Seat No. : ______________

DJ-112

December-2025

M.Sc. IT (DMVI), Sem.-V

DSC-M-DMVI-354T : Inferential Statistics

Time : 2:00 Hours] **[Max. Marks : 50**

Instructions : (1) Figures to the right indicate full marks.
(2) Do not write anything on the question paper.
(3) Simple calculator is allowed. Do not use a scientific calculator.

Answer the following Question :

1. (A) A factory claims its production process produces metal rods with an average length of 50 cm. A sample of 36 rods was taken, giving a sample mean of 48.9 cm. The population standard deviation is 2.4 cm. **5**

Using a 95% confidential interval, find the following :

(1) Compute a standard error.
(2) Compute the margin of error.
(3) Construct the 95% confidence interval (Interval Estimation).
(4) Create a hypothesis and find test statistics.
(5) Compute p-value.
(6) State the conclusion using p-value and critical value method.

(B) A researcher thinks that the proportion of people who prefer tea over coffee is not equal to 50%. A sample of 300 adults shows 168 prefer tea. At $\alpha = 0.05$. Find the following : **5**

(1) Compute sample proportion.
(2) Compute standard error.
(3) Find test statistics.
(4) Find p-value.
(5) Write conclusion using p-value and critical value.

OR

1. (A) A nutritionist believes the mean sodium content of soup is less than 850 mg. A random sample of 40 cans shows a sample mean of 820 mg, with a population Standard deviation of 90 mg. **5**

Test at the 1% significance level, find the following :

(1) Compute a standard error.

(2) Compute the margin of error.

(3) Construct the 99% confidence interval (interval estimation).

(4) Create a hypothesis and find test statistics.

(5) Compute p-value.

(6) State the conclusion using p-value and critical value method.

(B) In Gandhinagar, principal of Udgam School believes that less than 20% of students are late to class. Computer teacher does a survey on that by taking 150 students, in survey he finds 22 students reported being late. **5**

At $\alpha = 0.01$. Find the following :

(1) Compute sample proportion.

(2) Compute standard error.

(3) Create hypothesis and find test statistics.

(4) Compute p-value.

(5) Write conclusion using p-value and critical value.

2. (A) Two branches of a company want to compare the average number of tasks completed per day by employees. Management wants to know if the productivity of the two branches is differing. Using $\alpha = 0.05$. **5**

Consider the following hypothesis test :

$$H_0 : \mu_1 - \mu_2 = 0$$

$$H_a : \mu_1 - \mu_2 \neq 0$$

The following results are from Branch-A and Branch-B :

Branch-A	**Branch-B**
$n_1 = 90$	$n_2 = 80$
$\bar{x}_1 = 38.5$	$\bar{x}_2 = 40.1$
$\sigma_1 = 4.4$	$\sigma_2 = 4.8$

(1) Compute Point estimator

(2) Compute Standard error

(3) Compute test statistics

(4) Find p-value.

(5) Write conclusion using P-value and critical value.

(B) A school district is concerned about student attendance and wants to investigate whether two school differ in their overall attendance rates. The district wants to determine whether the attendance proportions of the two schools are different. Using $\alpha = 0.05$. **5**

Consider the following hypothesis test :

$H_0 : p_1 - p_2 = 0$

$H_a : p_1 - p_2 \neq 0$

The following results are for independence sample taken from the two Schools :

School-A	**School-B**
$n_1 = 420$	$n_2 = 390$
$x_1 = 378$	$x_2 = 330$

(1) Compute point estimator.

(2) Compute standard error.

(3) Find test statistics.

(4) Find p-value.

(5) Write conclusion using p-value and critical value.

OR

2. (A) A school decides to try two different teaching methods to improve student exam performance in mathematics. After one semester. **5**

Method-A is used in one group of students. A sample of $n_1 = 55$ students have an average exam score of $\bar{x}_1 = 78$ with a known population standard deviation $\sigma_1 = 9$.

Method-B is used in different group. A sample of $n_2 = 50$ students have an average exam score of $\bar{x}_2 = 81$ with a known population standard deviation $\sigma_2 = 10$.

A school wants to determine whether the two teaching methods lead to different average exam scores.

Using $\alpha = 0.05$.

Consider the following hypothesis test :

$H_0 : \mu_1 - \mu_2 = 0$

$H_a : \mu_1 - \mu_2 \neq 0$

(1) Compute point estimator.

(2) Compute standard error.

(3) Find test statistics.

(4) Find p-value.

(5) Write your conclusion using p-value and critical value.

(B) A company tests whether store A has a higher customer satisfaction rate then Store B. Use $\alpha = 0.01$. **5**

Test if store A has a higher satisfaction rate.

$H_0 : p_1 - p_2 \leq 0$

$H_a : p_1 - p_2 > 0$

Store A	**Store B**
$n_1 = 300$	$n_2 = 280$
$x_1 = 252$	$x_2 = 210$

(1) Compute point estimator.

(2) Compute standard error.

(3) Find test statistics.

(4) Find p-value.

(5) Write conclusion using P-value and Critical Value.

3. (A) A factory uses a machine to cut metal rods. The standard variance required for proper functioning is $\sigma^2 = 1.5$ mm^2. Engineers suspect the machine is producing rods with too much variation. A sample of n = 15 rods is measured, and the sample variance is $s^2 = 2.4$ mm^2. **5**

At $\alpha = 0.01$, test whether the machine's variance is greater than the acceptable level.

$H_0 : \sigma^2 \leq 1.5$

$H_a : \sigma^2 > 1.5$

(B) Visa card USA studied how frequently consumers of various age groups use plastic cards when making purchases. Sample data for 300 customers shows the use of plastic cards by four age groups. **5**

	Age Group			
Payment	**18-24**	**25-34**	**35-44**	**45 over**
Plastic	21	27	27	36
Cash or check	21	36	42	90

Test for the independence between method of payment and age group. What is the P-value ? Using $\alpha = 0.05$, what is your conclusion ?

OR

3. (A) Two delivery companies claim their delivery time consistency is superior. A consumer group compares them. **5**

Company X : $n_1 = 30,\ s_1^2 = 25$

Company Y: $n_2 = 28,\ s_2^2 = 18$

At $\alpha = 0.05$, test whether the variances of the two companies' delivery times are equal. Write conclusion using p value and critical value.

(B) Consider the market share study being conducted by Scott marketing research. Over the past year market shares stabilized at 30% for company A, 50% for company B, and 20% for company C. Recently company C retained Scott marketing research to determine whether the new product will alter market shares. **5**

The market research firm has used a consumer panel of 200 customers for the study. Each individual was asked to specify a purchase preference among the three alternatives :

Observed Frequency		
Company A	**Company B**	**Company C**
48	98	54

Using $\alpha = 0.05$. Perform a goodness of fit test that will determine whether the sample of 200 customer purchase preference is consistent with the null hypothesis.

4. (A) Three admission test preparation programs are being evaluated. The scores obtained by a sample of 20 people who used the programs provided the following data. Use the Kruskal Wallis test to determine whether there is a significant difference among the three test preparation programs. Use $\alpha = 0.05$. **5**

Products		
A	**B**	**C**
540	450	600
400	540	630
490	400	580
530	410	490
490	480	590
610	370	620
	550	570

(B) Three different methods for assembling a product were proposed by an industrial engineer. To investigate the number of units assembled correctly with each method, 30 employees were randomly selected and randomly assigned to the three proposed methods in such a way that each method was used by 10 workers. The number of units assembled correctly was recorded, and the analysis of variance procedure was applied to the resulting data set. The following results were obtained :

SST = 10,800, SSTR = 4,560. **5**

(1) Set up the ANOVA table for this problem.

(2) Use $\alpha = 0.05$ to test for any significant difference in the means for the three assembly methods.

(3) Write your conclusion using critical value.

OR

4. (A) A sample of 15 consumers provided the following product ratings for three different products. Five consumers were randomly assigned to test and rate each product. Use the Kruskal-Wallis test and $\alpha = 0.05$ to determine whether there is a significant difference among the ratings for the products. **5**

A	**B**	**C**
50	80	60
62	95	45
75	98	30
48	87	58
65	90	57

(B) An automobile dealer conducted a test to determine if the time in minutes needed to complete a minor engine tune-up depends on whether a computerized engine analyzer or an electronic analyzer is used. Because tune up time varies among compact, intermediate and full-sized cars, the three types of cars were used as blocks in the experiment. The data obtain follow : **5**

		Analyzer	
		Computerized	**Electronic**
Cars	Compact	50	42
	Intermediate	55	44
	Full- Sized	63	46

SSTR = 216, SSBL = 49, SSE = 19.

(1) Set up the ANOVA table for this problem.

(2) Use $\alpha = 0.05$ to test for any significant differences.

(3) Write your conclusion using P-value and critical value.

5. Choose the correct option. **10**

(1) At 1% significance level (two-tailed), Z critical value is
  (a) 1.96 (b) 2.33
  (c) 2.58 (d) 3.00

(2) Z-test assumes the data follows
  (a) Binomial Distribution (b) Poisson Distribution
  (c) Normal Distribution (d) Exponential Distribution

(3) Cluster sampling involves :
  (a) Selecting population groups and studying entire groups
  (b) Dividing population into homogeneous strata
  (c) Selecting every K^{th} item
  (d) Selecting based on convenience

(4) A sample chosen by selecting every 10^{th} member is :
  (a) Stratified sampling (b) Cluster sampling
  (c) Systematic sampling (d) Quota sampling

(5) For a one-sample t-test, the degrees of freedom are
  (a) n (b) n – 1
  (c) n + 1 (d) 2n

(6) Convenience sampling selects participants based on :
  (a) Random chance (b) Researcher judgment
  (c) Ease of access (d) Statistical probability

(7) If p-value < α, we
  (a) Increase sample size (b) Accept null hypothesis
  (c) Reject null hypothesis (d) do nothing

(8) Standard error of mean decreases when
  (a) Sample size increases
  (b) Population mean increases
  (c) Population standard deviation increases
  (d) Sample size decreases

(9) A good point estimator should have
  (a) High bias (b) High variance
  (c) Low variance (d) High MSE

(10) Z-test is appropriate when
  (a) Population variance is unknown (b) Population variance is known
  (c) Sample is non-random (d) Data are nominal

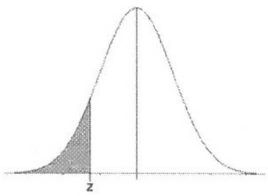
F - Distribution Table

	$n_1 = 29$					
$n_2 = 27$	α	0.005	0.01	0.025	0.05	0.10
	F-Value	2.73	2.47	2.13	1.88	1.64

	d.f.N = 2					
d.f.D = 27	α	0.005	0.01	0.025	0.05	0.10
	F-Value	6.49	5.49	4.24	3.35	2.51

	d.f.N = 1					
d.f.D = 2	α	0.005	0.01	0.025	0.05	0.10
	F-Value	198.5	98.5	38.51	18.51	8.53

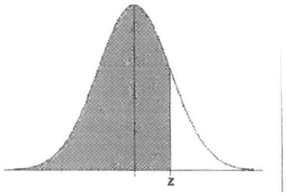
Standard Normal Cumulative Probability Table



Cumulative probabilities for NEGATIVE z-values are shown in the following table:

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
-3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003
-3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
-3.1	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
-3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641

Standard Normal Cumulative Probability Table



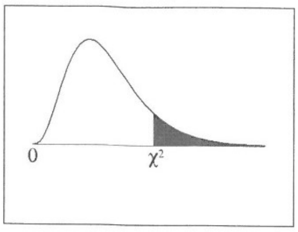
Cumulative probabilities for POSITIVE z-values are shown in the following table:

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

t Table

cum. prob	$t_{.50}$	$t_{.75}$	$t_{.80}$	$t_{.85}$	$t_{.90}$	$t_{.95}$	$t_{.975}$	$t_{.99}$	$t_{.995}$	$t_{.999}$	$t_{.9995}$
one-tail	0.50	0.25	0.20	0.15	0.10	0.05	0.025	0.01	0.005	0.001	0.0005
two-tails	1.00	0.50	0.40	0.30	0.20	0.10	0.05	0.02	0.01	0.002	0.001
df											
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71	31.82	63.66	318.31	636.62
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.000	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.000	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.000	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.000	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.000	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.000	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.000	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.000	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.000	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.000	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.000	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.000	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	0.000	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	0.000	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	0.000	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	0.000	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	0.000	0.679	0.848	1.045	1.296	1.671	2.000	2.390	2.660	3.232	3.460
80	0.000	0.678	0.846	1.043	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	0.000	0.677	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.174	3.390
1000	0.000	0.675	0.842	1.037	1.282	1.646	1.962	2.330	2.581	3.098	3.300
z	0.000	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.090	3.291
	0%	50%	60%	70%	80%	90%	95%	98%	99%	99.8%	99.9%
	Confidence Level										

Chi-Square Distribution Table



The shaded area is equal to α for $\chi^2 = \chi^2_\alpha$.

df	$\chi^2_{.995}$	$\chi^2_{.990}$	$\chi^2_{.975}$	$\chi^2_{.950}$	$\chi^2_{.900}$	$\chi^2_{.100}$	$\chi^2_{.050}$	$\chi^2_{.025}$	$\chi^2_{.010}$	$\chi^2_{.005}$
1	0.000	0.000	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.072	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860
5	0.412	0.554	0.831	1.145	1.610	9.236	11.070	12.833	15.086	16.750
6	0.676	0.872	1.237	1.635	2.204	10.645	12.592	14.449	16.812	18.548
7	0.989	1.239	1.690	2.167	2.833	12.017	14.067	16.013	18.475	20.278
8	1.344	1.646	2.180	2.733	3.490	13.362	15.507	17.535	20.090	21.955
9	1.735	2.088	2.700	3.325	4.168	14.684	16.919	19.023	21.666	23.589
10	2.156	2.558	3.247	3.940	4.865	15.987	18.307	20.483	23.209	25.188
11	2.603	3.053	3.816	4.575	5.578	17.275	19.675	21.920	24.725	26.757
12	3.074	3.571	4.404	5.226	6.304	18.549	21.026	23.337	26.217	28.300
13	3.565	4.107	5.009	5.892	7.042	19.812	22.362	24.736	27.688	29.819
14	4.075	4.660	5.629	6.571	7.790	21.064	23.685	26.119	29.141	31.319
15	4.601	5.229	6.262	7.261	8.547	22.307	24.996	27.488	30.578	32.801
16	5.142	5.812	6.908	7.962	9.312	23.542	26.296	28.845	32.000	34.267
17	5.697	6.408	7.564	8.672	10.085	24.769	27.587	30.191	33.409	35.718
18	6.265	7.015	8.231	9.390	10.865	25.989	28.869	31.526	34.805	37.156
19	6.844	7.633	8.907	10.117	11.651	27.204	30.144	32.852	36.191	38.582
20	7.434	8.260	9.591	10.851	12.443	28.412	31.410	34.170	37.566	39.997
21	8.034	8.897	10.283	11.591	13.240	29.615	32.671	35.479	38.932	41.401
22	8.643	9.542	10.982	12.338	14.041	30.813	33.924	36.781	40.289	42.796
23	9.260	10.196	11.689	13.091	14.848	32.007	35.172	38.076	41.638	44.181
24	9.886	10.856	12.401	13.848	15.659	33.196	36.415	39.364	42.980	45.559
25	10.520	11.524	13.120	14.611	16.473	34.382	37.652	40.646	44.314	46.928
26	11.160	12.198	13.844	15.379	17.292	35.563	38.885	41.923	45.642	48.290
27	11.808	12.879	14.573	16.151	18.114	36.741	40.113	43.195	46.963	49.645
28	12.461	13.565	15.308	16.928	18.939	37.916	41.337	44.461	48.278	50.993
29	13.121	14.256	16.047	17.708	19.768	39.087	42.557	45.722	49.588	52.336
30	13.787	14.953	16.791	18.493	20.599	40.256	43.773	46.979	50.892	53.672
40	20.707	22.164	24.433	26.509	29.051	51.805	55.758	59.342	63.691	66.766
50	27.991	29.707	32.357	34.764	37.689	63.167	67.505	71.420	76.154	79.490
60	35.534	37.485	40.482	43.188	46.459	74.397	79.082	83.298	88.379	91.952
70	43.275	45.442	48.758	51.739	55.329	85.527	90.531	95.023	100.425	104.215
80	51.172	53.540	57.153	60.391	64.278	96.578	101.879	106.629	112.329	116.321
90	59.196	61.754	65.647	69.126	73.291	107.565	113.145	118.136	124.116	128.299
100	67.328	70.065	74.222	77.929	82.358	118.498	124.342	129.561	135.807	140.169