



ZIMBABWE EZEKIEL GUTI UNIVERSITY

FACULTY OF LAW, BUSINESS INTELLIGENCE AND ECONOMICS

DEPARTMENT OF ECONOMICS, MARKETING AND ENTREPRENEURSHIP

EXAMINATION PAPER

MODULE CODE : CBM122
MODULE TITLE : Quantitative Analysis for
Business
SPECIAL REQUIREMENTS : Statistical Tables
Formulae Sheets
Graph Paper
DURATION : 3 Hours
LEVEL : 1.2
DATE : 11 FEB 2025

INSTRUCTIONS TO CANDIDATES:

1. No cell phones are allowed in the examination venue.
2. Answer any **FOUR (4)** questions.
3. The number of marks for each question or part question is shown in brackets []
4. Use of non-programmable calculators is allowed.
5. Show all your workings in order to gain full marks.
6. Begin each answer on a new page.
7. **DO NOT OPEN THIS PAPER UNTIL THE INVIGILATOR INSTRUCTS YOU.**

QUESTION ONE

The following data represent the afternoon high temperatures for construction days in Zimbabwe for a particular year.

38, 42, 35, 40, 16, 23, 64, 31, 38, 64, 12, 17, 30, 31, 38, 36, 66, 44, 31, 81, 53, 60, 75, 25, 79, 17, 15, 61, 64, 48, 10, 85, 69, 36, 38, 16, 47, 64, 40, 55, 23, 73, 52, 45, 81

- a) Construct the frequency distribution. **[5 marks]**
- b) Present the data on a Histogram and use the presentation to estimate the modal temperature. **[5 marks]**
- c) Compute the mean, mode, median and coefficient of variation. **[8 marks]**
- d) Write a brief report commenting on the statistics computed in (c) above and provide strategic recommendations to the Government of Zimbabwe? **[7 marks]**

QUESTION TWO

- a) Your firm has recently started to give economic advice to your clients. Acting as a consultant you have estimated the demand curve of a client's firm to be:

$$P = 200 - 8x, \text{ where } x \text{ is output.}$$

Investigation of the client firm's cost profile shows that total cost is given by:

$$TC = \frac{1}{3}x^3 - 14x^2 + 211x + 10$$

- i. Find the output level that maximizes profit **[10 marks]**
 - ii. Calculate the maximum profit. **[5 marks]**
- b) Suppose you work for a large firm that has 20000 employees. The CEO calls you in and asks you to determine employee attitudes toward the company. She is willing to commit \$100000 to this project. Justify a robust sampling technique you would propose to guarantee that the selected sample genuinely mirrors the entire employee population. **[10 marks]**

QUESTION THREE

- a. The State Tax Commission attempts to set up payroll tax-withholding tables such that by the end of the year, an employee's income tax withholding is about \$100 below his actual income tax owed to the state. The commission director claims that when all the tax returns are in, the average additional payment will be less than \$100. A random sample of 50 accounts revealed an average additional payment of \$114 with a sample

standard deviation of \$50. Testing at a significance level of 0.10, do the sample data refute the director's claim? **[20 marks]**

b. Describe an appropriate and applicable method of sampling that could be employed to obtain information on the views of University students on University canteen meals.

[5 marks]

QUESTION FOUR

a) Farirai took out a \$95600 loan from a bank over a five-year period at an interest of 16% per annum compounded quarterly. After $2\frac{1}{2}$ years, interest rate reduced to 8% per annum compounded quarterly.

- i. Construct an amortization schedule. **[20 marks]**
- ii. If her payments were made at the end of each three months, how much did Mary owe at the end of the first $2\frac{1}{2}$ years? **[2 marks]**
- iii. What were her quarterly repayments for the remaining $2\frac{1}{2}$ years? **[3 marks]**

QUESTION FIVE

a) You are given the following data for output at a factory and costs of production over the past five months.

Month	Output in thousand units (x)	Cost in thousand dollars (y)
1	20	82
2	16	70
3	24	90
4	22	85
5	18	73

There is high degree of correlation between output and costs, and so it is decided to calculate fixed costs and the variable costs per unit of output using the least squares method.

- i. Plot the data and comment. **[4 marks]**
- ii. Find an equation to determine the expected level of costs, for any given volume of output and interpret the coefficients. **[8 marks]**
- iii. Compute the coefficient of determination and comment **[4 marks]**
- iv. Confirm that the degree of correlation between output and costs is high by calculating the correlation coefficient. **[4 marks]**

b) In a management trainee program at Claremont Enterprises, 80% of the trainees are female and 20% male. 90% of the females attended college, and 78% of the males attended college. A management trainee is selected at random.

- i. What is the probability that the person selected is a female who did not attend college? **[3 marks]**
- ii. Are gender and attending college independent? Why? **[2 marks]**

THE END

STATISTICAL FORMULAS

MEASURES OF CENTRAL TENDENCY

Ungrouped data

$$\text{Population mean, } \mu = \frac{\sum x}{N}$$

$$\text{Sample mean, } \bar{x} = \frac{\sum x}{n}$$

$$\text{Median, } M_e = \frac{n+1}{2}$$

Grouped data

$$\text{Population mean, } \mu = \frac{\sum fx}{N}$$

$$\text{Sample mean, } \bar{x} = \frac{\sum fx}{n}$$

$$\text{Median, } M_e = L_m + \frac{\left(\frac{n}{2} - F\right)C}{f_m}$$

$$\text{Mode, } M_o = L_m + \frac{(d_1) c}{d_1 + d_2}$$

MEASURES OF DISPERSION

Ungrouped data

$$\text{Population average deviation, } AD = \frac{\sum |x - \mu|}{N}$$

$$\text{Sample average deviation, } AD = \frac{\sum |x - \bar{x}|}{n}$$

$$\text{Population variance} = \sigma^2 = \frac{1}{N} (\sum x^2 - \frac{1}{N} (\sum x)^2)$$

$$\text{Sample variance} = s^2 = \frac{1}{n-1} (\sum x^2 - \frac{1}{n} (\sum x)^2)$$

$$\text{Population standard deviation, } \sigma = \sqrt{\frac{1}{N} (\sum x^2 - \frac{1}{N} (\sum x)^2)}$$

$$\text{Sample standard deviation, } s = \sqrt{\frac{1}{n-1} (\sum x^2 - \frac{1}{n} (\sum x)^2)}$$

Grouped data

Range = maximum value – minimum value

$$\text{Percentile, } P_k = L_p + \frac{\left(\frac{kn}{100} - F\right)C}{f_p}$$

$$\text{Decile, } D_x = L_d + \frac{\left(\frac{xn}{10} - F\right)C}{f_d}$$

$$\text{Lower quartile, } Q_1 = L_q + \frac{\left(\frac{n}{4} - F\right)C}{f_q}$$

$$\text{Upper quartile } Q_3 = L_q + \frac{\left(\frac{3n}{4} - F\right)C}{f_q}$$

Interquartile range = $Q_3 - Q_1$

$$\text{Quartile deviation} = \frac{Q_3 - Q_1}{2}$$

$$\text{Population average deviation, AD} = \frac{\sum f|x - \mu|}{N}$$

$$\text{Sample average deviation, AD} = \frac{\sum f|x - \bar{x}|}{n}$$

$$\text{Population variance, } \sigma^2 = \frac{1}{N} (\sum fx^2 - \frac{1}{N} (\sum fx)^2)$$

$$\text{Sample variance} = s^2 = \frac{1}{n-1} (\sum fx^2 - \frac{1}{n} (\sum fx)^2)$$

$$\text{Population standard deviation, } \sigma = \sqrt{\frac{1}{N} (\sum fx^2 - \frac{1}{N} (\sum fx)^2)}$$

$$\text{Sample standard deviation, } s = \sqrt{\frac{1}{n-1} (\sum fx^2 - \frac{1}{n} (\sum fx)^2)}$$

$$\text{Population coefficient of variation, CV} = \frac{\sigma}{\mu} \times 100\%$$

$$\text{Sample coefficient of variation, CV} = \frac{s}{\bar{x}} \times 100\%$$

SHAPE OF FREQUENCY DISTRIBUTIONS

$$\text{Population skewness, Sk} = \frac{3(\mu - \text{median})}{\sigma} \text{ OR } \frac{(\mu - \text{mode})}{\sigma}$$

$$\text{Sample skewness, Sk} = \frac{3(\bar{x} - \text{median})}{s} \text{ OR } \frac{(\bar{x} - \text{mode})}{s}$$

$$\text{Population kurtosis} = \frac{\sum f(X - \mu)^4}{\sigma^4}$$

$$\text{Sample kurtosis} = \frac{\sum f(X - \bar{x})^4}{s^4}$$

BASIC PROBABILITY CONCEPTS

a) **Classical Method of Assigning Probabilities:** $P(E) = \frac{n_e}{N}$

b) **Probability by Relative Frequency of Occurrence**

$$\frac{\text{Number of Times an Event Occurred}}{\text{Total Number of Opportunities for the Event to Occur}}$$

c) **Complementary rule:** $P(A') = 1 - P(A)$

d) **Addition rule**

i. If X, Y are non-mutually exclusive, $P(X \cup Y) = P(X) + P(Y) - P(X \cap Y)$

ii. If X, Y are mutually exclusive, $P(X \cup Y) = P(X) + P(Y)$

e) **Multiplication rule**

i. If X, Y are dependent (conditional probability),

$$P(X \cap Y) = P(X) \cdot P(Y|X) = P(Y) \cdot P(X|Y)$$

ii. If X, Y are independent, $P(X \cap Y) = P(X) \cdot P(Y)$

f) **Law of Conditional Probability,** $P(X|Y) = \frac{P(X \cap Y)}{P(Y)} = \frac{P(X) \cdot P(Y|X)}{P(Y)}$

PROBABILITY DISTRIBUTION

Probability distribution	Mean	Variance
Binomial distribution $P(x) = \frac{n!}{x!(n-x)!} p^x(q)^{n-x}$	np	npq
Poisson distribution $P(x) = \frac{\lambda^x e^{-\lambda}}{x!}$	λ	λ
Standard normal distribution $Z = \frac{x - \mu}{\sigma}$	0	1

CONFIDENCE INTERVALS

Mean of a single normal population

- i. If sample size is small (i.e., $n < 30$) and σ^2 Unknown

$$\bar{x} - t_{\alpha/2} (n-1) \frac{s}{\sqrt{n}} \leq \mu \leq \bar{x} + t_{\alpha/2} (n-1) \frac{s}{\sqrt{n}} \text{ or simply } \bar{x} \pm t_{\alpha/2} (n-1) \frac{s}{\sqrt{n}}$$

- ii. If sample size is large and σ^2 unknown

$$\bar{x} - Z_{\alpha/2} \frac{s}{\sqrt{n}} \leq \mu \leq \bar{x} + Z_{\alpha/2} \frac{s}{\sqrt{n}} \text{ or simply, } \bar{x} \pm Z_{\alpha/2} \frac{s}{\sqrt{n}}$$

- iii. If variance, σ^2 is known

$$\bar{x} - Z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \leq \mu \leq \bar{x} + Z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \text{ or simply, } \bar{x} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

TESTING OF HYPOTHESIS

Tests on the mean of a single population

- i. If when σ^2 is unknown and sample size is small ($n < 30$), then the t Statistic is such that,

$$t = \frac{\bar{x} - \mu_k}{\frac{s}{\sqrt{n}}}$$

- ii. If when σ^2 is known and sample size is large, then the z statistic is such that:

$$z = \frac{\bar{x} - \mu_k}{\frac{\sigma}{\sqrt{n}}} = Z = \frac{\bar{x} - \mu_k}{\frac{s}{\sqrt{n}}}$$

- iii. If when σ^2 is unknown and sample size is large, then the t statistic is approximately a standard normal random variable such that: $z = \frac{\bar{x} - \mu_k}{\frac{s}{\sqrt{n}}}$

Hypothesis to be tested	Distribution	Reject H_0 if
$H_0: \mu = \mu_0$ $H_1: \mu \neq \mu_0$	Z -distribution	$Z > Z_{\alpha/2}$ $Z < -Z_{\alpha/2}$
	T - distribution	$Z > Z_{\alpha/2}$ $T < -t_{\alpha/2}(n-1)$
$H_0: \mu \leq \mu_0$ $H_1: \mu > \mu_0$	Z-distribution	$Z > Z_{\alpha}$
	T-distribution	$T > t_{\alpha}(n-1)$
$H_0: \mu \geq \mu_0$ $H_1: \mu < \mu_0$	Z-distribution	$Z < -Z_{\alpha}$
	T-distribution	$T < -t_{\alpha}(n-1)$

Chi-square tests: $\chi^2_{\text{calc}} = \sum \frac{(f_o - f_e)^2}{f_e}$

SIMPLE REGRESSION AND CORRELATION

Fitted linear model: $\hat{Y} = \hat{b}_0 + \hat{b}_1 X$

$$\hat{b}_1 = \frac{n \sum XY - \sum X \sum Y}{n \sum X^2 - (\sum X)^2}$$

$$\hat{b}_0 = \bar{Y} - \hat{b}_1 \bar{X}$$

Covariance, $\text{Cov}(X, Y) = \frac{\sum(XY)}{n} - \bar{X} \bar{Y}$

Correlation coefficient, $r = \sqrt{R^2} = \frac{n \sum XY - \sum X \sum Y}{\sqrt{[n \sum X^2 - (\sum X)^2][n \sum Y^2 - (\sum Y)^2]}}$

Coefficient of determination, $R^2 = \left(\frac{n \sum XY - \sum X \sum Y}{\sqrt{[n \sum X^2 - (\sum X)^2][n \sum Y^2 - (\sum Y)^2]}} \right)^2$

TIME SERIES ANALYSIS

Fitted Trend Line: $Y = a + bX$

$$b = \frac{n \sum XY - \sum X \sum Y}{n \sum X^2 - (\sum X)^2}$$

$$a = \bar{Y} - b \bar{X}$$

BUSINESS CALCULATIONS

Quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Differentiation

- i. if $f(x) = x^n$ then $f'(x) = nx^{n-1}$; if $y = x^n$ then, $\frac{dy}{dx} = nx^{n-1}$
- ii. Rule 1: The constant rule. If $h(x) = cf(x)$ then $h'(x) = cf'(x)$ for any constant c .
- iii. Rule 2: The sum rule. If $h(x) = f(x) + g(x)$ then $h'(x) = f'(x) + g'(x)$
- iv. Rule 3: The difference rule. If $h(x) = f(x) - g(x)$ then $h'(x) = f'(x) - g'(x)$
- v. Rule 4: The chain rule. If y is a function of u , which is itself a function of x , then

$$\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

- vi. Rule 5: The product rule. If $y = uv$ then $\frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$
- vii. Rule 6: The quotient rule. If $y = \frac{u}{v}$ then $\frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$
- viii. Implicit differentiation: $\frac{dy}{dx} = -\frac{f_x}{f_y}$

Simple interest:

$$FV = \text{Principal} \times \text{Rate} \times \text{Time}$$

Compound interest:

$$FV = A(1+i)^n$$

Future Value of an Ordinary Annuity:

$$FV = R \left[\frac{(1+i)^n - 1}{i} \right]$$

Regular deposit:

$$R = \frac{FVi}{(1+i)^n - 1}$$

Present Value of an Ordinary Annuity:

$$PV = R \left[\frac{1 - (1+i)^{-n}}{i} \right]$$

Regular payment:

$$R = \frac{PVi}{1 - (1+i)^{-n}}$$

Remaining Balance:

$$B = R \left[\frac{1 - (1+i)^{-(n-x)}}{i} \right]$$

Net Present Value:

$$NPV = \sum_{j=0}^n \frac{R_j}{(1+i)^j}$$

Internal Rate of Return:

$$IRR = a + \left[\left(\frac{NPV_a}{NPV_a - NPV_b} \right) (b-a) \right] \%$$

APPENDIX 1

Binomial Distribution

<i>n</i>	<i>x</i>	.01	.05	.10	.15	.20	.25	<i>p</i>	.30	.35	.40	.45	.50
1	0	.9900	.9500	.9000	.8500	.8000	.7500	.7000	.6500	.6000	.5500	.5000	.5000
	1	.0100	.0500	.1000	.1500	.2000	.2500	.3000	.3500	.4000	.4500	.5000	.5000
2	0	.9801	.9025	.8100	.7225	.6400	.5625	.4900	.4225	.3600	.3025	.2500	.2500
	1	.0198	.0950	.1800	.2550	.3200	.3750	.4200	.4550	.4800	.4950	.5000	.5000
	2	.0001	.0025	.1100	.0225	.0400	.0625	.0900	.1225	.1600	.2025	.2500	.2500
3	0	.9703	.8574	.7290	.6141	.5120	.4219	.3430	.2746	.2160	.1664	.1250	.1250
	1	.0294	.1354	.2430	.3251	.3840	.4219	.4410	.4436	.4320	.4084	.3750	.3750
	2	.0003	.0071	.0270	.0574	.0960	.1406	.1890	.2289	.2880	.3341	.3750	.3750
	3	.0000	.0001	.0010	.0034	.0080	.0156	.0270	.0429	.0640	.0911	.1250	.1250
4	0	.9606	.8145	.6561	.5220	.4096	.3164	.2401	.1785	.1296	.0915	.0625	.0625
	1	.0388	.1715	.2916	.3685	.4096	.4219	.4116	.3845	.3456	.2995	.2500	.2500
	2	.0006	.0135	.0486	.0975	.1536	.2109	.2646	.3105	.3456	.3675	.3750	.3750
	3	.0000	.0005	.0036	.0115	.0256	.0469	.0756	.1115	.1536	.2005	.2500	.2500
	4	.0000	.0000	.0001	.0005	.0016	.0039	.0081	.0150	.0256	.0410	.0625	.0625
5	0	.9510	.7738	.5905	.4437	.3277	.2373	.1681	.1160	.0778	.0503	.0312	.0312
	1	.0480	.2036	.3280	.3915	.4096	.3955	.3602	.3124	.2592	.2059	.1562	.1562
	2	.0010	.0214	.0729	.1382	.2048	.2637	.3087	.3364	.3456	.3369	.3125	.3125
	3	.0000	.0011	.0081	.0244	.0512	.0879	.1323	.1811	.2304	.2757	.3125	.3125
	4	.0000	.0000	.0004	.0022	.0064	.0146	.0284	.0488	.0768	.1128	.1562	.1562
	5	.0000	.0000	.0000	.0001	.0003	.0010	.0024	.0053	.0102	.0185	.0312	.0312
6	0	.9415	.7351	.5314	.3771	.2621	.1780	.1176	.0754	.0467	.0277	.0156	.0156
	1	.0571	.2321	.3543	.3993	.3932	.3560	.3025	.2437	.1866	.1359	.0938	.0938
	2	.0014	.0305	.0984	.1762	.2458	.2966	.3241	.3280	.3110	.2780	.2344	.2344
	3	.0000	.0021	.0146	.0415	.0819	.1318	.1852	.2355	.2765	.3032	.3125	.3125
	4	.0000	.0001	.0012	.0055	.0154	.0330	.0595	.0951	.1382	.1861	.2344	.2344
	5	.0000	.0000	.0001	.0004	.0015	.0044	.0102	.0205	.0369	.0609	.0938	.0938
	6	.0000	.0000	.0000	.0000	.0001	.0002	.0007	.0018	.0041	.0083	.0156	.0156
7	0	.9321	.6983	.4783	.3206	.2097	.1335	.0824	.0490	.0280	.0152	.0078	.0078
	1	.0659	.2573	.3720	.3960	.3670	.3115	.2471	.1848	.1306	.0872	.0547	.0547
	2	.0020	.0406	.1240	.2097	.2753	.3115	.3177	.2985	.2613	.2140	.1641	.1641

<i>n</i>	<i>x</i>	.01	.05	.10	.15	.20	.25	<i>p</i>	.30	.35	.40	.45	.50
8	3	.0000	.0036	.0230	.0617	.1147	.1730	.2269	.2679	.2903	.2918	.2734	
	4	.0000	.0002	.0026	.0109	.0287	.0577	.0972	.1442	.1935	.2388	.2734	
	5	.0000	.0000	.0002	.0012	.0043	.0115	.0250	.0466	.0774	.1172	.1641	
	6	.0000	.0000	.0000	.0001	.0004	.0013	.0036	.0084	.0172	.0320	.0547	
	7	.0000	.0000	.0000	.0000	.0000	.0001	.0002	.0006	.0016	.0037	.0078	
	0	.9227	.6634	.4305	.2725	.1678	.1002	.0576	.0319	.0168	.0084	.0039	
	1	.0746	.2793	.3826	.3847	.3355	.2670	.1977	.1373	.0896	.0548	.0312	
	2	.0026	.0515	.1488	.2376	.2936	.3115	.2065	.2587	.2090	.1569	.1094	
9	3	.0001	.0054	.0331	.0839	.1468	.2076	.2541	.2786	.2787	.2568	.2188	
	4	.0000	.0004	.0046	.0185	.0459	.0865	.1361	.1875	.2322	.2627	.2734	
	5	.0000	.0000	.0004	.0026	.0092	.0231	.0467	.0808	.1239	.1719	.2188	
	6	.0000	.0000	.0000	.0002	.0011	.0038	.0100	.0217	.0413	.0403	.1094	
	7	.0000	.0000	.0000	.0000	.0001	.0004	.0012	.0033	.0079	.0164	.0312	
	8	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0002	.0007	.0017	.0039	
	0	.9135	.6302	.3874	.2316	.1342	.0751	.0404	.0207	.0101	.0046	.0020	
	1	.0830	.2985	.3874	.3679	.3020	.2253	.1556	.1004	.0605	.0339	.0176	
10	2	.0034	.0629	.1722	.2597	.3020	.3003	.2668	.2162	.1612	.1110	.0703	
	3	.0001	.0077	.0446	.1069	.1762	.2336	.2668	.2716	.2508	.2119	.1641	
	4	.0000	.0006	.0074	.0283	.0661	.1168	.1715	.2194	.2508	.2600	.2461	
	5	.0000	.0000	.0008	.0050	.0165	.0389	.0735	.1181	.1672	.2128	.2461	
	6	.0000	.0000	.0001	.0006	.0028	.0087	.0210	.0424	.0743	.1160	.1641	
	7	.0000	.0000	.0000	.0000	.0003	.0012	.0039	.0098	.0212	.0407	.0703	
	8	.0000	.0000	.0000	.0000	.0000	.0001	.0004	.0013	.0035	.0083	.0176	
	9	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003	.0008	.0020	
11	0	.9044	.5987	.3487	.1969	.1074	.0563	.0282	.0135	.0060	.0025	.0010	
	1	.0914	.3151	.3874	.3474	.2684	.1877	.1211	.0725	.0403	.0207	.0098	
	2	.0042	.0746	.1937	.2759	.3020	.2816	.2335	.1757	.1209	.0763	.0439	
	3	.0001	.0105	.0574	.1298	.2013	.2503	.2668	.2522	.2150	.1665	.1172	
	4	.0000	.0010	.0112	.0401	.0881	.1460	.2001	.2377	.2508	.2384	.2051	
	5	.0000	.0001	.0015	.0085	.0264	.0584	.1029	.1536	.2007	.2340	.2461	
	6	.0000	.0000	.0001	.0012	.0055	.0162	.0368	.0689	.1115	.1596	.2051	
	7	.0000	.0000	.0000	.0001	.0008	.0031	.0090	.0212	.0425	.0746	.1172	
12	8	.0000	.0000	.0000	.0000	.0001	.0004	.0014	.0043	.0106	.0229	.0439	
	9	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0016	.0042	.0098	
	10	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003	.0010	
	0	.8953	.5688	.3138	.1673	.0859	.0422	.0198	.0088	.0036	.0014	.0005	
	1	.0995	.3293	.3835	.3248	.2363	.1549	.0932	.0518	.0266	.0125	.0054	
	2	.0050	.0867	.2131	.2866	.2953	.2581	.1998	.1395	.0887	.0513	.0269	
	3	.0002	.0137	.0710	.1517	.2215	.2581	.2568	.2254	.1774	.1259	.0806	
	4	.0000	.0014	.0158	.0536	.1107	.1721	.2201	.2428	.2365	.2060	.1611	
12	5	.0000	.0001	.0025	.0132	.0388	.0803	.1321	.1830	.2207	.2360	.2256	
	6	.0000	.0000	.0003	.0023	.0097	.0268	.0566	.0985	.1471	.1931	.2256	
	7	.0000	.0000	.0000	.0003	.0017	.0064	.0173	.0379	.0701	.1128	.1611	
	8	.0000	.0000	.0000	.0000	.0002	.0011	.0037	.0102	.0234	.0462	.0806	
	9	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0018	.0052	.0126	.0269	
	10	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0007	.0021	.0054	
	11	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0005	
	0	.8864	.5404	.2824	.1422	.0687	.0317	.0138	.0057	.0022	.0008	.0002	
12	1	.1074	.3413	.3766	.3012	.2062	.1267	.0712	.0368	.0174	.0075	.0029	
	2	.0060	.0988	.2301	.2924	.2835	.2323	.1678	.1088	.0639	.0339	.0161	
	3	.0002	.0173	.0852	.1720	.2362	.2581	.2397	.1954	.1419	.0923	.0537	
	4	.0000	.0021	.0213	.0683	.1329	.1936	.2311	.2367	.2128	.1700	.1208	
	5	.0000	.0002	.0038	.0193	.0532	.1032	.1585	.2039	.2270	.2225	.1934	
	6	.0000	.0000	.0005	.0040	.0155	.0401	.0792	.1281	.1766	.2124	.2256	

<i>n</i>	<i>x</i>	.01	.05	.10	.15	.20	.25	<i>p</i>	.30	.35	.40	.45	.50
7		.0000	.0000	.0000	.0006	.0033	.0115		.0291	.0591	.1009	.1489	.1934
8		.0000	.0000	.0000	.0001	.0005	.0024		.0078	.0199	.0420	.0762	.1208
9		.0000	.0000	.0000	.0000	.0001	.0004		.0015	.0048	.0125	.0277	.0537
10		.0000	.0000	.0000	.0000	.0000	.0000		.0002	.0008	.0025	.0068	.0161
11		.0000	.0000	.0000	.0000	.0000	.0000		.0000	.0001	.0003	.0010	.0029
12		.0000	.0000	.0000	.0000	.0000	.0000		.0000	.0000	.0000	.0001	.0002
0		.8775	.5133	.2542	.1209	.0550	.0238		.0097	.0037	.0013	.0004	.0001
1		.1152	.3512	.3672	.2774	.1787	.1029		.0540	.0259	.0113	.0045	.0016
2		.0070	.1109	.2448	.2937	.2680	.2059		.1388	.0836	.0453	.0220	.0095
3		.0003	.0214	.0997	.1900	.2457	.2517		.2181	.1651	.1107	.0660	.0349
4		.0000	.0028	.0277	.0838	.1535	.2097		.2337	.2222	.1845	.1350	.0873
13	5	.0000	.0003	.0055	.0266	.0691	.1258		.1803	.2154	.2214	.1989	.1571
6		.0000	.0000	.0008	.0063	.0230	.0559		.1030	.1546	.1968	.2169	.2095
7		.0000	.0000	.0001	.0011	.0058	.0186		.0442	.0833	.1312	.1775	.2095
8		.0000	.0000	.0001	.0001	.0011	.0047		.0142	.0336	.0656	.1089	.1571
9		.0000	.0000	.0000	.0000	.0001	.0009		.0034	.0101	.0243	.0495	.0873
10		.0000	.0000	.0000	.0000	.0000	.0001		.0006	.0022	.0065	.0162	.0349
11		.0000	.0000	.0000	.0000	.0000	.0000		.0001	.0003	.0012	.0036	.0095
12		.0000	.0000	.0000	.0000	.0000	.0000		.0000	.0000	.0001	.0005	.0016
13		.0000	.0000	.0000	.0000	.0000	.0000		.0000	.0000	.0000	.0000	.0001
14	0	.8687	.4877	.2288	.1028	.0440	.0178		.0068	.0024	.0008	.0002	.0001
1		.1229	.3593	.3559	.2539	.1539	.0832		.0467	.0181	.0073	.0027	.0009
2		.0081	.1229	.2570	.2912	.2501	.1802		.1134	.0634	.0317	.0141	.0056
3		.0003	.0259	.1142	.2056	.2501	.2402		.1943	.1366	.0845	.0462	.0222
4		.0000	.0037	.0349	.0998	.1720	.2202		.2290	.2022	.1549	.1040	.0611
5		.0000	.0004	.0078	.0352	.0860	.1468		.1963	.2178	.2066	.1701	.1222
6		.0000	.0000	.0013	.0093	.0322	.0734		.1262	.1759	.2066	.2088	.1833
7		.0000	.0000	.0002	.0019	.0092	.0280		.0618	.1082	.1574	.1952	.2095
8		.0000	.0000	.0000	.0003	.0020	.0082		.0232	.0510	.0918	.1398	.1833
9		.0000	.0000	.0000	.0000	.0003	.0018		.0066	.0183	.0408	.0762	.1222
10		.0000	.0000	.0000	.0000	.0000	.0003		.0014	.0049	.0136	.0312	.0611
11		.0000	.0000	.0000	.0000	.0000	.0000		.0002	.0010	.0033	.0093	.0222
12		.0000	.0000	.0000	.0000	.0000	.0000		.0000	.0001	.0005	.0019	.0056
13		.0000	.0000	.0000	.0000	.0000	.0000		.0000	.0000	.0001	.0002	.0009
14		.0000	.0000	.0000	.0000	.0000	.0000		.0000	.0000	.0000	.0000	.0001
15	0	.8601	.4633	.2059	.0874	.0352	.0134		.0047	.0016	.0005	.0001	.0000
1		.1303	.3658	.3432	.2312	.1319	.0668		.0305	.0126	.0047	.0016	.0005
2		.0092	.1348	.2669	.2856	.2309	.1559		.0916	.0476	.0219	.0090	.0032
3		.0004	.0307	.1285	.2184	.2501	.2252		.1700	.1110	.0634	.0318	.0139
4		.0000	.0049	.0428	.1156	.1876	.2252		.2186	.1792	.1268	.0780	.0417
5		.0000	.0006	.0105	.0449	.1032	.1651		.2061	.2123	.1859	.1404	.0916
6		.0000	.0000	.0019	.0132	.0430	.0917		.1472	.1906	.2066	.1914	.1527
7		.0000	.0000	.0003	.0030	.0138	.0393		.0811	.1319	.1771	.2013	.1964
8		.0000	.0000	.0000	.0005	.0035	.0131		.0348	.0710	.1181	.1647	.1964
9		.0000	.0000	.0000	.0001	.0007	.0034		.0116	.0298	.0612	.1048	.1527
10		.0000	.0000	.0000	.0000	.0001	.0007		.0030	.0096	.0245	.0515	.0916
11		.0000	.0000	.0000	.0000	.0000	.0001		.0006	.0024	.0074	.0191	.0417
12		.0000	.0000	.0000	.0000	.0000	.0000		.0001	.0004	.0016	.0052	.0139
13		.0000	.0000	.0000	.0000	.0000	.0000		.0000	.0001	.0003	.0010	.0032
14		.0000	.0000	.0000	.0000	.0000	.0000		.0000	.0000	.0000	.0001	.0005
15		.0000	.0000	.0000	.0000	.0000	.0000		.0000	.0000	.0000	.0000	.0000
16	0	.8515	.4401	.1853	.0743	.0281	.0100		.0033	.0010	.0003	.0001	.0000
1		.1376	.3706	.3294	.2097	.1126	.0535		.0228	.0087	.0030	.0009	.0002
2		.0104	.1463	.2745	.2775	.2111	.1336		.0732	.0353	.0150	.0056	.0018

<i>n</i>	<i>x</i>	.01	.05	.10	.15	.20	.25	<i>p</i>	.30	.35	.40	.45	.50
3		.0005	.0359	.1423	.2285	.2463	.2079	.1465	.0888	.0468	.0215	.0085	
4		.0000	.0061	.0514	.1311	.2001	.2252	.2040	.1553	.1014	.0572	.0278	
5		.0000	.0008	.0137	.0555	.1201	.1802	.2099	.2008	.1623	.1123	.0667	
6		.0000	.0001	.0028	.0180	.0550	.1101	.1649	.1982	.1983	.1684	.1222	
7		.0000	.0000	.0004	.0045	.0197	.0524	.1010	.1524	.1889	.1969	.1746	
8		.0000	.0000	.0001	.0009	.0055	.0197	.0487	.0923	.1417	.1812	.1964	
9		.0000	.0000	.0000	.0001	.0012	.0058	.0185	.0442	.0840	.1318	.1746	
10		.0000	.0000	.0000	.0000	.0002	.0014	.0056	.0167	.0392	.0755	.1222	
11		.0000	.0000	.0000	.0000	.0000	.0002	.0013	.0049	.0142	.0337	.0667	
12		.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0011	.0040	.0115	.0278	
13		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0008	.0029	.0085	
14		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0018	
15		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0002	
16		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	
17	0	.8429	.4181	.1668	.0631	.0225	.0075	.0023	.0007	.0002	.0000	.0000	.0000
	1	.1447	.3741	.3150	.1893	.0957	.0426	.0169	.0060	.0019	.0005	.0001	.0000
	2	.0117	.1575	.2800	.2673	.1914	.1136	.0581	.0260	.0102	.0035	.0010	.0000
	3	.0006	.0415	.1556	.2359	.2393	.1893	.1245	.0701	.0341	.0144	.0052	.0000
	4	.0000	.0076	.0605	.1457	.2093	.2209	.1868	.1320	.0796	.0411	.0182	.0000
	5	.0000	.0010	.0175	.0668	.1361	.1914	.2081	.1849	.1379	.0875	.0472	.0000
	6	.0000	.0001	.0039	.0236	.0680	.1276	.1784	.1991	.1839	.1432	.1044	.0000
	7	.0000	.0000	.0007	.0065	.0267	.0668	.1201	.1685	.1927	.1841	.1484	.0000
	8	.0000	.0000	.0001	.0014	.0084	.0279	.0644	.1134	.1606	.1883	.1855	.0000
	9	.0000	.0000	.0000	.0003	.0021	.0093	.0276	.0611	.1070	.1540	.1855	.0000
	10	.0000	.0000	.0000	.0000	.0004	.0025	.0095	.0263	.0571	.1008	.1484	.0000
	11	.0000	.0000	.0000	.0000	.0001	.0005	.0026	.0090	.0242	.0525	.0944	.0000
	12	.0000	.0000	.0000	.0000	.0000	.0001	.0006	.0024	.0081	.0215	.0472	.0000
	13	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0021	.0068	.0182	.0000
	14	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0004	.0016	.0052	.0000
	15	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003	.0010	.0000
	16	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0000
	17	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
18	0	.8345	.3972	.1501	.0536	.0180	.0056	.0016	.0004	.0001	.0000	.0000	.0000
	1	.1517	.3763	.3002	.1704	.0811	.0338	.0126	.0042	.0012	.0003	.0001	.0000
	2	.0130	.1683	.2835	.2556	.1723	.0958	.0458	.0190	.0069	.0022	.0006	.0000
	3	.0007	.0473	.1680	.2406	.2297	.1704	.1046	.0547	.0246	.0095	.0031	.0000
	4	.0000	.0093	.0700	.1592	.2153	.2130	.1681	.1104	.0614	.0291	.0117	.0000
	5	.0000	.0014	.0218	.0787	.1507	.1988	.2017	.1664	.1146	.0666	.0327	.0000
	6	.0000	.0002	.0052	.0301	.0816	.1436	.1873	.1941	.1655	.1181	.0708	.0000
	7	.0000	.0000	.0010	.0091	.0350	.0820	.1376	.1792	.1892	.1657	.1214	.0000
	8	.0000	.0000	.0002	.0022	.0120	.0376	.0811	.1327	.1734	.1864	.1669	.0000
	9	.0000	.0000	.0000	.0004	.0033	.0139	.0386	.0794	.1284	.1694	.1855	.0000
	10	.0000	.0000	.0000	.0001	.0008	.0042	.0149	.0385	.0771	.1248	.1669	.0000
	11	.0000	.0000	.0000	.0000	.0001	.0010	.0046	.0151	.0374	.0742	.1214	.0000
	12	.0000	.0000	.0000	.0000	.0000	.0002	.0012	.0047	.0145	.0354	.0708	.0000
	13	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0012	.0045	.0134	.0327	.0000
	14	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0011	.0039	.0117	.0000
	15	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0009	.0031	.0000
	16	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0006	.0000
	17	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0000
	18	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
19	0	.8262	.3774	.1351	.0456	.0144	.0042	.0011	.0003	.0001	.0000	.0000	.0000
	1	.1586	.3774	.2852	.1529	.0685	.0268	.0093	.0029	.0008	.0002	.0000	.0000
	2	.0144	.1787	.2852	.2428	.1540	.0803	.0358	.0138	.0046	.0013	.0003	.0000

<i>n</i>	<i>x</i>	.01	.05	.10	.15	.20	.25	<i>p</i>	.30	.35	.40	.45	.50	
20	3	.0008	.0533	.1796	.2428	.2182	.1517	.0869	.0422	.0175	.0062	.0018		
	4	.0000	.0112	.0798	.1714	.2182	.2023	.1491	.0909	.0467	.0203	.0074		
	5	.0000	.0018	.0266	.0907	.1636	.2023	.1916	.1468	.0933	.0497	.0222		
	6	.0000	.0002	.0069	.0374	.0955	.1574	.1916	.1844	.1451	.0949	.0518		
	7	.0000	.0000	.0014	.0122	.0443	.0974	.1525	.1844	.1797	.1443	.0961		
	8	.0000	.0000	.0002	.0032	.0166	.0487	.0981	.1489	.1797	.1771	.1442		
	9	.0000	.0000	.0000	.0007	.0051	.0198	.0514	.0980	.1464	.1771	.1762		
	10	.0000	.0000	.0000	.0001	.0013	.0066	.0220	.0528	.0976	.1449	.1762		
	11	.0000	.0000	.0000	.0000	.0003	.0018	.0077	.0233	.0532	.0970	.1442		
	12	.0000	.0000	.0000	.0000	.0000	.0004	.0022	.0083	.0237	.0529	.0961		
	13	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0024	.0085	.0233	.0518		
	14	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0006	.0024	.0082	.0222		
	15	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0022	.0074		
	16	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0018		
	17	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003		
	18	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000		
	19	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000		
	20	0	.8179	.3585	.1216	.0388	.0115	.0032	.0008	.0002	.0000	.0000	.0000	
		1	.1652	.3774	.2702	.1368	.0576	.0211	.0068	.0020	.0005	.0001	.0000	
2		.0159	.1887	.2852	.2293	.1369	.0669	.0278	.0100	.0031	.0008	.0002		
3		.0010	.0596	.1901	.2428	.2054	.1339	.0716	.0323	.0123	.0040	.0011		
4		.0000	.0133	.0898	.1821	.2182	.1897	.1304	.0738	.0350	.0139	.0046		
5		.0000	.0022	.0319	.1028	.1746	.2023	.1789	.1272	.0746	.0365	.0148		
6		.0000	.0003	.0089	.0454	.1091	.1686	.1916	.1712	.1244	.0746	.0370		
7		.0000	.0000	.0020	.0160	.0545	.1124	.1643	.1844	.1659	.1221	.0739		
8		.0000	.0000	.0004	.0046	.0222	.0609	.1144	.1614	.1797	.1623	.1201		
9		.0000	.0000	.0001	.0011	.0074	.0271	.0654	.1158	.1597	.1771	.1602		
10		.0000	.0000	.0000	.0002	.0020	.0099	.0308	.0686	.1171	.1593	.1762		
11		.0000	.0000	.0000	.0000	.0005	.0030	.0120	.0336	.0710	.1185	.1602		
12		.0000	.0000	.0000	.0000	.0001	.0008	.0039	.0136	.0355	.0727	.1201		
13		.0000	.0000	.0000	.0000	.0000	.0002	.0010	.0045	.0146	.0366	.0739		
14		.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0012	.0049	.0150	.0370		
15		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0013	.0049	.0148		
16		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0003	.0013	.0046		
17		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0011		
18		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002		
19	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000			
20	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000			
25	0	.7778	.2774	.0718	.0172	.0038	.0008	.0001	.0000	.0000	.0000	.0000		
	1	.1964	.3650	.1994	.0759	.0236	.0063	.0014	.0003	.0000	.0000	.0000		
	2	.0238	.2305	.2659	.1607	.0708	.0251	.0074	.0018	.0004	.0001	.0000		
	3	.0018	.0930	.2265	.2174	.1358	.0641	.0243	.0076	.0019	.0004	.0001		
	4	.0001	.0269	.1384	.2110	.1867	.1175	.0572	.0224	.0071	.0018	.0004		
	5	.0000	.0060	.0646	.1564	.1960	.1645	.1030	.0506	.0199	.0063	.0016		
	6	.0000	.0010	.0239	.0920	.1633	.1828	.1472	.0908	.0442	.0172	.0053		
	7	.0000	.0001	.0072	.0441	.1108	.1654	.1712	.1327	.0800	.0381	.0143		
	8	.0000	.0000	.0018	.0175	.0623	.1241	.1651	.1607	.1200	.0701	.0322		
	9	.0000	.0000	.0004	.0058	.0294	.0781	.1336	.1635	.1511	.1084	.0609		
	10	.0000	.0000	.0000	.0016	.0118	.0417	.0916	.1409	.1612	.1419	.0974		
	11	.0000	.0000	.0000	.0004	.0040	.0189	.0536	.1034	.1465	.1583	.1328		
	12	.0000	.0000	.0000	.0000	.0012	.0074	.0268	.0650	.1140	.1511	.1550		
	13	.0000	.0000	.0000	.0000	.0003	.0025	.0115	.0350	.0760	.1236	.1550		
	14	.0000	.0000	.0000	.0000	.0000	.0007	.0042	.0161	.0434	.0867	.1328		
15	.0000	.0000	.0000	.0000	.0000	.0002	.0013	.0064	.0212	.0520	.0974			

<i>n</i>	<i>x</i>	.01	.05	.10	.15	.20	.25	<i>p</i>	.30	.35	.40	.45	.50
16		.0000	.0000	.0000	.0000	.0000	.0000	.0004	.0021	.0088	.0266	.0609	
17		.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0006	.0031	.0115	.0322	
18		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0009	.0042	.0143	
19		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0013	.0053	
20		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0016	
21		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0004	
22		.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	
30	0	.7397	.2146	.0424	.0076	.0012	.0002	.0000	.0000	.0000	.0000	.0000	.0000
	1	.2242	.3389	.1413	.0404	.0093	.0018	.0003	.0000	.0000	.0000	.0000	.0000
	2	.0328	.2586	.2277	.1034	.0337	.0086	.0018	.0003	.0000	.0000	.0000	.0000
	3	.0031	.1270	.2361	.1703	.0785	.0269	.0072	.0015	.0003	.0000	.0000	.0000
	4	.0002	.0451	.1771	.2028	.1325	.0604	.0208	.0056	.0012	.0002	.0000	.0000
	5	.0000	.0124	.1023	.1861	.1723	.1047	.0464	.0157	.0041	.0008	.0001	.0001
	6	.0000	.0027	.0474	.1368	.1795	.1455	.0829	.0353	.0115	.0029	.0006	.0006
	7	.0000	.0005	.0180	.0828	.1538	.1662	.1219	.0652	.0263	.0081	.0019	.0019
	8	.0000	.0001	.0058	.0420	.1106	.1593	.1501	.1009	.0505	.0191	.0055	.0055
	9	.0000	.0000	.0016	.0181	.0676	.1298	.1573	.1328	.0823	.0382	.0133	.0133
	10	.0000	.0000	.0004	.0067	.0355	.0909	.1416	.1502	.1152	.0656	.0280	.0280
	11	.0000	.0000	.0001	.0022	.0161	.0551	.1103	.1471	.1396	.0976	.0509	.0509
	12	.0000	.0000	.0000	.0006	.0064	.0291	.0749	.1254	.1474	.1265	.0806	.0806
	13	.0000	.0000	.0000	.0001	.0022	.0134	.0444	.0935	.1360	.1433	.1115	.1115
	14	.0000	.0000	.0000	.0000	.0007	.0054	.0231	.0611	.1101	.1424	.1354	.1354
	15	.0000	.0000	.0000	.0000	.0002	.0019	.0106	.0351	.0783	.1242	.1445	.1445
	16	.0000	.0000	.0000	.0000	.0000	.0006	.0042	.0177	.0489	.0953	.1354	.1354
	17	.0000	.0000	.0000	.0000	.0000	.0002	.0015	.0079	.0269	.0642	.1115	.1115
	18	.0000	.0000	.0000	.0000	.0000	.0000	.0005	.0031	.0129	.0379	.0806	.0806
	19	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0010	.0054	.0196	.0509	.0509
	20	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0003	.0020	.0088	.0280	.0280
	21	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0006	.0034	.0133	.0133
	22	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0012	.0055	.0055
	23	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0003	.0019	.0019
	24	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0006	.0006
	25	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0001

*Example: $P(X = 3, n = 5, p = 0.30) = 0.1323$.

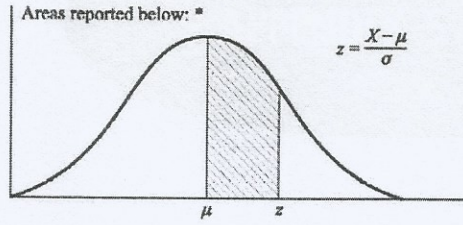
APPENDIX 2

Poisson Distribution

Values of $e^{-\lambda}$

λ	$e^{-\lambda}$	λ	$e^{-\lambda}$
0.0	1.00000	2.5	.08208
0.1	.90484	2.6	.07427
0.2	.81873	2.7	.06721
0.3	.74082	2.8	.06081
0.4	.67032	2.9	.05502
0.5	.60653	3.0	.04979
0.6	.54881	3.2	.04076
0.7	.49659	3.4	.03337
0.8	.44933	3.6	.02732
0.9	.40657	3.8	.02237
1.0	.36788	4.0	.01832
1.1	.33287	4.2	.01500
1.2	.30119	4.4	.01228
1.3	.27253	4.6	.01005
1.4	.24660	4.8	.00823
1.5	.22313	5.0	.00674
1.6	.20190	5.5	.00409
1.7	.18268	6.0	.00248
1.8	.16530	6.5	.00150
1.9	.14957	7.0	.00091
2.0	.13534	7.5	.00055
2.1	.12246	8.0	.00034
2.2	.00180	8.5	.00020
2.3	.10026	9.0	.00012
2.4	.09072	10.0	.00005

STANDARD NORMAL DISTRIBUTION



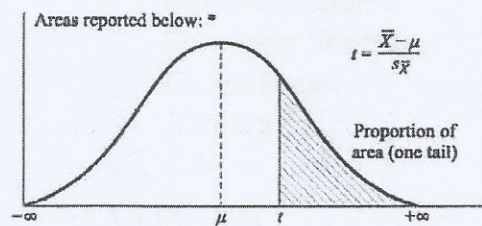
Proportions of Area for the Standard Normal Distribution

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	.2518	.2549
0.7	.2580	.2612	.2642	.2673	.2704	.2734	.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	.4014
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	.4983	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987									
3.5	.4997									
4.0	.4999									

*Example: For z = 1.96, shaded area is 0.4750 out of the total area of 1.0000.

APPENDIX 5

Student's *t* Distribution



Proportions of Area for the *t* Distributions

<i>df</i>	0.10	0.05	0.025	0.01	0.005	<i>df</i>	0.10	0.05	0.025	0.01	0.005
1	3.078	6.314	12.706	31.821	63.657	18	1.330	1.734	2.101	2.552	2.878
2	1.886	2.920	4.303	6.965	9.925	19	1.328	1.729	2.093	2.539	2.861
3	1.638	2.353	3.182	4.541	5.841	20	1.325	1.725	2.086	2.528	2.845
4	1.533	2.132	2.776	3.747	4.604	21	1.323	1.721	2.080	2.518	2.831
5	1.476	2.015	2.571	3.365	4.032	22	1.321	1.717	2.074	2.508	2.819
6	1.440	1.943	2.447	3.143	3.707	23	1.319	1.714	2.069	2.500	2.807
7	1.415	1.895	2.365	2.998	3.499	24	1.318	1.711	2.064	2.492	2.797
8	1.397	1.860	2.306	2.896	3.355	25	1.316	1.708	2.060	2.485	2.787
9	1.383	1.833	2.262	2.821	3.250	26	1.315	1.706	2.056	2.479	2.779
10	1.372	1.812	2.228	2.764	3.169	27	1.314	1.703	2.052	2.473	2.771
11	1.363	1.796	2.201	2.718	3.106	28	1.313	1.701	2.048	2.467	2.763
12	1.356	1.782	2.179	2.681	3.055	29	1.311	1.699	2.045	2.462	2.756
13	1.350	1.771	2.160	2.650	3.012	30	1.310	1.697	2.042	2.457	2.750
14	1.345	1.761	2.145	2.624	2.977	40	1.303	1.684	2.021	2.423	2.704
15	1.341	1.753	2.131	2.602	2.947	60	1.296	1.671	2.000	2.390	2.660
16	1.337	1.746	2.120	2.583	2.921	120	1.289	1.658	1.980	2.358	2.617
17	1.333	1.740	2.110	2.567	2.898	∞	1.282	1.645	1.960	2.326	2.576

*Example: For the shaded area to represent 0.05 of the total area of 1.0, value of *t* with 10 degrees of freedom is 1.812
 Source: From Table III of Fisher and Yates, *Statistical Tables for Biological, Agricultural and Medical Research*, 6th ed., 1974, published by Longman Group Ltd., London (previously published by Oliver & Boyd, Edinburgh), by permission of the authors and publishers.