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UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER 2005

TITLE OF PAPER	**:**	**DESCRIPTIVE/INFERENTIAL STATISTICS**
COURSE CODE	**:**	**IDE-ST230-1&2**
TIME ALLOWED	**:**	**3 (THREE) HOURS**
REQUIRMENTS	**:**	**STATISTICAL TABLES AND CALCULATOR**
INSTRUCTIONS	**:**	**ANSWER ALL THREE (3) QUESTIONS IN SECTION ONE & ANY FOUR (4) QUESTIONS IN SECTION TWO. ALL QUESTIONS CARRY MARKS AS INDICATED WITHIN THE PARENTHESIS.**

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SECTION ONE

ANSWER ALL QUESTIONS:

QUESTION ONE. [20 marks]

State the most correct answer for each of the following:

1.1 Which statistics are not affected by extreme values?

a. Mode
b. Median
c. Standard deviation
d. Both (a) and (b)

1.2 When a distribution is positively skewed, the relationship of the mean, median, and mode from left to right will generally be

a. mean, median, mode
b. mode, median, mean
c. median, mode, mean
d. mean, mode, median

1.3 If the mean of five values is 8.2, and the four of the values are 6, 10, 7, 12, then the fifth value will be

a. 6.
b. 5.
c. Neither 5 nor 6.
d. Not possible to find.

1.4 "Most people prefer red convertibles over any other color." Which measure of central tendency was probably used in this situation?

a. mean
b. mode
c. median
d. None of the above

1.5 The average score of the students in one mathematics class is 56, with a standard deviation of 8; the average of score of students in a statistics class is 63, with a standard deviation of 9. Which class is more variable in terms of scores?

a. Mathematics
b. Statistics
c. Both are equally variable
d. Not possible to find

1.6 Laspeyre's Price Index is given by

a. $\frac{\Sigma p_0 q_n}{\Sigma p_0 q_0}$ X 100

b. $\frac{\Sigma p_n q_n}{\Sigma p_0 q_0}$ X 100

c. $\frac{\Sigma p_n q_n}{\Sigma p_0 q_n}$ X 100

d. $\frac{\Sigma p_n q_0}{\Sigma p_0 q_0}$ X 100

1.7 What is the value of the mode when all values in the data set are different?

a. Zero
b. One
c. There is no mode.
d. It cannot be determined unless the data values are given.

1.8 Which of the following statements is true in a histogram?

a. Heights of the bars are proportional to the frequency
b. Widths of the bars are arbitrary
c. There are equal gaps between bars
d. All of the above

1.9 When data are categorized as, for example, places of residence (rural, suburban, urban), the most appropriate measure of central tendency is

a. mean
b. mode
c. median
d. It cannot be determined unless the data values are given.

1.10 The width of the bar in a Bar chart is proportional to

a. cumulative frequency
b. frequency
c. class interval
d. none of the above

1.11 In the standard normal distribution, the area outside the range Z = -1.0 to Z = +1.5 is:

a. 0.7745
b. 0.1587
c. 0.2255
d. 0.0668

1.12 A bag contains 2 green, 5 white and 3 red balls. If two balls are selected without replacement, the probability that the first ball is green and the second is red is

a. 2/15
b. 4/9
c. 8/10
d. 1/15

1.13 Which of the following statements is *not* true about binomial distribution?

a. It is a probability distribution for a discrete random variable.
b. If the sample size is very large, we can use the normal distribution as an approximation to the binomial distribution.
c. The mean of a binomial distribution is npq.
d. Both (a) and (b).

1.14 How many outcomes are there in a binomial experiment?

a. 1
b. 2
c. 3
d. It varies.

1.15 In the large sample case, the constant used in a 99% confidence interval is:

a. 1.645
b. 1.960
c. 2.326
d. 2.576

1.16 The z-score corresponding to a number below the mean is

a. always positive.
b. always negative.
c. mostly positive.
d. mostly negative.

1.17 A correlation coefficient of –1 implies

a. that we must made a computational error.
b. that as the x variable decreases, the y variable also increases.
c. that a perfect linear relationship exists between the variables.
d. Both (b) and (c) are correct.

1.18 When a 99% confidence interval is calculated instead of a 95% confidence interval without changing the sample size, the maximum error of the estimate will

a. be smaller.
b. be larger.
c. remain same.
d. not be possible to determine.

1.19 When the value of α is increased, the probability of committing a type I error

a. is decreased.
b. is increased.
c. remains unchanged.
d. None of the above.

1.20 The value of a Chi-square test statistic can *not* be

a. zero.
b. negative.
c. positive.
d. None of the above.

QUESTION TWO. [10 marks]

State which of the following statements are **TRUE** and which are **FALSE**?

2.1 Data that can be classified according to color are measured by ordinal scale.

2.2 If the value of an index number is 100, it must be the index number for base year.

2.3 The weight of pumpkin is considered to be a continuous variable.

2.4 Another name for the ogive is frequency polygon.

2.5 A single extremely large value will generally affect the median less than the mean.

2.6 If a person's score on an exam corresponds to the 75^{th} percentile, then that person obtained 75 correct answers out of 100 multiple choice questions.

2.7 When mean is computed for individual data, all values in the data set are used.

2.8 If the current value index number is 200, the prices must have doubled, on the average, as compared to the base year.

2.9 A z-score tells the number of standard deviations by which a data value is above or below the mean.

2.10 The trend in a time series data set is affected by seasonal variation.

2.11 Classical probability uses a frequency distribution to compute probabilities.

2.12 When two events are not mutually exclusive, $P(A \text{ or } B) = P(A) + P(B)$.

2.13 The total number of possible outcomes in the experiment of tossing three coins is 6.

2.14 When two events cannot occur at the same time, they are said to be independent events.

2.15 A binomial experiment has a fixed number of trials.

2.16 For a specific confidence interval, the larger the sample size, the smaller the maximum error of estimate will be.

2.17 In regression analysis, the x variable is called the dependent variable.

2.18 The test values for the chi-square goodness of fit test and the independence test are computed using the same formula.

2.19 In order to determine the sample size needed to estimate a parameter appropriately, one must know the maximum error of estimate.

2.20 The degrees of freedom for a 4X3 contingency table are 12.

QUESTION THREE. [3 + 1 + 4 + 2 marks]

The number of visitors to the Historic Museum for 30 randomly selected hours is shown below:

15	53	48	19	38	86	63	98	79	38
62	89	67	39	26	28	35	54	88	76
31	47	53	41	68	70	42	66	58	53

(a) Construct a Stem and Leaf diagram for the above data.
(b) Find the range.
(c) Use (a) to construct a frequency table with 5 equal class intervals.
(d) Comment on the shape of the distribution of visitors using either (a) or (c).

SECTION TWO

ANSWER ANY FOUR QUESTIONS:

(You must show all of your working in order to obtain full marks)

QUESTION FOUR. [4 + 4 + 7 marks]

The following table shows the quarterly sales of a company in thousands of tons for a period of three years:

Sales:		Quarter 1	2	3	4
Year	1	5.3	8.1	9.2	7.4
	2	5.5	8.8	9.1	7.9
	3	6.6	9.7	10.8	9.5

(a) Find the trend using four-quarterly moving averages.

(b) Estimate the quarterly sales for the 1st and 2nd quarter of Year 4 of the above company if the fitted trend values for the 3rd and 4th quarter of Year 3 are 9.30 and 9.75, respectively.

(c) Deseasonalise the sales data.

QUESTION FIVE. [4 + 3 + 4 + 4 marks]

(a) Assume that 1% of automobile carburettors are defective:
  (i) Find the mean and standard deviation of a lot of 500 carburettors.
  (ii) What is the probability that a random sample of 25 carburettors will include more than one defective?

(b) The average number of phone inquiries per day at a control centre is four.
  (i) What is the probability that it will receive five calls on a given day?
  (ii) What is the probability that it will receive between 3 and 7 calls (inclusive) on any given day?

QUESTION SIX. [8 + 7 marks]

(a) A bicycle racer must purchase 2 bicycles, 1 helmet, 3 riding shorts and 2 pairs of riding shoes every year. Per unit prices in both 2000 and 2004 are given below (use 2000 as base year):

Commodity	Price (2000)	Price (2004)
Bicycle	E3150.00	E3450.00
Helmet	E 350.00	E 400.00
Shorts	E 220.00	E 300.00
Shoes	E 535.00	E 625.00

Compute Fisher's price index.

(b) Suppose you are given that the base-year expenditure at base-year price is E9,430.00. If the expenditure index is 112.7 and the Paasche's volume index is 106.5, then find the Laspeyre's price index.

QUESTION SEVEN. [2 + 4 + 1 + 4 + 4 marks]

(a) A survey of 36 selected recording companies showed the following number of days it took to receive a shipment from the day it was ordered.

Days	Frequency
1 – 3	6
4 – 6	8
7 – 9	10
10 – 12	7
13 – 15	0
16 – 18	5

(i) Compute the mean.
(ii) Compute the standard deviation.
(iii) Compute the coefficient of variation.

(b) A car dealership owner wishes to determine if there is a relationship between number of years of experience (x) a salesperson has and the number of cars sold per month (y). The following results are computed using data with a sample of size 5:

$$\sum x = 15, \quad \sum y = 60, \quad \sum xy = 224, \quad \sum x^2 = 61, \quad and \quad \sum y^2 = 870$$

(i) Determine the regression line equation.
(ii) Compute the value of the coefficient of determination and interpret the value.

QUESTION EIGHT. [2 + 4 + 9 marks]

(a) A cruise director schedules continuous availability of four different movies, two bridge games, and three tennis games for a two-day period. If a couple selects three activities, find the probability that

(i) they attend first one movie, then one bridge game and last one tennis game.
(ii) they attend two movies and one tennis game.

(b) A researcher wishes to determine whether there is a relationship between the gender of an individual and the amount of alcohol consumed. A sample of 68 people is selected, and the following data are obtained.

Gender	Alcohol Consumption		
	Low	Moderate	High
Male	10	9	8
Female	13	16	12

At $\alpha = 0.10$, can the researcher conclude that the alcohol consumption is related to gender?

QUESTION NINE. [9 + 6 marks]

A real estate agent compares the selling prices of homes in two cities of Swaziland: Mbabane and Manzini, to see whether there is a difference in price. The results of the study are shown below:

Mbabane	Manzini
$\overline{X}_1$ = E316,275.00	$\overline{X}_2$ = E295,510.00
s_1 = E28,010.00	s_2 = E23,655.00
$n_1 = 35$	$n_2 = 40$

(a) Is there evidence to support the claim that the average cost of a home in Mbabane is higher than in Manzini? Use $\alpha = 0.01$.

(b) Construct an interval estimate for the difference of mean costs with a confidence level of 95%.

QUESTION TEN. [3 + 6 + 6 marks]

A contractor wanted to build new homes with two-car garages. He read in a survey that 70% of all home buyers want a two-car garage. To verify the figure, he selected a random sample of 30 home buyers and found that 23 wanted a two-car garage.

(a) Estimate the percentage of all buyers wanted a home with two-car garages.
(b) Construct an interval estimate for the proportion of all buyers wanting a home with a two-car garage. Use a confidence level of 99%.
(c) Does the sample evidence support the claim of the survey? Use $\alpha = 0.02$.

Table 1 (Continued)

(c) $n = 15$

a	0.01	0.05	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0.95	0.99	a
0	.860	.463	.206	.035	.005	.000	.000	.000	.000	.000	.000	.000	.000	0
1	.990	.829	.549	.167	.035	.005	.000	.000	.000	.000	.000	.000	.000	1
2	1.000	.964	.816	.398	.127	.027	.004	.000	.000	.000	.000	.000	.000	2
3	1.000	.995	.944	.648	.297	.091	.018	.002	.000	.000	.000	.000	.000	3
4	1.000	.999	.987	.836	.515	.217	.059	.009	.001	.000	.000	.000	.000	4
5	1.000	1.000	.998	.939	.722	.403	.151	.034	.004	.000	.000	.000	.000	5
6	1.000	1.000	1.000	.982	.869	.610	.304	.095	.015	.001	.000	.000	.000	6
7	1.000	1.000	1.000	.996	.950	.787	.500	.213	.050	.004	.000	.000	.000	7
8	1.000	1.000	1.000	.999	.985	.905	.696	.390	.131	.018	.000	.000	.000	8
9	1.000	1.000	1.000	1.000	.996	.966	.849	.597	.278	.061	.002	.000	.000	9
10	1.000	1.000	1.000	1.000	.999	.991	.941	.783	.485	.164	.013	.001	.000	10
11	1.000	1.000	1.000	1.000	1.000	.998	.982	.909	.703	.352	.056	.005	.000	11
12	1.000	1.000	1.000	1.000	1.000	1.000	.996	.973	.873	.602	.184	.036	.000	12
13	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.995	.965	.833	.451	.171	.010	13
14	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.995	.965	.794	.537	.140	14

(d) $n = 20$

a	0.01	0.05	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0.95	0.99	a
0	.818	.358	.122	.012	.001	.000	.000	.000	.000	.000	.000	.000	.000	0
1	.983	.736	.392	.069	.008	.001	.000	.000	.000	.000	.000	.000	.000	1
2	.999	.925	.677	.206	.035	.004	.000	.000	.000	.000	.000	.000	.000	2
3	1.000	.984	.867	.411	.107	.016	.001	.000	.000	.000	.000	.000	.000	3
4	1.000	.997	.957	.630	.238	.051	.006	.000	.000	.000	.000	.000	.000	4
5	1.000	1.000	.989	.804	.416	.126	.021	.002	.000	.000	.000	.000	.000	5
6	1.000	1.000	.998	.913	.608	.250	.058	.006	.000	.000	.000	.000	.000	6
7	1.000	1.000	1.000	.968	.772	.416	.132	.021	.001	.000	.000	.000	.000	7
8	1.000	1.000	1.000	.990	.887	.596	.252	.057	.005	.000	.000	.000	.000	8
9	1.000	1.000	1.000	.997	.952	.755	.412	.128	.017	.001	.000	.000	.000	9
10	1.000	1.000	1.000	.999	.983	.872	.588	.245	.048	.003	.000	.000	.000	10
11	1.000	1.000	1.000	1.000	.995	.943	.748	.404	.113	.010	.000	.000	.000	11
12	1.000	1.000	1.000	1.000	.999	.979	.868	.584	.228	.032	.000	.000	.000	12
13	1.000	1.000	1.000	1.000	1.000	.994	.942	.750	.392	.087	.002	.000	.000	13
14	1.000	1.000	1.000	1.000	1.000	.998	.979	.874	.584	.196	.011	.000	.000	14
15	1.000	1.000	1.000	1.000	1.000	1.000	.994	.949	.762	.370	.043	.003	.000	15
16	1.000	1.000	1.000	1.000	1.000	1.000	.999	.984	.893	.589	.133	.016	.000	16
17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.996	.965	.794	.323	.075	.001	17
18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.992	.931	.608	.264	.017	18
19	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.999	.988	.878	.642	.182	19

Table 1 (Continued)

(e) $n = 25$

a	0.01	0.05	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0.95	0.99	a
0	.778	.277	.072	.004	.000	.000	.000	.000	.000	.000	.000	.000	.000	0
1	.974	.642	.271	.027	.002	.000	.000	.000	.000	.000	.000	.000	.000	1
2	.998	.873	.537	.098	.009	.000	.000	.000	.000	.000	.000	.000	.000	2
3	1.000	.966	.764	.234	.033	.002	.000	.000	.000	.000	.000	.000	.000	3
4	1.000	.993	.902	.421	.090	.009	.000	.000	.000	.000	.000	.000	.000	4
5	1.000	.999	.967	.617	.193	.029	.002	.000	.000	.000	.000	.000	.000	5
6	1.000	1.000	.991	.780	.341	.074	.007	.000	.000	.000	.000	.000	.000	6
7	1.000	1.000	.998	.891	.512	.154	.022	.001	.000	.000	.000	.000	.000	7
8	1.000	1.000	1.000	.953	.677	.274	.054	.004	.000	.000	.000	.000	.000	8
9	1.000	1.000	1.000	.983	.811	.425	.115	.013	.000	.000	.000	.000	.000	9
10	1.000	1.000	1.000	.994	.902	.586	.212	.034	.002	.000	.000	.000	.000	10
11	1.000	1.000	1.000	.998	.956	.732	.345	.078	.006	.000	.000	.000	.000	11
12	1.000	1.000	1.000	1.000	.983	.846	.500	.154	.017	.000	.000	.000	.000	12
13	1.000	1.000	1.000	1.000	.994	.922	.655	.268	.044	.002	.000	.000	.000	13
14	1.000	1.000	1.000	1.000	.998	.966	.788	.414	.098	.006	.000	.000	.000	14
15	1.000	1.000	1.000	1.000	1.000	.987	.885	.575	.189	.017	.000	.000	.000	15
16	1.000	1.000	1.000	1.000	1.000	.996	.946	.726	.323	.047	.000	.000	.000	16
17	1.000	1.000	1.000	1.000	1.000	.999	.978	.846	.488	.109	.002	.000	.000	17
18	1.000	1.000	1.000	1.000	1.000	1.000	.993	.926	.659	.220	.009	.000	.000	18
19	1.000	1.000	1.000	1.000	1.000	1.000	.998	.971	.807	.383	.033	.001	.000	19
20	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.991	.910	.579	.098	.007	.000	20
21	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.998	.967	.766	.236	.034	.000	21
22	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.991	.902	.463	.127	.002	22
23	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.998	.973	.729	.358	.026	23
24	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.996	.928	.723	.222	24

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Table 3
(Continued)

λ \ a	0	1	2	3	4	5	6	7	8	9
2.2	0.111	0.355	0.623	0.819	0.928	0.975	0.993	0.998	1.000	
2.4	0.091	0.308	0.570	0.779	0.904	0.964	0.988	0.997	0.999	1.000
2.6	0.074	0.267	0.518	0.736	0.877	0.951	0.983	0.995	0.999	1.000
2.8	0.061	0.231	0.469	0.692	0.848	0.935	0.976	0.992	0.998	0.999
3.0	0.050	0.199	0.423	0.647	0.815	0.916	0.966	0.988	0.996	0.999
3.2	0.041	0.171	0.380	0.603	0.781	0.895	0.955	0.983	0.994	0.998
3.4	0.033	0.147	0.340	0.558	0.744	0.871	0.942	0.977	0.992	0.997
3.6	0.027	0.126	0.303	0.515	0.706	0.844	0.927	0.969	0.988	0.996
3.8	0.022	0.107	0.269	0.473	0.668	0.816	0.909	0.960	0.984	0.994
4.0	0.018	0.092	0.238	0.433	0.629	0.785	0.889	0.949	0.979	0.992
4.2	0.015	0.078	0.210	0.395	0.590	0.753	0.867	0.936	0.972	0.989
4.4	0.012	0.066	0.185	0.359	0.551	0.720	0.844	0.921	0.964	0.985
4.6	0.010	0.056	0.163	0.326	0.513	0.686	0.818	0.905	0.955	0.980
4.8	0.008	0.048	0.143	0.294	0.476	0.651	0.791	0.887	0.944	0.975
5.0	0.007	0.040	0.125	0.265	0.440	0.616	0.762	0.867	0.932	0.968
5.2	0.006	0.034	0.109	0.238	0.406	0.581	0.732	0.845	0.918	0.960
5.4	0.005	0.029	0.095	0.213	0.373	0.546	0.702	0.822	0.903	0.951
5.6	0.004	0.024	0.082	0.191	0.342	0.512	0.670	0.797	0.886	0.941
5.8	0.003	0.021	0.072	0.170	0.313	0.478	0.638	0.771	0.867	0.929
6.0	0.002	0.017	0.062	0.151	0.285	0.446	0.606	0.744	0.847	0.916

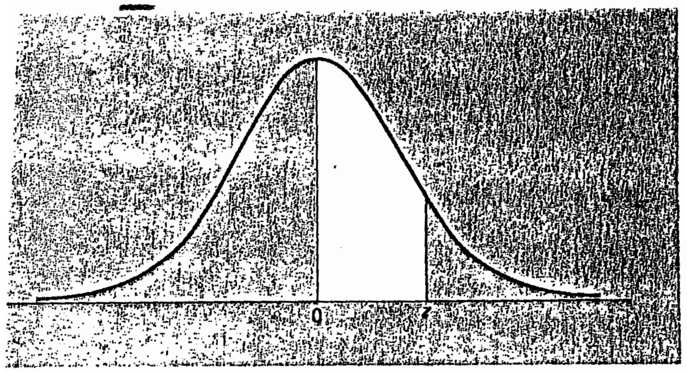
λ	10	11	12	13	14	15	16
2.8	1.000						
3.0	1.000						
3.2	1.000						
3.4	0.999	1.000					
3.6	0.999	1.000					
3.8	0.998	0.999	1.000				
4.0	0.997	0.999	1.000				
4.2	0.996	0.999	1.000				
4.4	0.994	0.998	0.999	1.000			
4.6	0.992	0.997	0.999	1.000			
4.8	0.990	0.996	0.999	1.000			
5.0	0.986	0.995	0.998	0.999	1.000		
5.2	0.982	0.993	0.997	0.999	1.000		
5.4	0.977	0.990	0.996	0.999	1.000		
5.6	0.927	0.988	0.995	0.998	0.999	1.000	
5.8	0.965	0.984	0.993	0.997	0.999	1.000	
6.0	0.957	0.980	0.991	0.996	0.999	0.999	1.000

Table 3
(Continued)

λ \ a	0	1	2	3	4	5	6	7	8	9
6.2	0.002	0.015	0.054	0.134	0.259	0.414	0.574	0.716	0.826	0.902
6.4	0.002	0.012	0.046	0.119	0.235	0.384	0.542	0.687	0.803	0.886
6.6	0.001	0.010	0.040	0.105	0.213	0.355	0.511	0.658	0.780	0.869
6.8	0.001	0.009	0.034	0.093	0.192	0.327	0.480	0.628	0.755	0.850
7.0	0.001	0.007	0.030	0.082	0.173	0.301	0.450	0.599	0.729	0.830
7.2	0.001	0.006	0.025	0.072	0.156	0.276	0.420	0.569	0.703	0.810
7.4	0.001	0.005	0.022	0.063	0.140	0.253	0.392	0.539	0.676	0.788
7.6	0.001	0.004	0.019	0.055	0.125	0.231	0.365	0.510	0.648	0.765
7.8	0.000	0.004	0.016	0.048	0.112	0.210	0.338	0.481	0.620	0.741
8.0	0.000	0.003	0.014	0.042	0.100	0.191	0.313	0.453	0.593	0.717
8.5	0.000	0.002	0.009	0.030	0.074	0.150	0.256	0.386	0.523	0.653
9.0	0.000	0.001	0.006	0.021	0.055	0.116	0.207	0.324	0.456	0.587
9.5	0.000	0.001	0.004	0.015	0.040	0.089	0.165	0.269	0.392	0.522
10.0	0.000	0.000	0.003	0.010	0.029	0.067	0.130	0.220	0.333	0.458

λ	10	11	12	13	14	15	16	17	18	19
6.2	0.949	0.975	0.989	0.995	0.998	0.999	1.000			
6.4	0.939	0.969	0.986	0.994	0.997	0.999	1.000			
6.6	0.927	0.963	0.982	0.992	0.997	0.999	0.999	1.000		
6.8	0.915	0.955	0.978	0.990	0.996	0.998	0.999	1.000		
7.0	0.901	0.947	0.973	0.987	0.994	0.998	0.999	1.000		
7.2	0.887	0.937	0.967	0.984	0.993	0.997	0.999	0.999	1.000	
7.4	0.871	0.926	0.961	0.980	0.991	0.996	0.998	0.999	1.000	
7.6	0.854	0.915	0.954	0.976	0.989	0.995	0.998	0.999	1.000	
7.8	0.835	0.902	0.945	0.971	0.986	0.993	0.997	0.999	1.000	
8.0	0.816	0.888	0.936	0.966	0.983	0.992	0.996	0.998	0.999	1.000
8.5	0.763	0.849	0.909	0.949	0.973	0.986	0.993	0.997	0.999	0.999
9.0	0.706	0.803	0.876	0.926	0.959	0.978	0.989	0.995	0.998	0.999
9.5	0.645	0.752	0.836	0.898	0.940	0.967	0.982	0.991	0.996	0.998
10.0	0.583	0.697	0.792	0.864	0.917	0.951	0.973	0.986	0.993	0.997

λ	20	21	22
8.5	1.000		
9.0	1.000		
9.5	0.999	1.000	
10.0	0.998	0.999	1.000



entries in Table I are the probabilities that a random variable having standard normal distribution takes on a value between 0 and z; they are en by the area of the white region under the curve in the figure shown ve.

TABLE I Normal-Curve Areas

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2784	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4083	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990

Also, for $z = 4.0$, 5.0, and 6.0, the areas are 0.49997, 0.4999997, and 0.499999999.

χ^2- distribution

$\chi^2_{0.100}$	$\chi^2_{0.050}$	$\chi^2_{0.025}$	$\chi^2_{0.010}$	$\chi^2_{0.005}$	d.f.
2.70554	3.84146	5.02389	6.63490	7.87944	1
4.60517	5.99147	7.37776	9.21034	10.5966	2
6.25139	7.81473	9.34840	11.3449	12.8381	3
7.77944	9.48773	11.1433	13.2767	14.8602	4
9.23635	11.0705	12.8325	15.0863	16.7496	5
10.6446	12.5916	14.4494	16.8119	18.5476	6
12.0170	14.0671	16.0128	18.4753	20.2777	7
13.3616	15.5073	17.5346	20.0902	21.9550	8
14.6837	16.9190	19.0228	21.6660	23.5893	9
15.9871	18.3070	20.4831	23.2093	25.1882	10
17.2750	19.6751	21.9200	24.7250	26.7569	11
18.5494	21.0261	23.3367	26.2170	28.2995	12
19.8119	22.3621	24.7356	27.6883	29.8194	13
21.0642	23.6848	26.1190	29.1413	31.3193	14
22.3072	24.9958	27.4884	30.5779	32.8013	15
23.5418	26.2962	28.8454	31.9999	34.2672	16
24.7690	27.5871	30.1910	33.4087	35.7185	17
25.9894	28.8693	31.5264	34.8053	37.1564	18
27.2036	30.1435	32.8523	36.1908	38.5822	19
28.4120	31.4104	34.1696	37.5662	39.9968	20
29.6151	32.6705	35.4789	38.9321	41.4010	21
30.8133	33.9244	36.7807	40.2894	42.7956	22
32.0069	35.1725	38.0757	41.6384	44.1813	23
33.1963	36.4151	39.3641	42.9798	45.5585	24
34.3816	37.6525	40.6465	44.3141	46.9278	25
35.5631	38.8852	41.9232	45.6417	48.2899	26
36.7412	40.1133	43.1944	46.9630	49.6449	27
37.9159	41.3372	44.4607	48.2782	50.9933	28
39.0875	42.5569	45.7222	49.5879	52.3356	29
40.2560	43.7729	46.9792	50.8922	53.6720	30
51.8050	55.7585	59.3417	63.6907	66.7659	40
63.1671	67.5048	71.4202	76.1539	79.4900	50
74.3970	79.0819	83.2976	88.3794	91.9517	60
85.5271	90.5312	95.0231	100.425	104.215	70
96.5782	101.879	106.629	112.329	116.321	60
107.565	113.145	118.136	124.116	128.299	90
118.498	124.342	129.561	135.807	140.169	100

From "Tables of the Percentage Points of the χ^2-Distribution." *Biometrika*, Vol. 32 (1941), pp. 188–189, by Catherine M. Thompson. Reproduced by permission of Professor E. S. Pearson.