

1. A student study club has members 2 from Taipei, 3 from Taichung, 5 from Tainan, and 2 from Kaohsiung. If a committee of 4 is selected at random, find the probability that
 - (a) all cities are represented;
 - (b) all cities except Taipei are represented. [15 points]

2. The average life of a type of bicycle is 10 years with a standard deviation of 2 years. The manufacturer gives a free bike if a bike is broken while under guarantee. If the manufacturer wishes to replace only 3% of the bikes that breaks, how long a guarantee should be offered? Assume that the lifetime of a bike follows a normal distribution. [15 points]

3. A random sample of 100 automobile owners shows that an automobile is driven on average 23,500 kilometers per year with a standard deviation of 3900 kilometers. Assume the distribution of measurements to be approximately normal. [25 points]
 - (a) Construct a 99% confidence interval for the average number of kilometers an automobile is driven per year.
 - (b) With 99% confidence, what can we say about the possible size of error if we estimate the average number of kilometers driven by car owners to be 23,500 kilometers per year?

4. Let us suppose that 12 Type A cars and 10 Type B cars. If the 12 Type A cars averaged 16 kilometers per liter with a standard deviation of 1.0 kilometer per liter and the 10 Type B cars averaged 11 kilometers per liter with a standard deviation of 0.8 kilometer per liter. Assume that the distances per liter for the car models are approximately normally distributed with equal variances.

Test the hypothesis that the fuel economy of Type A cars, on average, exceeds that of similarly equipped Type B cars by 4 kilometers per liter. Use a 0.10 level of significance. Clearly state the null and alternative hypothesis before you start. [25 points]

5. You are given three points: A(1,2), B(2,3), C(3,5). [20 points]
 - (a) Fit a regression line $y = mx + b$ to these points.
 - (b) Calculate the R^2 (coefficient of determination) for this regression line.
 - (c) Can you use hypothesis test on whether the regression line is better than a flat line?

見背面

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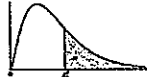


Table Critical Values of the Chi-Squared Distribution

Table with columns for alpha (0.995 to 0.50) and rows for degrees of freedom (1 to 60).

Table (continued) Critical Values of the Chi-Squared Distribution

Table with columns for alpha (0.30 to 0.001) and rows for degrees of freedom (1 to 60).

f_{0.05}(v_1, v_2)

Table of F-distribution critical values for alpha = 0.05, with columns for v_1 (1-9) and rows for v_2 (1-60).

f_{0.01}(v_1, v_2)

Table of F-distribution critical values for alpha = 0.01, with columns for v_1 (1-9) and rows for v_2 (1-60).

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