	
X1	*/A	*/A	*/A	A
X2	*/B	*/B	*/B	B

$P(X \mid Y)$

	Y1	Y2	Y3
X1	*/K	*/L	*/M
X2	*/K	*/L	*/M
	K	L	M

- That is, you find any one of the conditional distributions, and the values in same shaded cells should be equal.
- Then we say both variables are independent of each other.

In contingency table,

Expected frequency:

$$f_e = \frac{\text{Row total} \times \text{Column total}}{\text{Total Sample size}}$$

Degree of Freedom,

$$df = (r - 1) \times (c - 1)$$

Chi Square formula,

$$\chi^2 = \Sigma \frac{(f_o - f_e)^2}{f_e}$$

We **accept** the null hypothesis if:

Tabular value ≥ Calculated value

or if:

***p*-value > α**