

Characteristics of the Chi-Square Distribution:

- 1.
- 2.
- 3.
- 4.

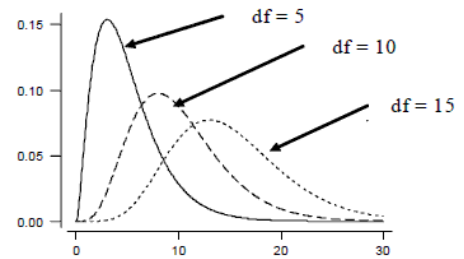


Fig. 11-1 Chi-square curves having 5, 10, and 15 degrees of freedom

- ❖ As degrees of freedom increase, the distribution becomes more _____.
- ❖ _____ values of χ^2 , are evidence to _____ the H_0 . **WHY?**

➤ Three Types of Chi-Square Hypothesis Testing:

I. **Goodness of Fit** ---- expected values must be calculated by _____; use χ^2 _____ to find _____
 $\chi^2 \text{cdf}(\text{_____}, \text{_____}, \text{_____}) = \text{p-value}$

- Use when you have _____ and a _____ set of proportions you expect to see in each category.
- These proportions are used to calculate _____ counts.
- Calculate _____ for each cell then add them to get the χ^2 test statistic.
- Must state _____ = _____, where _____ is _____ **not** sample size. Must record _____ in _____.
- Data is conveyed in a _____ table.

Template for Chi-Square Goodness of Fit:

I. Parameters: $p_1 =$
 $p_2 =$
 etc

II. Inference Test: χ^2 - test for _____

III. Hypotheses: $H_0: p_1 =$ _____ $p_2 =$ _____ $p_3 =$ _____ etc.

$H_a: \text{_____}$

IV. Conditions for Chi-square test:

1. _____

2. _____ & _____ (calculate to justify)

V. Calculation of test statistic: $\chi^2 =$ _____

$P(\chi^2 > \text{_____}) =$ _____

IV. Interpretation --- in terms of p-value and in context of problem

- **Chi-Square Activity #1: Follow the template to run this Chi-Square GOF Problem**

The M & M's company claims the colors in a bag of Plain M & M's follows the following distribution...

Brown - 13% Yellow - 14% Red - 13% Orange - 20% Green - 16% Blue - 24%

Use your bag of M & M's to determine if you believe them.

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Parameters:

Inference Test:

Hypotheses:

Conditions:

COLOR	Brown	Yellow	Red	Blue	Orange	Green	Total
Observed, O							
Expected, E							
$(O - E)^2/E$							$\chi^2 =$

Calculation: $df =$ _____ $\alpha =$ _____

$\chi^2 =$ _____ $P(\chi^2 \geq \text{_____}) =$ _____

Decision:

- **Chi-Square Activity #2: Follow the template to run this Chi-Square GOF Problem**

The Skittles company claims the colors in a bag of original Skittles follows the following distribution...

Red - 20% Orange - 20% Yellow - 20% Green - 20% Purple - 20%

Use your bag of Skittles to determine if you believe them.

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Parameters:

Inference Test:

Hypotheses:

Conditions:

COLOR	Red	Orange	Yellow	Green	Purple	Total
Observed, O						
Expected, E						
$(O - E)^2/E$						$\chi^2 =$

Calculation: $df =$ _____ $\alpha =$ _____

$\chi^2 =$ _____ $P(\chi^2 \geq \quad) =$ _____

Decision: