MAT121 Statistics I Midterm Exam #3

4/9/2026

Name ____________________________ WCUID Number_____________________
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Instructions

1. **Formula Sheet**:
   - You are allowed to bring **one formula sheet** (8.5" x 11", single-sided or double-sided) with **formulas only**.
   - The formula sheet must be handwritten or printed and will be collected at the end of the exam.
2. **Calculators**:
   - (Graphing or scientific) calculators are allowed for this exam.
   - Calculators with internet access, communication capabilities, or stored notes are **not allowed**.
3. **Notebooks and Notes**:
   - **No notebooks, notes, or additional materials** are allowed during the
4. **Exam Versions**:
   - Each student will receive a **different version** of the exam.
   - Ensure you are working on your assigned version only.
5. **Multiple Choice Problems**:
   - For multiple-choice questions, **manually calculate** your answer and select the optio
   - n that is **closest to your calculated result**.
   - If your calculated answer does not match any option exactly, choose the **closest value**.
6. **General Rules**:
   - No communication or collaboration with other students is allowed during the exam.
   - All electronic devices (e.g., phones, smartwatches) must be turned off and stored away.

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MAT121 Statistics I
Midterm Exam #1
9/18/2025

A

1. (A) (B) (C) (D) ( )
2. (A) (B) (C) (D) ( )
3. (A) (B) (C) (D) ( )
4. (A) (B) (C) (D) ( )
5. (A) (B) (C) (D) (E)
6. (A) (B) (C) (D) ( )
7. (A) (B) (C) (D) (E)
8. (A) (B) (C) (D) (E)
9. (A) (B) (C) (D) ( )
10. (A) (B) (C) (D) ( )
11. (A) (B) (C) (D) ( )
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17. (A) (B) (C) (D) ( )
18. (A) (B) (C) (D) ( )
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20. (A) (B) (C) (D) ( )

21 (A) (B) (C) (D) ( )
22 (A) (B) (C) (D) ( )
23 (A) (B) (C) (D) ( )
24 (A) (B) (C) (D) ( )
25 (A) (B) (C) (D) ( )

For each question, only one choice is correct. If your calculated answer does not match any option exactly, choose the **closest value**.

Problem 1. Marketing research shows that 60 tissues is the average number of tissues a person uses during a cold. The company that makes Kleenex brand tissues thinks that fewer of the tissues are needed. What are their null and alternative hypotheses for justifying the company's belief?

A. Ho: μ = 60 vs Ha: μ > 60
B. Ho: μ = 60 vs Ha: μ < 60
C. Ho: $\bar{x}$= 60 vs Ha: $\bar{x}$< 60
D. Ho: μ < 60 vs Ha:= 60

Answer B

Problem 2. A randomly selected sample of 1,000 college students was asked whether they had ever used the drug Ecstasy. Sixteen percent (16% or 0.16) of the 1,000 students surveyed said they had. Which one of the following statements about the number 0.16 is correct?

A. It is a sample proportion.
B. It is a population proportion.
C. It is a margin of error.
D. It is a randomly chosen number.

Answer A

Problem 3. Which of the following is not a correct way to state a null hypothesis?

A. H_0: $\hat{\mu}_1 - \hat{\mu}_2 = 0$
B. H_0: $\mu_d = 10$
C. H_0: $\mu_1 - \mu_2 = 0$
D. H_0: $p = .5$

Answer A

Problem 4. A result is called "statistically significant" whenever

A. The null hypothesis is true.

B. The alternative hypothesis is true.
C. The p-value is less or equal to the significance level.
D. The p-value is larger than the significance level.

Answer C.

Problem 5. A random sample of 25 college males was obtained and each was asked to report their actual height and what they wished as their ideal height. A 95% confidence interval for μd = average difference between their ideal and actual heights was 0.8" to 2.2". Based on this interval, which one of the null hypotheses below (versus a two-sided alternative) can be rejected?

A. H_0: $\mu_d = 0.5$
B. H_0: $\mu_d = 1.0$
C. H_0: $\mu_d = 1.5$
D. H_0: $\mu_d = 2.0$

Answer A

Problem 6. Null and alternative hypotheses are statements about:
A. population parameters.
B. sample parameters.
C. sample statistics.
D. it depends - sometimes population parameters and sometimes sample statistics.

Answer A

Problem 7. The average time in years to get an undergraduate degree in computer science was compared for men and women. Random samples of 100 male computer science majors and 100 female computer science majors were taken. Choose the appropriate parameter(s) for this situation.

A. One population proportion p.
B. Difference between two population proportions $p_1 - p_2$.
C. One population mean μ_1
D. Difference between two population means $\mu_1 - \mu_2$

Answer D

Problem 8. Researchers have claimed that the average number of headaches per student during a semester of Statistics is 11. Statistics students believe the average is higher. In a sample of n = 16 students, the mean is 12 headaches with a deviation of 2.4. Which of the following represents the null and alternative hypotheses necessary to test the students' beliefs?

A. H_0: μ = 11 vs. H_a: μ ≠ 11
B. H_0: μ = 11 vs. H_a: μ < 11
C. H_0: μ < 11 vs. H_a: μ = 11
D. H_0: μ = 11 vs. H_a: μ > 11

Answer D.

Problem 9. A large company examines the annual salaries for all of the men and women performing a certain job and finds that the means and standard deviations are $32,120 and $3,240, respectively, for the men and $34,093 and $3521, respectively, for the women. The best way to determine if there is a difference in mean salaries for the population of men and women performing this job in this company is

A. to compute a 95% confidence interval for the difference.
B. to subtract the two sample means.
C. to test the hypothesis that the population means are the same versus that they are different.
D. to test the hypothesis that the population means are the same versus that the mean for men is higher.

Answer: A and C (assign full credit for choosing either A or C.)

Problem 10. Assuming the conditions are met, based on the t-statistic of 1.80 the appropriate conclusion for this test using α = .05 is

A. Df = 14, so p-value < .05, and the null hypothesis can be rejected.
B. Df = 14, so p-value > .05, and the null hypothesis cannot be rejected.
C. Df = 28, so p-value < .05, and the null hypothesis can be rejected.
D. Df = 28, so p-value > .05, and the null hypothesis cannot be rejected.

Answer A or B (denpending how the difference is defined, assign full credit for shoosing either A or B)

Problem 11. In testing the hypotheses Ho: μ = 50 vs Ha: μ ≠ 50, the following information is known: n = 64, $\bar{x}$= 53.5 and σ = 10. The standardized test statistic is:
A. t = 2.8
B. t = −2.8
C. z = 2.8
D. z = −2.8

Answer: A

Problem 12. It is known that for right-handed people, the dominant (right) hand tends to be stronger. For left-handed people who live in a world designed for right-handed people, the same may not be true. To test this, muscle strength was measured on the right and left hands of a random sample of 15 left-handed men, and the difference (left-right) was found. The alternative hypothesis is one-sided (left hand stronger). The resulting t-statistic was 1.80. This is an example of:

A. A two-sample t-test.
B. A paired t-test.
C. A pooled t-test.
D. An unpooled t-test.

Answer B

Problem 13. If an economist wishes to determine whether there is evidence that the average family income in a community exceeds $32,000,

A. either a one-tail or two-tail test could be used with equivalent results.
B. a one-tail test should be utilized.
C. a two-tail test should be utilized.
D. none of these choices.

Answer B.

Problem 14. A coffee shop chain compares the average daily sales (in $) of its two most popular blends. Data from 60 days for Blend Dark shows a mean of $420, and from 55 days for Blend Light shows a mean of $405. The known population standard deviations are $50 for Dark and $45 for Light. To test if the sales are different, what is the standard error for the difference in means?

A) 50 + 45

B) (50/60) + (45/55)

C) $\sqrt{(50^2/60 + 45^2/55)}$

D) $\sqrt{(50^2 + 45^2)}$

Answer: C

Problem 15: A manufacturer tests the battery life of two smartphone models. Model X (n=60) has a mean battery life of 15 hours, and Model Y (n=65) has a mean of 14 hours. The population standard deviations are 1.5 hours for Model X and 2.0 hours for Model Y. The company wants to test if Model X has a longer battery life. What is the value of the test statistic?

A) z = (15 - 14) / $\sqrt{(1.5^2/60\ +\ 2.0^2/65)}$
B) z = (60 - 65) / $\sqrt{(1.5^2/15\ +\ 2.0^2/14)}$
C) z = (15 - 14) / (1.5 + 2.0)
D) z = (15 - 14) / $\sqrt{(1.5^2\ +\ 2.0^2)}$

Answer A

Problem 16. A psychologist compares the average test anxiety scores of students from two different universities. University Stress (n=75) has a mean score of 75, and University Calm (n=80) has a mean score of 70. The population standard deviation for the test is 10 at both universities. At α=0.01, what is the conclusion?

A) Fail to reject H_0; no difference in anxiety scores.
B) Reject H_0; there is a significant difference in anxiety scores.
C) Reject H_0; University Stress has significantly higher anxiety.
D) Fail to reject H_0; the p-value is too small.

Answer: B

Given sample information: $n_1 = 75$, $\bar{x}_1 = 75$, $s_1^2 = 100$; $n_2 = 80$, $\bar{x}_2 = 70$, $s_2^2 = 100$.

Step 1: Identify the claim of the population mean $(\mu_1 - \mu_2)$.
The given information indicates that the claim is: $\mu_1 - \mu_2$ is equal to 0.

Step 2: Set up the null and alternative hypotheses.
Based on the claim, the null and alternative hypotheses are given by $H_0 : \mu_1 - \mu_2 = 0$ and $H_1 : \mu_1 - \mu_2 \neq 0$.

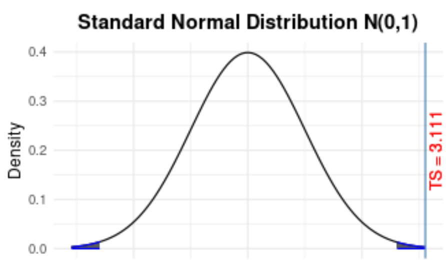
Step 3: Evaluate the test statistic.
The test statistic is defined to be:

$$TS = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{s_1^2/n_1 + s_2^2/n_2}} = \frac{(75 - 70) - 0}{\sqrt{100/75 + 100/80}} = 3.111.$$

Step 4: Find the critical value and calculate the p-value.
Based on the significance level, we found the critical values to be : $\pm z_{\alpha/2} = \pm z_{0.005}. = \pm 2.576$.
The p-value is can be found as p-value ≈ 0.002.

Step 5: Make a statistical decision on H_0.
At the 1% significance level, we reject the null hypothesis. (p-value $= 0.002$).

Step 6: Draw conclusion [justify the claim in step 1].
At the 1% significance level, we conclude the alternative hypothesis. The claim is addressed using relationship between the alternative hypothesis and the claim.



Problem 17. A study looks at the average age of diagnosis for two medical conditions. Condition X (n=60) has a mean diagnosis age of 52 years, and Condition Y (n=70) has a mean of 48 years. The population standard deviations are 8 years for Condition X and 10 years for Condition Y. The researchers test if the mean diagnosis age for Condition X is greater than for Condition Y. What is the value of the test statistic?

A) z = (52 - 48) / $\sqrt{(8^2/60 \ + \ 10^2/70)}$
B) z = (60 - 70) / $\sqrt{(8^2/52 \ + \ 10^2/48)}$
C) z = (52 - 48) / (8 + 10)
D) z = (52 - 48) / $\sqrt{(8^2 \ + \ 10^2)}$

Answer: A

Problem 18. The MPG of 10 hybrid cars and 15 gasoline cars is tested. The analyst wants to see if hybrids have a higher average MPG. The data from the gasoline cars is much more spread out. The correct alternative hypothesis is:

a) $\mu_{Hybrid} - \mu_{Gas} \neq 0$

b) $\mu_{Hybrid} - \mu_{Gas} = 0$

c) $\mu_{Hybrid} - \mu_{Gas} > 0$

d) $\mu_{Hybrid} - \mu_{Gas} < 0$

Answer: C

Problem 19. Two brands of light bulbs are tested for lifespan. Brand X (n=10) has a mean life of 1100 hours (s=50). Brand Y (n=10) has a mean life of 1070 hours (s=45). What is the critical value for a two-tailed test at $\alpha=0.05$?

a) ±1.96

b) ±2.101

c) ±2.086

d) ±2.262

Answer B.

Problem 20. A doctor measures the blood pressure of 15 patients before and after administering a new drug. The mean of the differences (after - before) is -5 mmHg, with a standard deviation of the differences of 8 mmHg. What is the value of the t-statistic for testing if the drug reduces blood pressure?

a) -2.42

b) -0.625

c) -1.94

d) -5.00

Answer: A

$t = (\bar{d} - 0) / (s_d/\sqrt{n}) = (-5) / (8/\sqrt{15}) \approx -2.42$

Problem 20. A company tests a new keyboard design by having 12 data entry specialists type a standard document on both the old and new keyboards. The p-value for the paired t-test (H_1: μ_d (new - old) > 0) is 0.03. What is the conclusion at α=0.05?

a) Fail to reject H_0; the new keyboard is not faster.
b) Reject H_0; the new keyboard is faster.
c) Reject H_0; the new keyboard is slower.
d) Fail to reject H_0; the keyboards are the same speed.

Answer: B

p-value < α, so reject H_0 in favor of the alternative that the new mean is greater

Problem 21. A bakery states its croissants weigh 60g on average. An inspector weighs 20 croissants and finds a mean of 58g with a standard deviation of 4g. For a two-tailed test at α=0.05, what is the correct critical t-value region for rejection?

a) t < -2.093 or t > 2.093
b) t < -1.729 or t > 1.729
c) t > 2.093
d) t < -1.725

Answer: A

Problem 22. A factory process is designed to produce bolts with a length of 5 cm. A quality check on 25 bolts yields a sample mean of 5.02 cm and a sample standard deviation of 0.15 cm. What is the standard error of the mean used in the t-test?

a) 0.15
b) 0.03
c) 0.005
d) $0.15 / \sqrt{29}$

Answer: B

Problem 23. A machine is calibrated to cut rods to 100 cm. A sample of 22 rods has a mean length of 100.3 cm and a standard deviation of 0.8 cm. A 95% confidence interval is constructed. If we were to perform a two-tailed t-test for H_0: μ=100, what would the result be?

a) Reject H_0 because 100 is not in the confidence interval.
b) Fail to reject H_0 because 100 is close to the sample mean.
c) Reject H_0 because the standard deviation is small.
d) It cannot be determined without constructing the interval.

Answer: B

Solution: This t test is based on the assumption that the population is normal and the population variance is unknown.

Given sample information: $n = 22$, $\bar{x} = 100.3$, $s = 0.8$.

Step 1: Identify the claim of the population mean (μ_0).
The given information indicates that the claim is: μ_0 is equal to 100.

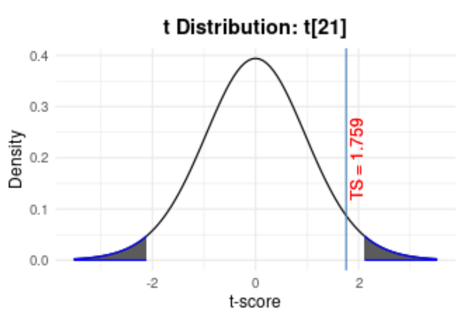
Step 2: Set up the null and alternative hypotheses.
Based on the claim, the null and alternative hypotheses are given by $H_0 : \mu = 100$ and $H_1 : \mu \neq 100$.

Step 3: Evaluate the test statistic.
The test statistic is defined to be: $TS = \dfrac{\bar{x} - \mu_0}{s/\sqrt{n}} = \dfrac{100.3 - 100}{0.8/\sqrt{22}} = 1.759.$

Step 4: Find the critical value and calculate the p-value.
Based on the significance level, we found the critical values to be : $CV = \pm t_{\alpha/2,df} = \pm t_{0.025,21}. = \pm 2.08$.
The p-value is can be found as p-value $\approx$ 0.0940000000000001.

Step 5: Make a statistical decision on H_0.
At the 5% significance level, we do not reject the null hypothesis that the true mean is 100 (p-value $= 0.094$).

Step 6: Draw conclusion [justify the claim in step 1].
At the 5% significance level, we reject the alternative hypothesis .



Problem 24. A botanist measures the heights of two species of plants which were normally distributed with a common variance. Species X (n=13, x̄=22 cm, s=3 cm), Species Y (n=11, x̄=19 cm, s=2 cm). The calculated pooled t-statistic is 2.85. For a two-tailed test at α=0.05 with df=22, what is the conclusion?

a) Reject H_0; the mean heights are different.

b) Fail to reject H_0; the mean heights are the same.

c) Reject H_0; Species X is taller.

d) Fail to reject H_0; there is not enough evidence to say the means are different.

Answer: A

Solution: Since one of the sample sizes is less than 31. The following normal test assumes both populations are normal and the two unknown population variances are equal.

Given sample information: $n_1 = 13$, $\bar{x}_1 = 22$, $s_1^2 = 9$.
$n_2 = 11$, $\bar{x}_2 = 19$, $s_2^2 = 4$.

Step 1: Identify the claim of the population mean $(\mu_1 - \mu_2)$.
The given information indicates that the claim is: $\mu_1 - \mu_2$ is equal to 0.

Step 2: Set up the null and alternative hypotheses.
Based on the claim, the null and alternative hypotheses are given by $H_0 : \mu 1 - \mu_2 = 0$ and $H_1 : \mu_1 - \mu_2 \neq 0$.

Step 3: Evaluate the test statistic.
We first find the pooled sample variance in the following

$$s_{pool}^2 = \frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2} = \frac{(13-1)9 + (11-1)4}{13+11-2} = 6.727.$$

The test statistic is defined to be:

$$TS = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{s_{pool}^2/n_1 + s_{pool}^2/n_2}} = \frac{(22-19)-0}{\sqrt{6.727/13 + 6.727/11}} = 2.823.$$

Step 4: Find the critical value and calculate the p-value.
Based on the significance level, we found the critical values to be : $\pm t_{\alpha/2,df} = \pm t_{0.025,22}. = \pm 2.074$.

Step 5: Make a statistical decision on H_0.
At the 5% significance level, we reject the null hypothesis that the true mean is 0 (p-value $= 0.01$).

Step 6: Draw conclusion [justify the claim in step 1].
At the 5% significance level, we conclude the alternative hypothesis. The claim is addressed using relationship between the alternative hypothesis and the claim.

Problem 25. The average starting salary for accountants in a city is known to be \$55,000 with a population standard deviation of \$5,000. A firm believes its new hires are paid more. They sample 36 new hires and find a mean salary of \$57,000. What is the conclusion at α=0.01?

a) Reject H_0, the firm pays more.

b) Fail to reject H_0, the firm pays more.

c) Reject H_0, the firm does not pay more.

d) Fail to reject H_0, no evidence the firm pays more.

Answer: A

Given sample information: $n = 36$, $\bar{x} = 57000$, $s = 5000$.

Step 1: Identify the claim of the population mean (μ_0).
The given information indicates that the claim is: μ_0 is greater than 55000.

Step 2: Set up the null and alternative hypotheses.
Based on the claim, the null and alternative hypotheses are given by $H_0 : \mu = 55000$ and $H_1 : \mu > 55000$.

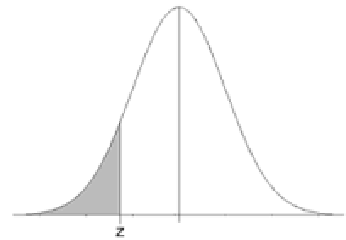
Step 3: Evaluate the test statistic.
The test statistic is defined to be: $TS = \dfrac{\bar{x} - \mu_0}{s/\sqrt{n}} = \dfrac{57000 - 55000}{5000/\sqrt{36}} = 2.4$

Step 4: Find the critical value and calculate the p-value.
Based on the significance level, we found the critical value$s$ to be : $z_\alpha = z_{0.01} = 2.326$
The p-value is can be found as p-value $\approx$ 0.00800000000000001.

Step 5: Make a statistical decision on H_0.
At the 1% significance level, we reject the null hypothesis. (p-value $= 0.008$).

Step 6: Draw conclusion [justify the claim in step 1].
At the 1% significance level, we conclude the alternative hypothesis.

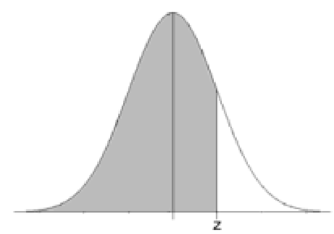
Standard Normal Cumulative Probability Table



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

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

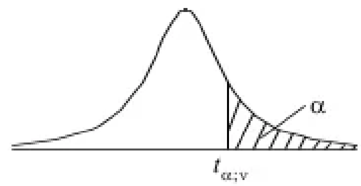
Standard Normal Cumulative Probability Table



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

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

Table of the Student's t-distribution



The table gives the values of $t_{\alpha;\nu}$ where $\Pr(T_\nu > t_{\alpha;\nu}) = \alpha$, with ν degrees of freedom

ν \ α	0.1	0.05	0.025	0.01	0.005	0.001	0.0005
1	3.078	6.314	12.076	31.821	63.657	318.310	636.620
2	1.886	2.920	4.303	6.965	9.925	22.326	31.598
3	1.638	2.353	3.182	4.541	5.841	10.213	12.924
4	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	1.319	1.714	2.069	2.500	2.807	3.485	3.767
24	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	1.296	1.671	2.000	2.390	2.660	3.232	3.460
120	1.289	1.658	1.980	2.358	2.617	3.160	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.090	3.291