

AP Statistics - Chi-Square Tests - Quiz

Common Core AP STAT 8.1, AP STAT 8.2, AP STAT 8.3, AP STAT 8.4, AP STAT 8.5, AP STAT 8.6, AP STAT 8.7 · maths-pdf.fr/en/

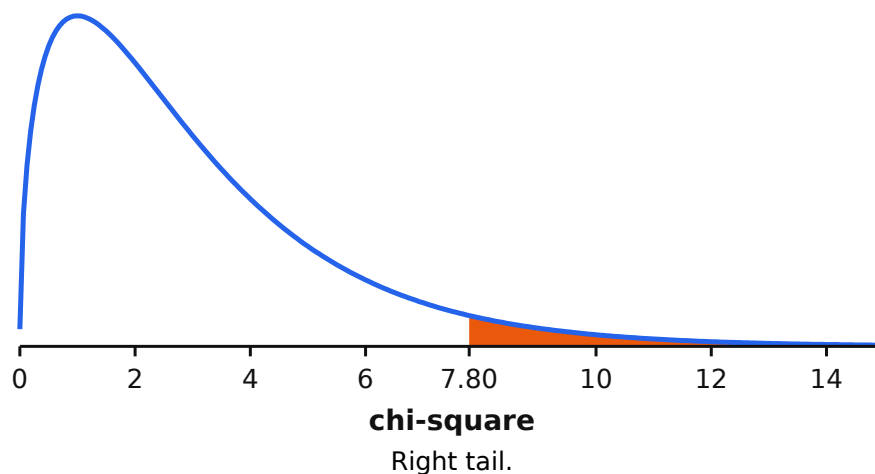
Name: _____ Class: _____ Date: ____/____/____

Ten multiple-choice questions test chi-square vocabulary, expected counts, and choosing a procedure. Read each explanation to see which condition or formula the distractors misuse.

AP Statistics · Common Core State Standards: **AP STAT 8.1, AP STAT 8.2, AP STAT 8.3, AP STAT 8.4, AP STAT 8.5, AP STAT 8.6, AP STAT 8.7**

Questions

Question 1



The p-value for this chi-square value ($df = 3$) is closest to:

- A. 0.05
- B. 0.50
- C. 0.95
- D. 0.005

Question 2

Category	Observed	Expected
A	18	24
B	22	24
C	30	24

Three categories.

What is chi-square for this goodness-of-fit table?

- A. 3.17
- B. 6
- C. 0.5
- D. 10

Question 3

	Col 1	Col 2	Total
Row 1	20	30	50
Row 2	40	10	50
Total	60	40	100

Two-way table.

What is the expected count in the cell Row 1, Col 1?

- A. 20
- B. 30
- C. 50
- D. 40

Question 4

The degrees of freedom for a test of homogeneity with 3 populations and 4 categories are:

- A. 12
- B. 7
- C. 6
- D. 5

Question 5

A chi-square test requires:

- A. all observed counts to be at least 5
- B. all expected counts to be at least 5
- C. n at least 30

D. a normal population

Question 6

Chi-square distributions are:

- A. symmetric
- B. skewed left
- C. skewed right
- D. bimodal

Question 7

Which test compares the distribution of a categorical variable across 3 separate populations?

- A. Chi-square test for independence
- B. Two-sample t test
- C. Goodness-of-fit
- D. Chi-square test for homogeneity

Question 8

A chi-square statistic of 0 means:

- A. the observed counts equal the expected counts
- B. a very large p-value cannot occur
- C. the sample is biased
- D. H_0 is false

Question 9

To test whether a spinner with 5 equal sections is fair, use:

- A. a two-sample t test
- B. a chi-square test for independence
- C. a goodness-of-fit test with $df = 5$
- D. a chi-square goodness-of-fit test with $df = 4$

Question 10

Expected count formula in a two-way table:

- A. observed - expected
- B. row total x column total / grand total
- C. row total + column total
- D. grand total / number of cells

Answers

1. **A** - The 0.05 critical value for $df = 3$ is 7.81, so 7.8 gives a p-value near 0.05.
2. **A** - $(36 + 4 + 36)/24 = 76/24 = 3.17$.
3. **B** - Row 1 total 50, column 1 total 60, grand total 100: $50 \times 60 / 100 = 30$.
4. **C** - $(3 - 1)(4 - 1) = 6$.
5. **B** - The expected counts must be large enough for the chi-square approximation.
6. **C** - They start at 0 and have a long right tail.
7. **D** - Separate samples from several populations call for homogeneity.
8. **A** - All $(O - E)$ are zero, so the data fit H_0 perfectly.
9. **D** - There are 5 categories, so $df = 5 - 1 = 4$.
10. **B** - This assumes no association between the variables.

Remember

- chi-square = sum of $(O - E)^2 / E$; right-tailed p-value; distribution skewed right.
- Goodness-of-fit: one categorical variable; $df = \text{number of categories} - 1$.
- Two-way table: $E = \text{row total} \times \text{column total} / \text{grand total}$; $df = (r - 1)(c - 1)$.
- Conditions: random sample or random assignment, and all expected counts at least 5.
- Homogeneity: compare distributions across groups; independence: two variables in one sample.