

KATHMANDU UNIVERSITY
End Semester Examination [C]
June, 2018

Marks Scored:

Level : B. Sc./B.Pharm/B.Tech
Year : II

Course : MATH 206
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date JUN 18 2018

SECTION "A"
[10 Q. \times 1 = 10 marks]

Fill in the blank(s) by the most appropriate word(s) or symbol(s)

1. Although the sample variance is an unbiased estimator of population variance, it does not follow that the _____ is also an unbiased estimator of population standard deviation.
2. Besides of sample standard deviation, the population standard deviations are sometimes estimated in terms of the _____.
3. The point estimator of the population proportion, itself, is _____.
4. The chi-square statistic should not be used when on or more the expected frequencies is less than _____.
5. We apply the chi-square test for goodness of fit only when the discrepancies between the _____ and the expected frequencies can be attributed by chance.
6. If the exact inferences can be made when the assumptions underlying the so-called standard method cannot be met, then we would prefer as _____.
7. An alternative to one sample t-test is _____.
8. If n_1 , and n_2 are sequence of symbols of one kind and of another kind, then formula for Mean of test of randomness is _____.
9. The statistical analysis leading to a comparison of the sum of squares about the overall grand mean into a component due to treatment differences, and a component due to _____ within a sample.
10. In usual notation, the relationship between SST, SS(Tr), and SSE in one way analysis of variance, SSE is _____.

KATHMANDU UNIVERSITY
End Semester Examination [C]
June, 2018

JUN 18 2018

Level : B. Sc./B.Pharm/B.Tech
Year : II
Time : 2 hrs.30 mins.

Course : MATH 206
Semester : I
F.M. : 55

SECTION "C"
[3 Q. × 9 = 27 marks]

1. Discuss procedure involved in the analysis of variance (ANOVA). In what circumstances is the technique of analysis of variance preferred to the usual z or t test for testing the significance of the difference between means? [3+6]

Three alternatives are suggested for electroplating to reduce dissolved metal cations so that they form a coherent metal coating on an electrode. In an experiment conducted to compare the manufacturing yields using the three alternatives, experimenters record the number of electrodes coated before the metal cations are exhausted. Suppose the data are

| Alternative X | Alternative Y | Alternative Z |
|---------------|---------------|---------------|
| 5 | 17 | 9 |
| 12 | 12 | 11 |
| 9 | 15 | 6 |
| 8 | 14 | 14 |
| 11 | 17 | 10 |

Test at the level of significance $\alpha = 0.05$ whether the differences among the means obtained for the 3 samples are significant.

2. What do you understand by parametric and nonparametric test? With the help of examples, explain where would you use parametric and nonparametric test of statistical significance. An experiment, designed to compare two methods for preventing corrosion, yielded the following maximum depths of pits (in thousandths of an inch) in pieces of wire subjected to the respective treatments: [3+6]

Method A: 77, 54, 67, 74, 71, 66, 62

Method B: 60, 41, 9, 65, 62, 64, 52

Use the U test at the 0.01 level of significance to test the claim that the strength of Method A is stochastically larger than the strength of Method A.

3. The following data pertain to the growth of a colony of bacteria in a culture medium:

| Days since inoculation (X) | Count ('000) (Y) |
|-------------------------------|---------------------|
| 3 | 115 |
| 6 | 147 |
| 9 | 239 |
| 12 | 356 |
| 15 | 579 |
| 18 | 864 |

- i) Plot $\log Y_i$ versus X_i to verify that it is reasonable to fit an exponential curve.
- ii) Fit an exponential curve to the given data.

SECTION "D"

[4Q. $\times 7 = 28$ marks]

4. The weight of cement bags produced by Cement Company follows normal distribution. The quality assistant at the final inspection section of the company feels that the variance of the weight of the cement bags has increased from a specified maximum variance which will lead to customer complaints. Hence, he has selected a sample of 10 cement bags and found that the variance of the sample is 0.36 kg. Find the 95% confidence interval for the standard deviation of the entire markets.

or

The weight of cement bags packed during night shifts and day shifts in Cement Company follows normal distribution. The quality assistant at the final inspection section of the company feels that the variance of the weight of the cement bags packed during night shift is more than that of cement bags packed during day shifts. To verify this fact, he has taken a sample of 10 bags of cement packed during night shift and found that its variance is 0.49 kg. Similarly, he has taken a sample of 12 bags of cement packed during day shift and found that its variance is 0.81 kg.

Test the null hypothesis $\sigma_1^2 = \sigma_2^2$ against the alternative hypothesis $\sigma_1^2 < \sigma_2^2$ at the 0.05 level of significance.

5. Thirty-five consecutive samples of 100 bearings each, taken from a factory, had, respectively, 1, 2, 5, 3, 4, 2, 6, 8, 1, 2, 3, 9, 8, 0, 12, 10, 5, 4, 1, 8, 6, 7, 9, 4, 8, 1, 2, 6, 7, 5, 8, 1, 3, 4 and 2 unusable bearings. If the fraction unusable is to be maintained at 0.03, construct a p chart for these data and state whether or not this standard is being met.

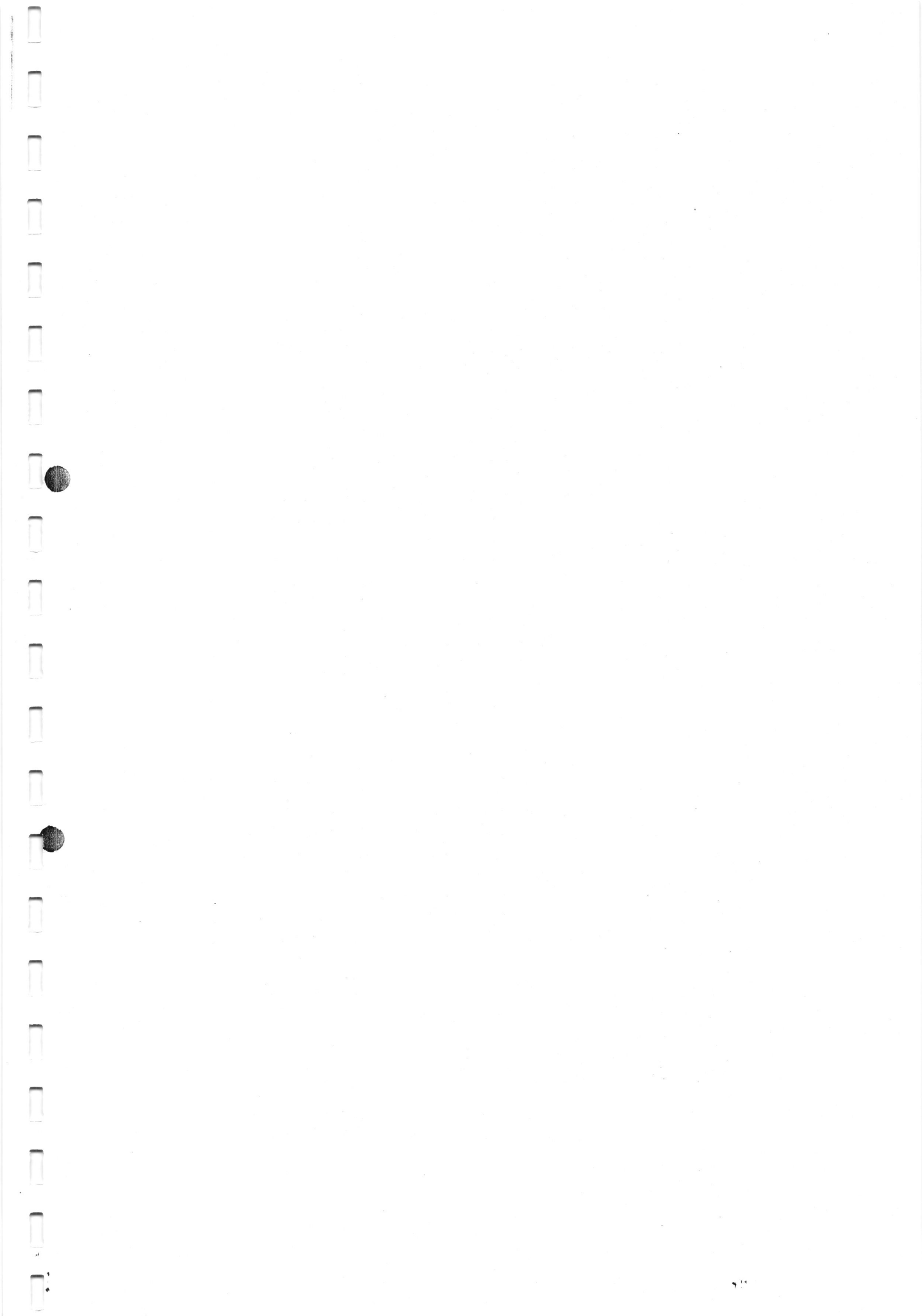
JUN 18 2018

6. Consider a study on prevalence of cataract in males and females of age 50 years and above. Suppose the results are as follows. Number of males examined ($n_1=90$); found with cataract 55. The number of females examined ($n_2=90$); these found with cataract 45. This is stated in table below::

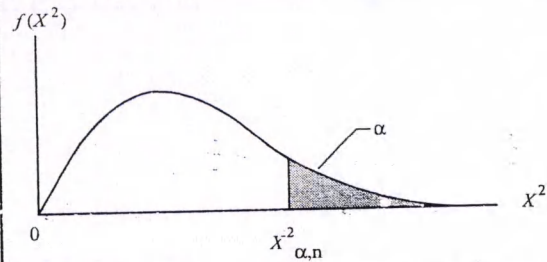
| Gender | Yes | No |
|--------|-----|----|
| Male | 55 | 35 |
| Female | 45 | 15 |

Use the level of significance $\alpha=0.05$ to decide on the basis of the sample data shown in the above table whether it is reasonable to opinion on the prevalence of cataract in males or females of age 50 years and above?

7. Write short notes on *ANY TWO*.
- Sign test
 - Curvilinear regression
 - Range Chart



CRITICAL VALUES OF χ^2 DISTRIBUTION



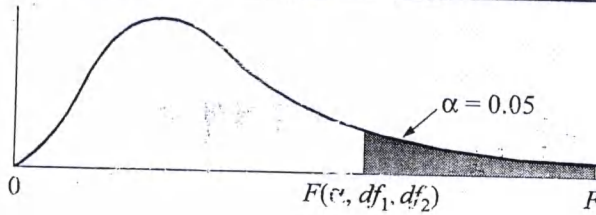
| Degrees of Freedom | $\chi^2_{.995}$ | $\chi^2_{.990}$ | $\chi^2_{.975}$ | $\chi^2_{.950}$ | $\chi^2_{.900}$ | $\chi^2_{.100}$ | $\chi^2_{.050}$ | $\chi^2_{.025}$ | $\chi^2_{.010}$ | $\chi^2_{.005}$ |
|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1 | 0.0000393 | 0.0001571 | 0.0009821 | 0.0039321 | 0.0157908 | 2.70554 | 3.84146 | 5.02389 | 6.63490 | 7.87944 |
| 2 | 0.0100251 | 0.0201007 | 0.0506356 | 0.102587 | 0.210720 | 4.60517 | 5.99147 | 7.37776 | 9.21034 | 10.5966 |
| 3 | 0.0717212 | 0.114832 | 0.215795 | 0.351846 | 0.584375 | 6.25139 | 7.81473 | 9.34840 | 11.3449 | 12.8381 |
| 4 | 0.206990 | 0.297110 | 0.484419 | 0.710721 | 1.063623 | 7.77944 | 9.48773 | 11.1433 | 13.2767 | 14.8602 |
| 5 | 0.411740 | 0.554300 | 0.831211 | 1.145476 | 1.61031 | 9.23635 | 11.0705 | 12.8325 | 15.0863 | 16.7496 |
| 6 | 0.675727 | 0.872085 | 1.237347 | 1.63539 | 2.20413 | 10.6446 | 12.5916 | 14.4494 | 16.8119 | 18.5476 |
| 7 | 0.989265 | 1.239043 | 1.68987 | 2.16735 | 2.83311 | 12.0170 | 14.0671 | 16.0128 | 18.4753 | 20.2777 |
| 8 | 1.344419 | 1.646482 | 2.17973 | 2.73264 | 3.48954 | 13.3616 | 15.5073 | 17.5346 | 20.0902 | 21.9550 |
| 9 | 1.734926 | 2.087912 | 2.70039 | 3.32511 | 4.16816 | 14.6837 | 16.9190 | 19.0228 | 21.6660 | 23.5893 |
| 10 | 2.15585 | 2.55821 | 3.24697 | 3.94030 | 4.86518 | 15.9871 | 18.3070 | 20.4831 | 23.2093 | 25.1882 |
| 11 | 2.60321 | 3.05347 | 3.81575 | 4.57481 | 5.57779 | 17.2750 | 19.6751 | 21.9200 | 24.7250 | 26.7569 |
| 12 | 3.07382 | 3.57056 | 4.40379 | 5.22603 | 6.30380 | 18.5494 | 21.0261 | 23.3367 | 26.2170 | 28.2995 |
| 13 | 3.56503 | 4.10691 | 5.00874 | 5.89186 | 7.04150 | 19.8119 | 22.3621 | 24.7356 | 27.6883 | 29.8194 |
| 14 | 4.07468 | 4.66043 | 5.62872 | 6.57063 | 7.78953 | 21.0642 | 23.6848 | 26.1190 | 29.1413 | 31.3193 |
| 15 | 4.60094 | 5.22935 | 6.26214 | 7.26094 | 8.54675 | 22.3072 | 24.9958 | 27.4884 | 30.5779 | 32.8013 |
| 16 | 5.14224 | 5.81221 | 6.90766 | 7.96164 | 9.31223 | 23.5418 | 26.2962 | 28.8454 | 31.9999 | 34.2672 |
| 17 | 5.69724 | 6.40776 | 7.56418 | 8.67176 | 10.0852 | 24.7690 | 27.5871 | 30.1910 | 33.4087 | 35.7185 |
| 18 | 6.26481 | 7.01491 | 8.23075 | 9.39046 | 10.8649 | 25.9894 | 28.8693 | 31.5264 | 34.8053 | 37.1564 |
| 19 | 6.84398 | 7.63273 | 8.90655 | 10.1170 | 11.6509 | 27.2036 | 30.1435 | 32.8523 | 36.1908 | 38.5822 |
| 20 | 7.43386 | 8.26040 | 9.59083 | 10.8508 | 12.4426 | 28.4120 | 31.4104 | 34.1696 | 37.5662 | 39.9968 |
| 21 | 8.03366 | 8.89720 | 10.28293 | 11.5913 | 13.2396 | 29.6151 | 32.6705 | 35.4789 | 38.9321 | 41.4010 |
| 22 | 8.64272 | 9.54249 | 10.9823 | 12.3380 | 14.0415 | 30.8133 | 33.9244 | 36.7807 | 40.2894 | 42.7956 |
| 23 | 9.26042 | 10.19567 | 11.6885 | 13.0905 | 14.8479 | 32.0069 | 35.1725 | 38.0757 | 41.6384 | 44.1813 |
| 24 | 9.88623 | 10.8564 | 12.4011 | 13.8484 | 15.6587 | 33.1963 | 36.4151 | 39.3641 | 42.9798 | 45.5585 |
| 25 | 10.5197 | 11.5240 | 13.1197 | 14.6114 | 16.4734 | 34.3816 | 37.6525 | 40.6465 | 44.3141 | 46.9278 |
| 26 | 11.1603 | 12.1981 | 13.8439 | 15.3791 | 17.2919 | 35.5631 | 38.8852 | 41.9232 | 45.6417 | 48.2899 |
| 27 | 11.8076 | 12.8786 | 14.5733 | 16.1513 | 18.1138 | 36.7412 | 40.1133 | 43.1944 | 46.9630 | 49.6449 |
| 28 | 12.4613 | 13.5648 | 15.3079 | 16.9279 | 18.9392 | 37.9159 | 41.3372 | 44.4607 | 48.2782 | 50.9933 |
| 29 | 13.1211 | 14.2565 | 16.0471 | 17.7083 | 19.7677 | 39.0875 | 42.5569 | 45.7222 | 49.5879 | 52.3356 |
| 30 | 13.7867 | 14.9535 | 16.7908 | 18.4926 | 20.5992 | 40.2560 | 43.7729 | 46.9792 | 50.8922 | 53.6720 |
| 40 | 20.7065 | 22.1643 | 24.4331 | 26.5093 | 29.0505 | 51.8050 | 55.7585 | 59.3417 | 63.6907 | 66.7659 |
| 50 | 27.9907 | 29.7067 | 32.3574 | 34.7642 | 37.6886 | 63.1671 | 67.5048 | 71.4202 | 76.1539 | 79.4900 |
| 60 | 35.5346 | 37.4848 | 40.4817 | 43.1879 | 46.4589 | 74.3970 | 79.0819 | 83.2976 | 88.3794 | 91.9517 |
| 70 | 43.2752 | 45.4418 | 48.7576 | 51.7393 | 55.3290 | 85.5271 | 90.5312 | 95.0231 | 100.425 | 104.215 |
| 80 | 51.1720 | 53.5400 | 57.1532 | 60.3915 | 64.2778 | 96.5782 | 101.879 | 106.629 | 112.329 | 116.321 |
| 90 | 59.1963 | 61.7541 | 65.6466 | 69.1260 | 73.2912 | 107.565 | 113.145 | 118.136 | 124.116 | 128.299 |
| 100 | 67.3276 | 70.0648 | 74.2219 | 77.9295 | 82.3581 | 118.498 | 124.342 | 129.561 | 135.807 | 140.169 |

Source: Thompson, C. M., "Tables of the Percentage Points of the χ^2 -Distribution," *Biometrika*, ©1941, 32, 188-189. Reproduced by permission of the Biometrika Trustees.

M11117 - 2018 - JUN 18 2018

CRITICAL VALUES OF THE F DISTRIBUTION — TABLE

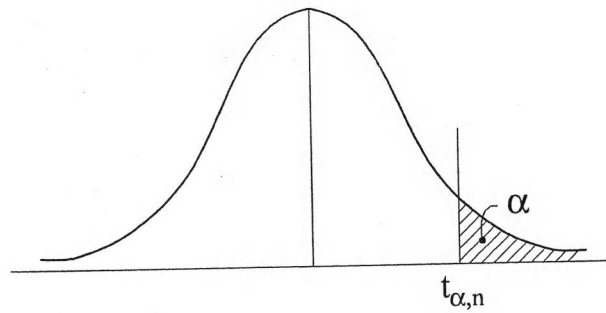
For a particular combination of numerator and denominator degrees of freedom, entry represents the critical values of F corresponding to a specified upper tail area (α).



| Denominator df_2 | Numerator df_1 | | | | | | | | | | | | | | | | | | |
|--------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 | 15 | 20 | 24 | 30 | 40 | 60 | 120 | ∞ |
| 1 | 161.4 | 199.5 | 215.7 | 224.6 | 230.2 | 234.0 | 236.8 | 238.9 | 240.5 | 241.9 | 243.9 | 245.9 | 248.0 | 249.1 | 250.1 | 251.1 | 252.2 | 253.3 | 254.3 |
| 2 | 18.51 | 19.00 | 19.16 | 19.25 | 19.30 | 19.33 | 19.35 | 19.37 | 19.38 | 19.40 | 19.41 | 19.43 | 19.45 | 19.45 | 19.46 | 19.47 | 19.48 | 19.49 | 19.50 |
| 3 | 10.13 | 9.55 | 9.28 | 9.12 | 9.01 | 8.94 | 8.89 | 8.85 | 8.81 | 8.79 | 8.74 | 8.70 | 8.66 | 8.64 | 8.62 | 8.59 | 8.57 | 8.55 | 8.53 |
| 4 | 7.71 | 6.94 | 6.59 | 6.39 | 6.26 | 6.16 | 6.09 | 6.04 | 6.00 | 5.96 | 5.91 | 5.86 | 5.80 | 5.77 | 5.75 | 5.72 | 5.69 | 5.66 | 5.63 |
| 5 | 6.61 | 5.79 | 5.41 | 5.19 | 5.05 | 4.95 | 4.88 | 4.82 | 4.77 | 4.74 | 4.68 | 4.62 | 4.56 | 4.53 | 4.50 | 4.46 | 4.43 | 4.40 | 4.36 |
| 6 | 5.99 | 5.14 | 4.76 | 4.53 | 4.39 | 4.28 | 4.21 | 4.15 | 4.10 | 4.06 | 4.00 | 3.94 | 3.87 | 3.84 | 3.81 | 3.77 | 3.74 | 3.70 | 3.67 |
| 7 | 5.59 | 4.74 | 4.35 | 4.12 | 3.97 | 3.87 | 3.79 | 3.73 | 3.68 | 3.64 | 3.57 | 3.51 | 3.44 | 3.41 | 3.38 | 3.34 | 3.30 | 3.27 | 3.23 |
| 8 | 5.32 | 4.46 | 4.07 | 3.84 | 3.69 | 3.58 | 3.50 | 3.44 | 3.39 | 3.35 | 3.28 | 3.22 | 3.15 | 3.12 | 3.08 | 3.04 | 3.01 | 2.97 | 2.93 |
| 9 | 5.12 | 4.26 | 3.86 | 3.63 | 3.48 | 3.37 | 3.29 | 3.23 | 3.18 | 3.14 | 3.07 | 3.01 | 2.94 | 2.90 | 2.86 | 2.83 | 2.79 | 2.75 | 2.71 |
| 10 | 4.96 | 4.10 | 3.71 | 3.48 | 3.33 | 3.22 | 3.14 | 3.07 | 3.02 | 2.98 | 2.91 | 2.85 | 2.77 | 2.74 | 2.70 | 2.66 | 2.62 | 2.58 | 2.54 |
| 11 | 4.84 | 3.98 | 3.59 | 3.36 | 3.20 | 3.09 | 3.01 | 2.95 | 2.90 | 2.85 | 2.79 | 2.72 | 2.65 | 2.61 | 2.57 | 2.53 | 2.49 | 2.45 | 2.40 |
| 12 | 4.75 | 3.89 | 3.49 | 3.26 | 3.11 | 3.00 | 2.91 | 2.85 | 2.80 | 2.75 | 2.69 | 2.62 | 2.54 | 2.51 | 2.47 | 2.43 | 2.38 | 2.34 | 2.30 |
| 13 | 4.67 | 3.81 | 3.41 | 3.18 | 3.03 | 2.92 | 2.83 | 2.77 | 2.71 | 2.67 | 2.60 | 2.53 | 2.46 | 2.42 | 2.38 | 2.34 | 2.30 | 2.25 | 2.21 |
| 14 | 4.60 | 3.74 | 3.34 | 3.11 | 2.96 | 2.85 | 2.76 | 2.70 | 2.65 | 2.60 | 2.53 | 2.46 | 2.39 | 2.35 | 2.31 | 2.27 | 2.22 | 2.18 | 2.13 |
| 15 | 4.54 | 3.68 | 3.29 | 3.06 | 2.90 | 2.79 | 2.71 | 2.64 | 2.59 | 2.54 | 2.48 | 2.40 | 2.33 | 2.29 | 2.25 | 2.20 | 2.16 | 2.11 | 2.07 |
| 16 | 4.49 | 3.63 | 3.24 | 3.01 | 2.85 | 2.74 | 2.66 | 2.59 | 2.54 | 2.49 | 2.42 | 2.35 | 2.28 | 2.24 | 2.19 | 2.15 | 2.11 | 2.06 | 2.01 |
| 17 | 4.45 | 3.59 | 3.20 | 2.96 | 2.81 | 2.70 | 2.61 | 2.55 | 2.49 | 2.45 | 2.38 | 2.31 | 2.23 | 2.19 | 2.15 | 2.10 | 2.06 | 2.01 | 1.96 |
| 18 | 4.41 | 3.55 | 3.16 | 2.93 | 2.77 | 2.66 | 2.58 | 2.51 | 2.46 | 2.41 | 2.34 | 2.27 | 2.19 | 2.15 | 2.11 | 2.06 | 2.02 | 1.97 | 1.92 |
| 19 | 4.38 | 3.52 | 3.13 | 2.90 | 2.74 | 2.63 | 2.54 | 2.48 | 2.42 | 2.38 | 2.31 | 2.23 | 2.16 | 2.11 | 2.07 | 2.03 | 1.98 | 1.93 | 1.88 |
| 20 | 4.35 | 3.49 | 3.10 | 2.87 | 2.71 | 2.60 | 2.51 | 2.45 | 2.39 | 2.35 | 2.28 | 2.20 | 2.12 | 2.08 | 2.04 | 1.99 | 1.95 | 1.90 | 1.84 |
| 21 | 4.32 | 3.47 | 3.07 | 2.84 | 2.68 | 2.57 | 2.49 | 2.42 | 2.37 | 2.32 | 2.25 | 2.18 | 2.10 | 2.05 | 2.01 | 1.96 | 1.92 | 1.87 | 1.81 |
| 22 | 4.30 | 3.44 | 3.05 | 2.82 | 2.66 | 2.55 | 2.46 | 2.40 | 2.34 | 2.30 | 2.23 | 2.15 | 2.07 | 2.03 | 1.98 | 1.94 | 1.89 | 1.84 | 1.78 |
| 23 | 4.28 | 3.42 | 3.03 | 2.80 | 2.64 | 2.53 | 2.44 | 2.37 | 2.32 | 2.27 | 2.20 | 2.13 | 2.05 | 2.01 | 1.96 | 1.91 | 1.86 | 1.81 | 1.76 |
| 24 | 4.26 | 3.40 | 3.01 | 2.78 | 2.62 | 2.51 | 2.42 | 2.36 | 2.30 | 2.25 | 2.18 | 2.11 | 2.03 | 1.98 | 1.94 | 1.89 | 1.84 | 1.79 | 1.73 |
| 25 | 4.24 | 3.39 | 2.99 | 2.76 | 2.60 | 2.49 | 2.40 | 2.34 | 2.28 | 2.24 | 2.16 | 2.09 | 2.01 | 1.96 | 1.92 | 1.87 | 1.82 | 1.77 | 1.71 |
| 26 | 4.23 | 3.37 | 2.98 | 2.74 | 2.59 | 2.47 | 2.39 | 2.32 | 2.27 | 2.22 | 2.15 | 2.07 | 1.99 | 1.95 | 1.90 | 1.85 | 1.80 | 1.75 | 1.69 |
| 27 | 4.21 | 3.35 | 2.96 | 2.73 | 2.57 | 2.46 | 2.37 | 2.31 | 2.25 | 2.20 | 2.13 | 2.06 | 1.97 | 1.93 | 1.88 | 1.84 | 1.79 | 1.73 | 1.67 |
| 28 | 4.20 | 3.34 | 2.95 | 2.71 | 2.56 | 2.45 | 2.36 | 2.29 | 2.24 | 2.19 | 2.12 | 2.04 | 1.96 | 1.91 | 1.87 | 1.82 | 1.77 | 1.71 | 1.65 |
| 29 | 4.18 | 3.33 | 2.93 | 2.70 | 2.55 | 2.43 | 2.35 | 2.28 | 2.22 | 2.18 | 2.10 | 2.03 | 1.94 | 1.90 | 1.85 | 1.81 | 1.75 | 1.70 | 1.64 |
| 30 | 4.17 | 3.32 | 2.92 | 2.69 | 2.53 | 2.42 | 2.33 | 2.27 | 2.21 | 2.16 | 2.09 | 2.01 | 1.93 | 1.89 | 1.84 | 1.79 | 1.74 | 1.68 | 1.62 |
| 40 | 4.08 | 3.23 | 2.84 | 2.61 | 2.45 | 2.34 | 2.25 | 2.18 | 2.12 | 2.08 | 2.00 | 1.92 | 1.84 | 1.79 | 1.74 | 1.69 | 1.64 | 1.58 | 1.51 |
| 60 | 4.00 | 3.15 | 2.76 | 2.53 | 2.37 | 2.25 | 2.17 | 2.10 | 2.04 | 1.99 | 1.92 | 1.84 | 1.75 | 1.70 | 1.65 | 1.59 | 1.53 | 1.47 | 1.39 |
| 120 | 3.92 | 3.07 | 2.68 | 2.45 | 2.29 | 2.17 | 2.09 | 2.02 | 1.96 | 1.91 | 1.83 | 1.75 | 1.66 | 1.61 | 1.55 | 1.50 | 1.43 | 1.35 | 1.25 |
| ∞ | 3.84 | 3.00 | 2.60 | 2.37 | 2.21 | 2.10 | 2.01 | 1.94 | 1.88 | 1.83 | 1.75 | 1.67 | 1.57 | 1.52 | 1.46 | 1.39 | 1.32 | 1.22 | 1.00 |

JUN 18 2018

STUDENT'S *t*-DISTRIBUTION



VALUES OF $t_{\alpha, n}$

| <i>df</i> | 0.25 | 0.20 | 0.15 | 0.10 | 0.05 | 0.025 | 0.01 | 0.005 | <i>df</i> |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------|
| 1 | 1.000 | 1.376 | 1.963 | 3.078 | 6.314 | 12.706 | 31.821 | 63.657 | 1 |
| 2 | 0.816 | 1.061 | 1.386 | 1.886 | 2.920 | 4.303 | 6.965 | 9.925 | 2 |
| 3 | 0.765 | 0.978 | 1.350 | 1.638 | 2.353 | 3.182 | 4.541 | 5.841 | 3 |
| 4 | 0.741 | 0.941 | 1.190 | 1.533 | 2.132 | 2.776 | 3.747 | 4.604 | 4 |
| 5 | 0.727 | 0.920 | 1.156 | 1.476 | 2.015 | 2.571 | 3.365 | 4.032 | 5 |
| 6 | 0.718 | 0.906 | 1.134 | 1.440 | 1.943 | 2.447 | 3.143 | 3.707 | 6 |
| 7 | 0.711 | 0.896 | 1.119 | 1.415 | 1.895 | 2.365 | 2.998 | 3.499 | 7 |
| 8 | 0.706 | 0.889 | 1.108 | 1.397 | 1.860 | 2.306 | 2.896 | 3.355 | 8 |
| 9 | 0.703 | 0.883 | 1.100 | 1.383 | 1.833 | 2.262 | 2.821 | 3.250 | 9 |
| 10 | 0.700 | 0.879 | 1.093 | 1.372 | 1.812 | 2.228 | 2.764 | 3.169 | 10 |
| 11 | 0.697 | 0.876 | 1.088 | 1.363 | 1.796 | 2.201 | 2.718 | 3.106 | 11 |
| 12 | 0.695 | 0.873 | 1.083 | 1.356 | 1.782 | 2.179 | 2.681 | 3.055 | 12 |
| 13 | 0.694 | 0.870 | 1.079 | 1.350 | 1.771 | 2.160 | 2.650 | 3.012 | 13 |
| 14 | 0.692 | 0.868 | 1.076 | 1.345 | 1.761 | 2.145 | 2.624 | 2.977 | 14 |
| 15 | 0.691 | 0.866 | 1.074 | 1.341 | 1.753 | 2.131 | 2.602 | 2.947 | 15 |
| 16 | 0.690 | 0.865 | 1.071 | 1.337 | 1.746 | 2.120 | 2.583 | 2.921 | 16 |
| 17 | 0.689 | 0.863 | 1.069 | 1.333 | 1.740 | 2.110 | 2.567 | 2.898 | 17 |
| 18 | 0.688 | 0.862 | 1.067 | 1.330 | 1.734 | 2.101 | 2.552 | 2.878 | 18 |
| 19 | 0.688 | 0.861 | 1.066 | 1.328 | 1.729 | 2.093 | 2.539 | 2.861 | 19 |
| 20 | 0.687 | 0.860 | 1.064 | 1.325 | 1.725 | 2.086 | 2.528 | 2.845 | 20 |
| 21 | 0.686 | 0.859 | 1.063 | 1.323 | 1.721 | 2.080 | 2.518 | 2.831 | 21 |
| 22 | 0.686 | 0.858 | 1.061 | 1.321 | 1.717 | 2.074 | 2.508 | 2.819 | 22 |
| 23 | 0.685 | 0.858 | 1.060 | 1.319 | 1.714 | 2.069 | 2.500 | 2.807 | 23 |
| 24 | 0.685 | 0.857 | 1.059 | 1.318 | 1.711 | 2.064 | 2.492 | 2.797 | 24 |
| 25 | 0.684 | 0.856 | 1.058 | 1.316 | 1.708 | 2.060 | 2.485 | 2.787 | 25 |
| 26 | 0.684 | 0.856 | 1.058 | 1.315 | 1.706 | 2.056 | 2.479 | 2.779 | 26 |
| 27 | 0.684 | 0.855 | 1.057 | 1.314 | 1.703 | 2.052 | 2.473 | 2.771 | 27 |
| 28 | 0.683 | 0.855 | 1.056 | 1.313 | 1.701 | 2.048 | 2.467 | 2.763 | 28 |
| 29 | 0.683 | 0.854 | 1.055 | 1.311 | 1.699 | 2.045 | 2.462 | 2.756 | 29 |
| 30 | 0.683 | 0.854 | 1.055 | 1.310 | 1.697 | 2.042 | 2.457 | 2.750 | 30 |
| ∞ | 0.674 | 0.842 | 1.036 | 1.282 | 1.645 | 1.960 | 2.326 | 2.576 | ∞ |

