

THE OPEN UNIVERSITY OF SRI LANKA
 FACULTY OF MANAGEMENT STUDIES
 BACHELOR OF MANAGEMENT STUDIES (HONOURS) DEGREE
 PROGRAMME
 OSU4570 - BUSINESS STATISTICS
 FINAL EXAMINATION – 2025/26
 DURATION – THREE (03) HOURS



DATE: 21ST JUNE 2026

TIME: 1.30 PM – 4.30 PM

INSTRUCTIONS:

- Answer FIVE questions ONLY.
- All questions carry equal marks.
- Use of a non-programmable calculator is allowed.
- All workings pertaining to answers should be properly submitted.
- This question paper consists of 7 questions in 10 pages.

Question 1

- a. At a supermarket checkout, it is assumed that customers arrive randomly and independently throughout the day. The checkout counter receives an average of 9 customers per minute. Find the probability that more than 5 customers arrive during a particular one-minute period. (4 marks)
- b. A delivery company owns 7 vans. Each van has a 8% probability of requiring maintenance. If 6 vans are assigned to routes, find the probability that at least 2 vans require maintenance. (4 marks)
- c. A university registration office records the time required to process student registration applications. The processing times are distributed with a mean of 25 minutes and a standard deviation of 5 minutes. What is the probability of registration applications being processed in less than 20 minutes? (4 marks)
- d. Market research indicates that 5.5% of smartphone users replace their phones every year. Find the probability that, in a sample of 500 smartphone users, between 45 and 70 users (inclusive) report replacing their phones annually. (4 marks)
- e. Briefly explain the concept and the criteria applied in Normal approximation to Poisson distribution. State how to calculate the expected number and the standard deviation applicable in this scenario. (4 marks)

(Total 20 marks)

Question 2

- a. A retail clothing store wants to estimate the average amount customers spend per shopping trip with 95% confidence. A random sample of 36 customers shows a mean spending of Rs. 2,250 with a standard deviation of Rs. 420. Calculate the 95% confidence interval for the true mean of customer expenditure. (5 marks)
- b. A software company claims that the average system response time is 200 milliseconds. A sample of 50 tests shows an average response time of 215 milliseconds with a standard deviation of 40 milliseconds. Test the claim at the 1% significance level. (5 marks)
- c. A company compares the average customer spending at two different branches. Branch A has 45 customers with an average spending of Rs. 2,300 and a standard deviation of Rs. 350. Branch B has 40 customers with an average spending of Rs. 2,150 and a standard deviation of Rs. 300. Test at the 1% significance level whether there is a significant difference in customer spending between the two branches. (10 marks)

(Total 20 marks)

Question 3

A logistics company wants to determine whether there is an association between customer satisfaction levels and the type of delivery service type used. They collected data from a random sample of 670 customers and their responses are as follows:

Customer satisfaction	Delivery Service Type				Total
	Standard	Express	Same-day	International	
Extremely high	45	23	52	65	185
High	75	22	53	65	215
Moderate	15	24	32	41	112
Low	32	42	28	56	158
Total	167	111	165	227	670

At 1% significance level, determine whether there is a significant association between customer satisfaction and delivery service type.

(Total 20 marks)

Question 4

A sustainable packaging company wants to investigate the relationship between use of eco-friendly training (measured in hours) and waste generated (measured in kilograms of waste per production cycle). They collected data from 12 randomly selected production teams and recorded the following:

Team	Sustainability Training Hours	Waste generated (kg per cycle)
1	1	48
2	1.5	52
3	2	49
4	2.5	43
5	3	39
6	3.5	40
7	4	32
8	4.5	30
9	5	23
10	5.5	15
11	6	8
12	6.5	7

- Plot the above data on a graph paper and interpret the relationship you can observe.
(3 marks)
- Calculate the correlation coefficient between waste generated and training hours. Interpret the correlation between the two factors?
(6 marks)
- Calculate the regression equation and draw the regression line in the same graph drawn for part (a).
(3 marks)
- If 4 hours has been allocated for training, what amount of waste would you **predict**? Compare that with actual data in the table and discuss your observations of actual and calculated values.
(4 marks)
- Briefly discuss the difference between the concepts of correlation analysis and regression analysis.
(4 marks)

(Total: 20 marks)

Question 5

A hotel management company wants to understand the factors that influence the monthly revenue generated by its hotels. They collected data from 60 randomly selected hotels operating under the company and recorded data related to the followings:

- Monthly revenue (in Rs. '000)
- Number of rooms in the hotel
- Number of employees working in the hotel
- Marketing expenditure (in Rs. '000) per month

a. Determine the regression equation based on the output tables given below. (3 marks)

Table 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.874	.764	.751	.425

*Predictors: (Constant), Number of rooms, Number of employees, Marketing expenditure

**Dependent Variable: Monthly revenue

Table 2

Model	Unstandardized Coefficients		t	Sig.
	B	Std. Error		
(Constant)	850.24	.229	3.861	.009
Number of rooms	18.25	.032	5.784	.071
Number of employees	-12.94	.085	3.022	.006
Marketing expenditure	22.27	.073	3.154	.002

- b. The researcher claims that the Monthly Revenue increases with the number of rooms. Is this statement correct? Justify your answer. (3 marks)
- c. Interpret the coefficient of the variable of 'Number of employees'. (Its strength and how it may affect the Monthly Revenue) (4 marks)
- d. Estimate the Monthly Revenue when the scores for the three dimensions, 'Number of rooms', 'Number of employees', 'Marketing expenditure' are 15, 19, and 50.5 respectively. (2 marks)
- e. Comment on the correlation coefficient values (i.e. the relationship and its strength) given in the below table.

Dimension	Coefficient of correlation with variable 'Monthly Revenue'	Sig (p)
Number of rooms in the hotel	0.536	0.062
Number of employees working in the hotel	-0.262	0.189
Marketing expenditure (in Rs. '000) per month	-0.630	0.000
Customer satisfaction score (out of 100)	0.852	0.002

(8 marks)

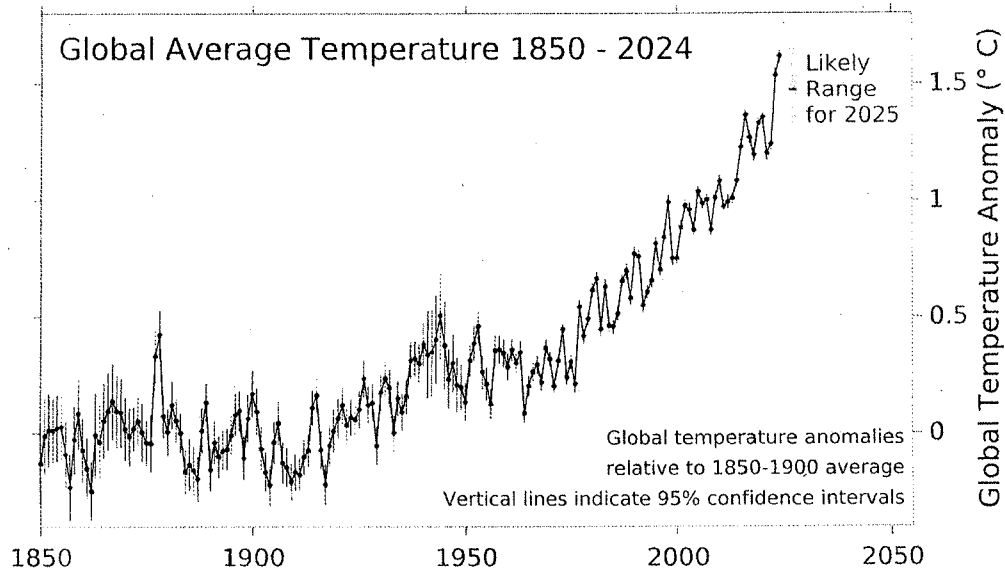
(Total 20 marks)

Question 6

- a. The quarterly customer visits data of a shop are available for past 4 years. An analysis is required to predict the future sales.

Period	Year	Quarter	Number of customer visits	Quarterly Moving Averages	Centered Moving Averages (CMA)	Number of customer visits/ CMA
1	2022	1	592			
2		2	647			
3		3	524	569.75	576.125	0.910
4		4	516	582.5	592.625	0.871
5	2023	1	643	(a)	623.125	1.032
6		2	728	(b)	(f)	(k)
7		3	687	687.5	(g)	(l)
8		4	692	696	705.125	0.981
9	2024	1	677	(c)	(h)	(m)
10		2	801	718.75	(i)	1.110
11		3	705	(d)	730.875	0.965
12		4	715	737.25	744.125	(n)
13	2025	1	728	751	(j)	0.957
14		2	856	(e)	780.75	1.096
15		3	785	790.5		
16		4	793			

- i. Calculate the values for $(a) - (n)$. (7 marks)
 - ii. Find the adjusted seasonal index values. (5 marks)
 - iii. If the trend line equation is, $\text{Customer Visits} = 532.17 + 20.03 * \text{Period}$, find the forecasted sales for the four quarters of year 2026. (4 marks)
- b. Interpret the following graph with the knowledge of time series. (4 marks)



(Total: 20 marks)

Question 7

- a. A quality control analyst is comparing the consistency of two filling machines used in a beverage factory. A random sample of 12 bottles filled by Machine X had a mean volume of 498 ml and a standard deviation of 4 ml. A random sample of 14 bottles filled by Machine Y had a mean volume of 502 ml and a standard deviation of 6 ml. Test, at the 5% significance level, the hypothesis that there is no difference in the volume dispensed by the two filling machines, X and Y. (10 marks)
- b. Describe the following terms: (10 marks)
 - i. Type I error
 - ii. Confidence Interval
 - iii. Normal Approximation to Binomial Distribution
 - iv. Critical Region

(Total: 20 marks)

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Binomial Probability Distribution Table

$n = 7$										
x	$p = 0.01$	$p = 0.02$	$p = 0.03$	$p = 0.04$	$p = 0.05$	$p = 0.06$	$p = 0.07$	$p = 0.08$	$p = 0.09$	
0	0.9321	0.8681	0.8080	0.7514	0.6983	0.6485	0.6017	0.5578	0.5168	7
1	0.0659	0.1240	0.1749	0.2192	0.2573	0.2897	0.3170	0.3396	0.3578	6
2	0.0020	0.0076	0.0162	0.0274	0.0406	0.0555	0.0716	0.0886	0.1061	5
3	0.0000	0.0003	0.0008	0.0019	0.0036	0.0059	0.0090	0.0128	0.0175	4
4	0.0000	0.0000	0.0000	0.0001	0.0002	0.0004	0.0007	0.0011	0.0017	3
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	2
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1
	$p = 0.99$	$p = 0.98$	$p = 0.97$	$p = 0.96$	$p = 0.95$	$p = 0.94$	$p = 0.93$	$p = 0.92$	$p = 0.91$	x
0	0.4783	0.3206	0.2097	0.1335	0.0824	0.0490	0.0280	0.0152	0.0078	7
1	0.3720	0.3960	0.3670	0.3115	0.2471	0.1848	0.1306	0.0872	0.0547	6
2	0.1240	0.2097	0.2753	0.3115	0.3177	0.2985	0.2613	0.2140	0.1641	5
3	0.0230	0.0617	0.1147	0.1730	0.2269	0.2679	0.2903	0.2918	0.2734	4
4	0.0026	0.0109	0.0287	0.0577	0.0972	0.1442	0.1935	0.2388	0.2734	3
5	0.0002	0.0012	0.0043	0.0115	0.0250	0.0466	0.0774	0.1172	0.1641	2
6	0.0000	0.0001	0.0004	0.0013	0.0036	0.0084	0.0172	0.0320	0.0547	1
7	0.0000	0.0000	0.0000	0.0001	0.0002	0.0006	0.0016	0.0037	0.0078	0
	$p = 0.90$	$p = 0.85$	$p = 0.80$	$p = 0.75$	$p = 0.70$	$p = 0.65$	$p = 0.60$	$p = 0.55$	$p = 0.50$	x

$$P(r) = {}^nC_r p^r q^{(n-r)}$$

$$P(x) = \frac{e^{-\lambda} \lambda^x}{x!} \text{ where, } e = 2.718$$

$$\bar{x} \pm z^* \sigma / \sqrt{n}$$

$$\bar{x} \pm t^* s / \sqrt{n}$$

$$p \pm z \sqrt{\frac{p(1-p)}{n}}$$

$$\chi^2 = \sum_{i=1}^k \left[\frac{(O_i - E_i)^2}{E_i} \right]$$

$$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

$$Z = \frac{\bar{x}_1 - \bar{x}_2 - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

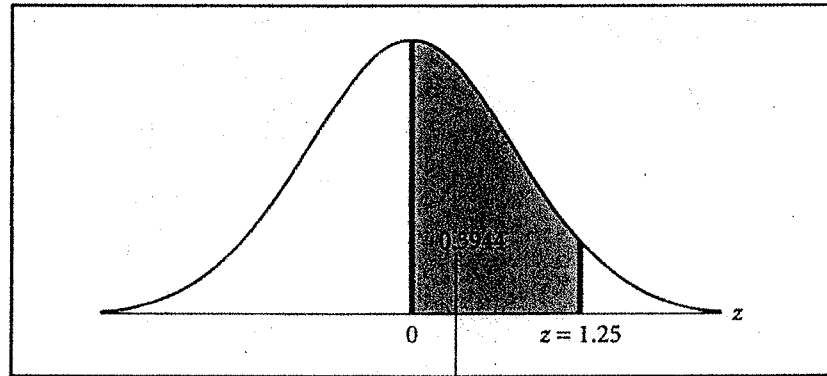
$$t = \frac{\bar{x}_1 - \bar{x}_2 - (\mu_1 - \mu_2)}{S_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \text{ where } S_p = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

$$r = \frac{\sum xy - \frac{\sum(x) \cdot \sum(y)}{n}}{\sqrt{\left(\sum x^2 - \frac{(\sum x)^2}{n} \right) \left(\sum y^2 - \frac{(\sum y)^2}{n} \right)}}$$

$$b = \frac{n \sum xy - (\sum x)(\sum y)}{n \sum x^2 - (\sum x)^2}$$

$$a = \frac{\sum y}{n} - b \cdot \frac{\sum x}{n}$$

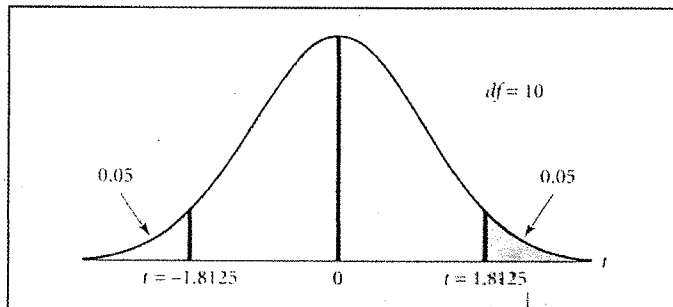
Standard Normal Distribution Table



z	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990

The highlighted value is 0.3944

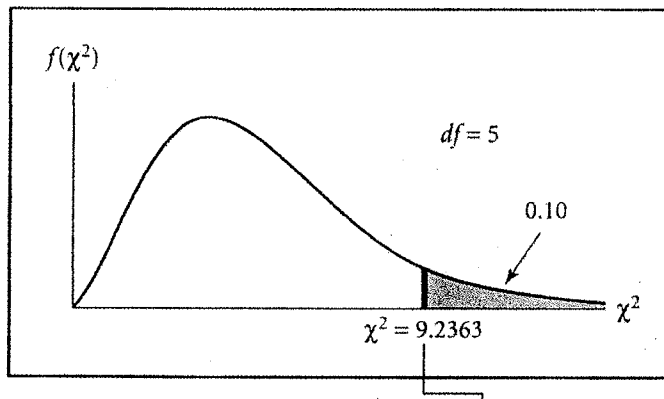
Critical Values for t-Distribution



Conf. Level	0.1	0.3	0.5	0.7	0.8	0.9	0.95	0.98	0.99
One Tail	0.45	0.35	0.25	0.15	0.1	0.05	0.025	0.01	0.005
Two Tails	0.9	0.7	0.5	0.3	0.2	0.1	0.05	0.02	0.01
df	Values of t								
1	0.1584	0.5095	1.0000	1.9626	3.0777	6.3137	12.7062	31.8210	63.6559
2	0.1421	0.4447	0.8165	1.3862	1.8856	2.9200	4.3027	6.9645	9.9250
3	0.1366	0.4242	0.7649	1.2498	1.6377	2.3534	3.1824	4.5407	5.8408
4	0.1338	0.4142	0.7407	1.1896	1.5332	2.1318	2.7765	3.7469	4.6041
5	0.1322	0.4082	0.7267	1.1558	1.4759	2.0150	2.5706	3.3649	4.0321
6	0.1311	0.4043	0.7176	1.1342	1.4398	1.9432	2.4469	3.1427	3.7074
7	0.1303	0.4015	0.7111	1.1192	1.4149	1.8946	2.3646	2.9979	3.4995
8	0.1297	0.3995	0.7064	1.1081	1.3968	1.8595	2.3060	2.8965	3.3554
9	0.1293	0.3979	0.7027	1.0997	1.3830	1.8331	2.2622	2.8214	3.2498
10	0.1289	0.3966	0.6998	1.0931	1.3722	1.8125	2.2281	2.7638	3.1693
11	0.1286	0.3956	0.6974	1.0877	1.3634	1.7959	2.2010	2.7181	3.1058
12	0.1283	0.3947	0.6955	1.0832	1.3562	1.7823	2.1788	2.6810	3.0545
13	0.1281	0.3940	0.6938	1.0795	1.3502	1.7709	2.1604	2.6503	3.0123
14	0.1280	0.3933	0.6924	1.0763	1.3450	1.7613	2.1448	2.6245	2.9768
15	0.1278	0.3928	0.6912	1.0735	1.3406	1.7531	2.1315	2.6025	2.9467
16	0.1277	0.3923	0.6901	1.0711	1.3368	1.7459	2.1199	2.5835	2.9208
17	0.1276	0.3919	0.6892	1.0690	1.3334	1.7396	2.1098	2.5669	2.8982
18	0.1274	0.3915	0.6884	1.0672	1.3304	1.7341	2.1009	2.5524	2.8784
19	0.1274	0.3912	0.6876	1.0655	1.3277	1.7291	2.0930	2.5395	2.8609
20	0.1273	0.3909	0.6870	1.0640	1.3253	1.7247	2.0860	2.5280	2.8453
21	0.1272	0.3906	0.6864	1.0627	1.3232	1.7207	2.0796	2.5176	2.8314
22	0.1271	0.3904	0.6858	1.0614	1.3212	1.7171	2.0739	2.5083	2.8188
23	0.1271	0.3902	0.6853	1.0603	1.3195	1.7139	2.0687	2.4999	2.8073
24	0.1270	0.3900	0.6848	1.0593	1.3178	1.7109	2.0639	2.4922	2.7970
25	0.1269	0.3898	0.6844	1.0584	1.3163	1.7081	2.0595	2.4851	2.7874
26	0.1269	0.3896	0.6840	1.0575	1.3150	1.7056	2.0555	2.4786	2.7787
27	0.1268	0.3894	0.6837	1.0567	1.3137	1.7033	2.0518	2.4727	2.7707
28	0.1268	0.3893	0.6834	1.0560	1.3125	1.7011	2.0484	2.4671	2.7633
29	0.1268	0.3892	0.6830	1.0553	1.3114	1.6991	2.0452	2.4620	2.7564
30	0.1267	0.3890	0.6828	1.0547	1.3104	1.6973	2.0423	2.4573	2.7500
40	0.1265	0.3881	0.6807	1.0500	1.3031	1.6839	2.0211	2.4233	2.7045
50	0.1263	0.3875	0.6794	1.0473	1.2987	1.6759	2.0086	2.4033	2.6778
60	0.1262	0.3872	0.6786	1.0455	1.2958	1.6706	2.0003	2.3901	2.6603
70	0.1261	0.3869	0.6780	1.0442	1.2938	1.6669	1.9944	2.3808	2.6479
80	0.1261	0.3867	0.6776	1.0432	1.2922	1.6641	1.9901	2.3739	2.6387
90	0.1260	0.3866	0.6772	1.0424	1.2910	1.6620	1.9867	2.3685	2.6316
100	0.1260	0.3864	0.6770	1.0418	1.2901	1.6602	1.9840	2.3642	2.6259
250	0.1258	0.3858	0.6755	1.0386	1.2849	1.6510	1.9695	2.3414	2.5956
500	0.1257	0.3855	0.6750	1.0375	1.2832	1.6479	1.9647	2.3338	2.5857
∞	See Normal Distribution								

The highlighted value is 1.8125

Critical Values for Chi-Squared Distribution



PROBABILITIES (OR AREAS UNDER CHI-SQUARE DISTRIBUTION CURVE
ABOVE GIVEN CHI-SQUARE VALUES)

	0.995	0.99	0.975	0.95	0.90	0.10	0.05	0.025	0.01	0.005
<i>df</i>	<i>Values of Chi-Squared</i>									
1	0.0000	0.0002	0.0010	0.0039	0.0158	2.7055	3.8415	5.0239	6.6349	7.8794
2	0.0100	0.0201	0.0506	0.1026	0.2107	4.6052	5.9915	7.3778	9.2104	10.5965
3	0.0717	0.1148	0.2158	0.3518	0.5844	6.2514	7.8147	9.3484	11.3449	12.8381
4	0.2070	0.2971	0.4844	0.7107	1.0636	7.7794	9.4877	11.1433	13.2767	14.8602
5	0.4118	0.5543	0.8312	1.1455	1.6103	9.2363	11.0705	12.8325	15.0863	16.7496
6	0.6757	0.8721	1.2373	1.6354	2.2041	10.6446	12.5916	14.4494	16.8119	18.5475
7	0.9893	1.2390	1.6899	2.1673	2.8331	12.0170	14.0671	16.0128	18.4753	20.2777
8	1.3444	1.6465	2.1797	2.7326	3.4895	13.3616	15.5073	17.5345	20.0902	21.9549
9	1.7349	2.0879	2.7004	3.3251	4.1682	14.6837	16.9190	19.0228	21.6660	23.5893
10	2.1558	2.5582	3.2470	3.9403	4.8652	15.9872	18.3070	20.4832	23.2093	25.1881
11	2.6032	3.0535	3.8157	4.5748	5.5778	17.2750	19.6752	21.9200	24.7250	26.7569
12	3.0738	3.5706	4.4038	5.2260	6.3038	18.5493	21.0261	23.3367	26.2170	28.2997
13	3.5650	4.1069	5.0087	5.8919	7.0415	19.8119	22.3620	24.7356	27.6882	29.8193
14	4.0747	4.6604	5.6287	6.5706	7.7895	21.0641	23.6848	26.1189	29.1412	31.3194
15	4.6009	5.2294	6.2621	7.2609	8.5468	22.3071	24.9958	27.4884	30.5780	32.8015
16	5.1422	5.8122	6.9077	7.9616	9.3122	23.5418	26.2962	28.8453	31.9999	34.2671
17	5.6973	6.4077	7.5642	8.6718	10.0852	24.7690	27.5871	30.1910	33.4087	35.7184
18	6.2648	7.0149	8.2307	9.3904	10.8649	25.9894	28.8693	31.5264	34.8052	37.1564
19	6.8439	7.6327	8.9065	10.1170	11.6509	27.2036	30.1435	32.8523	36.1908	38.5821
20	7.4338	8.2604	9.5908	10.8508	12.4426	28.4120	31.4104	34.1696	37.5663	39.9969
21	8.0336	8.8972	10.2829	11.5913	13.2396	29.6151	32.6706	35.4789	38.9322	41.4009
22	8.6427	9.5425	10.9823	12.3380	14.0415	30.8133	33.9245	36.7807	40.2894	42.7957
23	9.2604	10.1957	11.6885	13.0905	14.8480	32.0069	35.1725	38.0756	41.6383	44.1814
24	9.8862	10.8563	12.4011	13.8484	15.6587	33.1962	36.4150	39.3641	42.9798	45.5584
25	10.5196	11.5240	13.1197	14.6114	16.4734	34.3816	37.6525	40.6465	44.3140	46.9280
26	11.1602	12.1982	13.8439	15.3792	17.2919	35.5632	38.8851	41.9231	45.6416	48.2898
27	11.8077	12.8785	14.5734	16.1514	18.1139	36.7412	40.1133	43.1945	46.9628	49.6450
28	12.4613	13.5647	15.3079	16.9279	18.9392	37.9159	41.3372	44.4608	48.2782	50.9936
29	13.1211	14.2564	16.0471	17.7084	19.7677	39.0875	42.5569	45.7223	49.5878	52.3355
30	13.7867	14.9535	16.7908	18.4927	20.5992	40.2560	43.7730	46.9792	50.8922	53.6719

The highlighted value is 9.2363