Final Examination
2017/2018 Academic Session

May/June 2018

JIM106 – Elementary Statistics
[Asas Statistik]

Duration : 3 hours
[*Masa: 3 jam*]

Please ensure that this examination paper contains **SEVENTEEN** printed pages before you begin the examination.

Answer **ALL** questions. You may answer either in Bahasa Malaysia or in English.

Read the instructions carefully before answering.

Each question is worth 100 marks.

In the event of any discrepancies, the English version shall be used.

*Sila pastikan bahawa kertas peperiksaan ini mengandungi **TUJUH BELAS** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.*

*Jawab **SEMUA** soalan. Anda dibenarkan menjawab sama ada dalam Bahasa Malaysia atau Bahasa Inggeris.*

Baca arahan dengan teliti sebelum anda menjawab soalan.

Setiap soalan diperuntukkan 100 markah.

Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi Bahasa Inggeris hendaklah digunapakai.

…2/-

1. (a). The mean SAT math scores for selected states are represented below.

Score	Frequency
478–504	4
505–531	6
532–558	2
559–585	2
586–612	2

(i). Draw the histogram and frequency polygon.

(ii). Find the mean, median and mode.

(iii). Find the variance and standard deviation.

(iv). Determine the shape of the data and give reason(s).

(60 marks)

(b). The average earnings of year-round full-time workers 25–34 years old with a bachelor's degree or higher were $58,500 in 2003. If the standard deviation is $11,200, what is the percentage of these workers who earn

(i). between $47,300 and $69,700?

(ii). more than $100,000?

(40 marks)

2. (a). Box A, B and C each contains 7 red balls and 2 green balls. Randomly, a ball is moved from A to B, then a ball is moved from B to C, and finally a ball is taken out from C. For this random experiment,

(i). draw a tree diagram,

(ii). find the sample space,

(iii). find the probability that a green ball was taken out from C.

(50 marks)

(b). Four different physics books, six different biology books, and two different chemistry books are to be arranged on a shelf. How many different arrangements are possible if

(i). the books in each particular subject must all stand together?

(ii). only the physics books must stand together?

(20 marks)

(c). Female comprise 83.3% of all high school students. In a random sample of 300 high school students, what is the probability that more than 50 are males?

(30 marks)

3. (a). The probability that Ahmad will be accepted by the university of his choice and obtain a scholarship is 0.35. If the probability that he is accepted by the university is 0.65, find the probability that he will obtain a scholarship given that he is accepted by the university.

(30 marks)

(b). The mean weight of 15 year old males is 142 pounds and the standard deviation is 12.3 pounds. If a sample of thirty-six 15 year old males is selected, find the probability that the mean of the sample will be greater than 144.5 pounds. Assume the variable is normally distributed. Based on your answer, would you consider the group overweight?

(30 marks)

(c). A study of 40 professors showed that they spent on average, 12.6 minutes grading a student's assignment.

(i). Find a point estimate of the mean.

(ii). Find the 90% confidence interval of the mean time for grading an assignment when σ = 2.5 minutes.

(iii). If a professor stated that he spent, on average, 30 minutes grading an assignment, is he/she a typical professor in terms of grading an assignment?

(40 marks)

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4. (a). A box contains five balls numbered 3, 6, 9, 12 and 15 respectively. A random sample of size three is taken from the box without replacement. Suppose *Y* indicates the mean of numbers on the three balls. Find the

(i). distribution of *Y*,

(ii). mean and variance of *Y*.

(60 marks)

(b). Let X be a normal random variable with mean μ and standard deviation σ. Given $P(X > 5) = 0.9772$ and $P(X < 10) = 0.9987$, find the values of μ and σ.

(40 marks)

5. (a). A group of social researchers reviewed a random sample of size 1600 people from the work force in a city and found that 100 of them are unemployed. A survey conducted by the Department of National Statistics shows that the national unemployment rate is 8%. Can we accept the claim that the urban unemployment rate is below the national rate?

(40 marks)

(b). A manager states that in his factory, the average number of days per year missed by the employees due to illness is less than the national average of 10. The following data show the number of days missed by 40 employees last year. Is there sufficient evidence to believe the manager's statement at $\alpha = 0.05$? Use *s* to estimate σ and use the P-value method.

0	6	12	3	3	5	4	1
3	9	6	0	7	6	3	4
7	4	7	1	0	8	12	3
2	5	10	5	15	3	2	5
3	11	8	2	2	4	1	9

(60 marks)

…5/-

1. (a). Min markah matematik SAT untuk negeri-negeri terpilih ialah seperti berikut.

Markah	Frekuensi
478–504	4
505–531	6
532–558	2
559–585	2
586–612	2

(i). Lakar histogram dan frekuensi poligon.

(ii). Cari min, median dan mod.

(iii). Cari varians dan sisihan piawai.

(iv). Tentukan bentuk data dan beri alasan.

(60 markah)

(b). Purata pendapatan sepanjang tahun bagi pekerja sepenuh masa yang berumur 25-34 tahun dengan ijazah sarjana muda atau lebih tinggi ialah $58,500 pada tahun 2003. Jika sisihan piawai adalah $11,200, berapakah peratusan pekerja yang mendapat

(i). di antara $47,300 and $69,700?

(ii). lebih daripada $100,000?

(40 markah)

2. (a). Kotak A, B dan C masing-masing mengandungi 7 biji bola merah dan 2 biji bola hijau. Secara rawak, sebiji bola dipindahkan dari A ke B, kemudian sebiji bola dipindahkan dari B ke C, dan akhirnya sebiji bola dikeluarkan daripada C. Untuk eksperimen rawak ini,

(i). lukiskan gambar rajah pohon,

(ii). dapatkan ruang sampel,

(iii). cari kebarangkalian bahawa bola hijau dikeluarkan dari C.

(50 markah)

(b). Empat naskah buku fizik yang berlainan, enam naskah buku biologi yang berlainan dan dua naskah buku kimia yang berlainan disusun di atas satu rak. Berapakah susunan berlainan yang mungkin jika

(i). buku untuk setiap subjek mesti disusun bersama?

(ii). hanya buku fizik sahaja mesti disusun bersama?

(20 markah)

(c). Peratus pelajar wanita di sekolah menengah ialah 83.3%. Dalam sampel rawak 300 orang pelajar sekolah menengah, berapakah kebarangkalian bahawa lebih daripada 50 orang adalah pelajar lelaki?

(30 markah)

3. (a). Kebarangkalian Ahmad akan diterima oleh universiti pilihannya dan mendapat biasiswa ialah 0.35. Jika kebarangkalian dia diterima oleh universiti ialah 0.65, cari kebarangkalian bahawa dia akan mendapat biasiswa diberi beliau diterima oleh universiti.

(30 markah)

(b). Min berat badan seorang lelaki berusia 15 tahun adalah 142 paun dan sisihan piawai adalah 12.3 paun. Jika sampel tiga puluh enam orang lelaki berusia 15 tahun dipilih, dapatkan kebarangkalian bahawa min daripada sampel tersebut lebih besar daripada 144.5 paun. Anggap pembolehubah bertaburan secara normal. Berasaskan jawapan anda, adakah kumpulan tersebut terlebih berat badan?

(30 markah)

…7/-

(c). Suatu kajian mendapati 40 orang profesor memerlukan pada purata, 12.6 minit untuk menyemak tugasan para pelajar.

(i). Dapatkan anggaran titik untuk min.

(ii). Dapatkan 90% selang keyakinan untuk penyemakan tugasan pelajar bila $\sigma = 2.5$ minit.

(iii). Jika profesor tersebut menyatakan bahawa dia menghabiskan masa secara purata, 30 minit untuk menyemak tugasan, adakah dia seorang profesor biasa dari segi menyemak tugasan?

(40 markah)

4. (a). Sebuah kotak mengandungi lima biji bola yang masing-masing bernombor 3, 6, 9, 12 dan 15. Sampel rawak bersaiz tiga diambil dari kotak ini tanpa pengembalian. Katakan *Y* menandakan min nombor yang ada pada tiga bola tersebut. Carikan

(i). taburan bagi *Y*,

(ii). min dan varians bagi *Y*.

(60 markah)

(b). Andai X satu pembolehubah rawak normal dengan min μ dan sisihan piawai σ. Diberi $P(X > 5) = 0.9772$ dan $P(X < 10) = 0.9987$, dapatkan nilai μ dan σ.

(40 markah)

5. (a). Sekumpulan penyelidik sosial menyemak suatu sampel rawak bersaiz 1600 orang daripada golongan pekerja di satu bandar dan mendapati bahawa 100 daripada mereka sedang menganggur. Suatu tinjauan yang telah dijalankan oleh Jabatan Statistik Negara menunjukkan bahawa kadar pengangguran nasional ialah 8%. Bolehkah kita terima dakwaan bahawa kadar pengangguran di bandar tersebut kurang daripada kadar nasional?

(40 markah)

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(b). Seorang pengurus mengatakan bahawa dalam kilangnya, min jumlah hari dalam setahun yang tidak dihadiri pekerja kerana sakit adalah kurang daripada min nasional 10 hari. Data berikut menunjukkan jumlah hari yang tidak dihadiri oleh 40 orang pekerja pada tahun lepas. Apakah terdapat cukup bukti untuk mempercayai pernyataan pengurus pada $\alpha = 0.05$? Gunakan *s* untuk menganggar σ dan gunakan kaedah nilai-P.

0	6	12	3	3	5	4	1
3	9	6	0	7	6	3	4
7	4	7	1	0	8	12	3
2	5	10	5	15	3	2	5
3	11	8	2	2	4	1	9

(60 markah)

Formulas

Chapter 3 Data Description

Mean for individual data: $\bar{X} = \frac{\sum X}{n}$

Mean for grouped data: $\bar{X} = \frac{\sum f \cdot X_m}{n}$

Standard deviation for a sample:

$$s = \sqrt{\frac{n\left(\sum X^2\right) - \left(\sum X\right)^2}{n(n-1)}}$$

Standard deviation for grouped data:

$$s = \sqrt{\frac{n\left(\sum f \cdot X_m^2\right) - \left(\sum f \cdot X_m\right)^2}{n(n-1)}}$$

Range rule of thumb: $s \approx \frac{\text{range}}{4}$

Median for grouped data:

$$MD = \frac{(n/2) - cf}{f}(w) + L_m$$

where

n = sum of frequencies
cf = cumulative frequency of class immediately preceding the median class
w = width of median class
f = frequency of median class
L_m = lower boundary of median class

Chapter 4 Probability of Counting Rules

Addition rule 1 (mutually exclusive events):

$$P(A \text{ or } B) = P(A) + P(B)$$

Addition rule 2 (events not mutually exclusive):

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

Multiplication rule 1 (independent events):

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

Multiplication rule 2 (dependent events):

$$P(A \text{ and } B) = P(A) \cdot P(B|A)$$

Conditional probability: $P(B|A) = \dfrac{P(A \text{ and } B)}{P(A)}$

Complementary events: $P(\bar{E}) = 1 - P(E)$

Fundamental counting rule: Total number of outcomes of a sequence when each event has a different number of possibilities: $k_1 \cdot k_2 \cdot k_3 \cdots k_n$

Permutation rule: Number of permutations of *n* objects taking *r* at a time is

$${}_nP_r = \frac{n!}{(n-r)!}$$

Combination rule: Number of combinations of *r* objects selected from *n* objects is

$${}_nC_r = \frac{n!}{(n-r)!r!}$$

Chapter 5 Discrete Probability Distributions

Mean for a probability distribution: $\mu = \sum[X \cdot P(X)]$

Variance and standard deviation for a probability distribution:

$$\sigma^2 = \sum[X^2 \cdot P(X)] - \mu^2$$

$$\sigma^2 = \sqrt{\sum[X^2 \cdot P(X)] - \mu^2}$$

Expectation: $E(X) = \sum[X \cdot P(X)]$

Binomial probability: $P(X) = \dfrac{n!}{(n-X)!X!} \cdot p^X \cdot q^{n-X}$

Mean for binomial distribution: $\mu = n \cdot p$

Variance and standard deviation for the binomial distribution:

$\sigma^2 = n \cdot p \cdot q$ $\sigma = \sqrt{n \cdot p \cdot q}$

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Multinomial probability:

$$P(X) = \frac{n!}{X_1!X_2!X_3!\cdots X_k!} \cdot p_1^{X_1} \cdot p_2^{X_2} \cdot p_3^{X_3} \cdots p_k^{X_k}$$

Poisson probability: $P(X;\lambda) = \frac{e^{-\lambda}\lambda^X}{X!}$ where X = 0, 1, 2, ...

Hypergeometric probability: $P(X) = \frac{{}_aC_X \cdot {}_bC_{n-X}}{{}_{a+b}C_n}$

Chapter 6 The Normal Distribution

Standard score: $z = \frac{X-\mu}{\sigma}$ or $\frac{X-\bar{X}}{s}$

Mean of sample means: $\mu_{\bar{X}} = \mu$

Standard error of the mean: $\sigma_{\bar{X}} = \frac{\sigma}{\sqrt{n}}$

Central limit theorem formula: $z = \frac{\bar{X}-\mu}{\sigma/\sqrt{n}}$

Chapter 7 Confidence Intervals and Sample Size

z confidence interval for means:

$$\bar{X} - z_{\alpha/2}\left(\frac{\sigma}{\sqrt{n}}\right) < \mu < \bar{X} + z_{\alpha/2}\left(\frac{\sigma}{\sqrt{n}}\right)$$

t confidence interval for means:

$$\bar{X} - t_{\alpha/2}\left(\frac{s}{\sqrt{n}}\right) < \mu < \bar{X} + t_{\alpha/2}\left(\frac{s}{\sqrt{n}}\right)$$

Sample size for means: $n = \left(\frac{z_{\alpha/2}\cdot\sigma}{E}\right)^2$ where *E* is the maximum error of estimate

Confidence interval for a proportion:

$$\hat{p} - (z_{\alpha/2})\sqrt{\frac{\hat{p}\hat{q}}{n}} < p < \hat{p} + (z_{\alpha/2})\sqrt{\frac{\hat{p}\hat{q}}{n}}$$

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Sample size for a proportion: $n = \hat{p}\hat{q}\left(\frac{z_{\alpha/2}}{E}\right)^2$

where $\hat{p} = \frac{X}{n}$ and $\hat{q} = 1 - \hat{p}$

Confidence interval for variance:

$$\frac{(n-1)s^2}{\chi^2_{\text{right}}} < \sigma^2 < \frac{(n-1)s^2}{\chi^2_{\text{left}}}$$

Confidence interval for standard deviation:

$$\sqrt{\frac{(n-1)s^2}{\chi^2_{\text{right}}}} < \sigma < \sqrt{\frac{(n-1)s^2}{\chi^2_{\text{left}}}}$$

Chapter 8 Hypothesis Testing

z test : $z = \frac{\bar{X} - \mu}{\sigma/\sqrt{n}}$ for any value n. If $n < 30$, population must be normally distributed.

$$z = \frac{\bar{X} - \mu}{s/\sqrt{n}}$$ for σ unknown and $n \geq 30$

t test : $t = \frac{\bar{X} - \mu}{s/\sqrt{n}}$ for $n < 30$ (d.f. = $n - 1$)

z test for proportions: $z = \frac{\hat{p} - p}{\sqrt{pq/n}}$

Chi-square test for a single variance: $\chi^2 = \frac{(n-1)s^2}{\sigma^2}$

(d.f. = $n - 1$)

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Chapter 9 Testing the Difference Between Two Means, Two Variances and Two Proportions

z test for comparing two means (independent samples);

$$z = \frac{\left(\bar{X}_1 - \bar{X}_2\right) - \left(\mu_1 - \mu_2\right)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Formula for the confidence interval for difference of two means (large samples):

$$\left(\bar{X}_1 - \bar{X}_2\right) - z_{a/2}\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} < \mu_1 - \mu_2 < \left(\bar{X}_1 - \bar{X}_2\right) + z_{a/2}\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$$

Note: s_1^2 and s_2^2 can be used when $n_1 \geq 30$ and $n_2 \geq 30$.

F test for comparing two variances: $F = \frac{s_1^2}{s_2^2}$

where s_1^2 is the larger variance and

$$\text{d.f.N.} = n_1 - 1,\ \text{d.f.D} = n_2 - 1$$

t test for comparing two means (independent samples, variances not equal):

$$t = \frac{\left(\bar{X}_1 - \bar{X}_2\right) - \left(\mu_1 - \mu_2\right)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

(d.f. = the smaller on $n_1 - 1$ or $n_2 - 1$)

Formula for the confidence interval for difference of two means (small independent samples, variance unequal):

$$\left(\bar{X}_1 - \bar{X}_2\right) - t_{\alpha/2}\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} < \mu_1 - \mu_2 < \left(\bar{X}_1 - \bar{X}_2\right) + t_{\alpha/2}\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

(d.f. = smaller of $n_1 - 1$ and $n_2 - 1$)

t test for comparing two means (independent samples, variances equal):

$$t = \frac{\left(\bar{X}_1 - \bar{X}_2\right) - \left(\mu_1 - \mu_2\right)}{\sqrt{\frac{\left(n_1 - 1\right)s_1^2 + \left(n_2 - 1\right)s_2^2}{\left(n_1 + n_2 - 2\right)}}\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

(d.f. = $n_1 + n_2 - 2$)

Formula for the confidence interval for difference of two means (small independent samples, variances equal):

$$\left(\bar{X}_1 - \bar{X}_2\right) - t_{\alpha/2}\sqrt{\frac{\left(n_1 - 1\right)s_1^2 + \left(n_2 - 1\right)s_2^2}{n_1 + n_2 - 2}}\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

$$\left(\bar{X}_1 - \bar{X}_2\right) + t_{\alpha/2}\sqrt{\frac{\left(n_1 - 1\right)s_1^2 + \left(n_2 - 1\right)s_2^2}{n_1 + n_2 - 2}}\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

and d.f. = $n_1 + n_2 - 2$.

t test for comparing two means for dependent samples:

$$t = \frac{\bar{D} - \mu_D}{s_D/\sqrt{n}} \quad \text{where} \quad \bar{D} = \frac{\sum D}{n} \quad \text{and}$$

$$s_D = \sqrt{\frac{n\sum D^2 - \left(\sum D\right)^2}{n\left(n-1\right)}} \qquad \left(\text{d.f.} = n - 1\right)$$

Formula for confidence interval for the mean of the difference for dependent samples:

$$\bar{D} - t_{\alpha/2}\frac{S_D}{\sqrt{n}} < \mu_D < \bar{D} + t_{\alpha/2}\frac{S_D}{\sqrt{n}}$$

(d.f. = $n - 1$)

t test for comparing two proportions:

$$z = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\bar{p}\bar{q}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

where $\bar{p} = \frac{X_1 + X_2}{n_1 + n_2}$ $\hat{p}_1 = \frac{X_1}{n_1}$

$\bar{q} = 1 - \bar{p}$ $\hat{p}_2 = \frac{X_2}{n_2}$

Formula for the confidence interval for the difference of two proportions:

$$(\hat{p}_1 - \hat{p}_2) - z_{\alpha/2}\sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}} < p_1 - p_2 < (\hat{p}_1 - \hat{p}_2) + z_{\alpha/2}\sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}}$$

Table E The Standard Normal Distribution

Cumulative Standard Normal Distribution

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
−3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
−3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
−3.2	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
−3.1	.0010	.0009	.0009	.0009	.0008	.0008	.0008	.0008	.0007	.0007
−3.0	.0013	.0013	.0013	.0012	.0012	.0011	.0011	.0011	.0010	.0010
−2.9	.0019	.0018	.0018	.0017	.0016	.0016	.0015	.0015	.0014	.0014
−2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
−2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
−2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
−2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
−2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
−2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
−2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
−2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
−2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
−1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
−1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
−1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
−1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
−1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
−1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681
−1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
−1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
−1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
−1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
−0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
−0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
−0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
−0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
−0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
−0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
−0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
−0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
−0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
−0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641

For z values less than −3.49, use 0.0001.

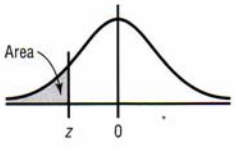
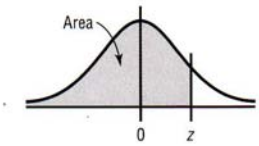


Table E *(continued)*

Cumulative Standard Normal Distribution

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

For z values greater than 3.49, use 0.9999.



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