

6B Degrees of Freedom and the Chi-Squared Family of Distributions

Degrees of freedom:

Constraint (restriction):

Cell:

Number of degrees of freedom =

A coin is flipped 100 times. How many degrees of freedom are there? Why?

A dice is rolled 120 times. How many degrees of freedom are there? Why?

χ^2 is approximated well by a χ^2 distribution as long as ...

If any of the expected values are less than 5:

Notation: χ^2_v means

Which member of the χ^2 family do you use to approximate χ^2 ?

1. In a sample of 100 households, the expected number of dogs is as follows:

Dogs	0	1	2	3	4	5	>5	Total
Expected	55	20	10	7	4	3	1	100

Select an appropriate chi-squared distribution to model the goodness of fit, χ^2 , for these data.

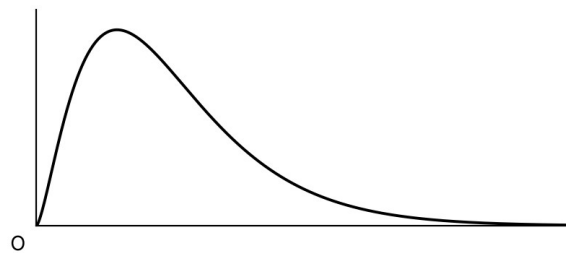
Dogs	0	1	2	3		Total
Expected						

Critical value notation: $\chi^2_{v(5\%)}$ or $\chi^2_{v(0.05)}$ means

Percentage points of the χ^2 distribution (the value exceeded with the probability shown):

v	0.995	0.990	0.975	0.950	0.100	0.050	0.025	0.010
1	0.000	0.000	0.001	0.004	2.705	3.841	5.024	6.635
2	0.010	0.020	0.051	0.103	4.605	5.991	7.378	9.210
3	0.072	0.115	0.216	0.352	6.251	7.815	9.348	11.345
4	0.207	0.297	0.484	0.711	7.779	9.488	11.143	13.277
5	0.412	0.554	0.831	1.145	9.236	11.070	12.832	15.086
6	0.676	0.872	1.237	1.635	10.645	12.592	14.449	16.812
7	0.989	1.239	1.690	2.167	12.017	14.067	16.013	18.475
8	1.344	1.646	2.180	2.733	13.362	15.507	17.535	20.090

2. With $v = 5$ find the value of χ^2 that is exceeded with 0.05 probability.



3.

- a) Find the following critical values: i $\chi^2_{3(95\%)}$ ii $\chi^2_{4(10\%)}$

- b) Find the smallest values of y such that: i $P(\chi^2_2 > y) = 0.95$ ii $P(\chi^2_4 > y) = 0.99$