Statistics CA Exam

Sample Questions

The number in square brackets after the question number represents the topic to which the question corresponds. The list of topics can be found on pages ** and **.

1-4. The ages of 5 randomly selected members of a club are as follows: 42, 52, 57, 63, 51

1. [**1.1.1**] The sample mean is
   (A) 21 (B) 60.5 (C) 52 (D) 53 (E) 7.78

2. [**1.1.1**] The sample median is
   (A) 21 (B) 60.5 (C) 52 (D) 53 (E) 7.78

3. [**1.2.1**] The sample variance is
   (A) 21 (B) 7.78 (C) 52 (D) 53 (E) 60.5

4. [**1.2.1**] The sample range is
   (A) 21 (B) 60.5 (C) 52 (D) 53 (E) 7.78

5-7. The following table shows the number of credit hours registered for by 20 randomly selected students in a class.

Number of dollar bills	frequency (f_i)	mid-point (x_i)	$f_i x_i$
4 – 6	4	5	20
7 – 9	7	8	56
10 – 12	8	11	88
13 – 15	1	14	14
Total	20		178

5. [**1.1.2**] The sample mean is
   (A) 4.68 (B) 8.9 (C) 9.8 (D) 17.8 (E) None of these

6. [**1.1.2**] The class that contains the median is
   (A) 4 – 6 (B) 7 – 9 (C) 10 – 12 (D) 13 – 15

7. [**1.1.2**] The modal class is
   (A) 4 – 6 (B) 7 – 9 (C) 10 – 12 (D) 13 – 15

8. [**1.1.3**] Which of the following statements is correct?
   (A) The range is a measure of central tendency.
   (B) The median is a measure of dispersion.
   (C) For a symmetric distribution, the mean is equal to the median.
   (D) For a skewed distribution, the variance is a negative number.
   (E) The variance is a measure of central tendency.

9. [**1.3.2**] After a test, John found out that she scored in the 80^{th} percentile. This means
   (A) John scored as high or higher than 20% of the students who took the test.
   (B) At least 80% of the students who took the test did better than John.
   (C) John scored as high or higher than 80% of the students who took the test.
   (D) John answered 80% of the questions correctly.
   (E) None of the above

10-12. The probability that Mary will play soccer is 0.3, the probability that Wendy will play soccer is 0.4, and they make their decisions independently.

10. [**2.1.3**] The probability that both of them will play soccer is
    (A) .28 (B) .18 (C) .1 (D) .42 (E) .12

11. [**2.1.2**] The probability that Mary or Wendy or both will play soccer is
    (A) .58 (B) .82 (C) .7 (D) .12 (E) None of these

12. [**2.1.3**] The probability that both Mary and Wendy will not play soccer is
    (A) .58 (B) .82 (C) .18 (D) .42 (E) .12

13-15. A survey classified 200 students by gender and by their opinion on a certain issue. The number falling into the different categories are shown in the following table. A student is randomly chosen from the group.

	Opinion		
Gender	For	Against	Total
Male	30	40	70
Female	50	80	130
Total	80	120	200

13. [**2.1.1**] The probability that the student is female and is against the issue is
    (A) .615 (B) .4 (C) .667 (D) .85 (E) None of these

14. [**2.1.2**] The probability that the student is male or is for the issue is
    (A) .35 (B) .40 (C) .43 (D) .6 (E) .375

15. [**2.1.4**] Given that the student chosen is for the issue, the conditional probability that the student is male is
    (A) .375 (B) .35 (C) .40 (D) .6 (E) .43

16-18. The following is the probability distribution of the number of phone calls received by an office between 8 am and 9 am on a day.

x	1	2	3	4	5
p(x)	.1	.2	.2	.4	.1

16. [**2.2.1**] The probability of at least 3 phone calls is
(A) .5 (B) .2 (C) .3 (D) .7 (E) None of these

17. [**2.2.2**] The mean number of phone calls is
(A) 3.2 (B) 3.5 (C) 11.6 (D) 1.36 (E) 1

18. [**2.2.2**] The variance of the number of phone calls is
(A) 3.2 (B) 1.17 (C) 11.6 (D) 1.36 (E) None of these

19. [**2.3.2**] Suppose that 80% of all voters in a city support candidate A. Assume that 40 voters in the city are randomly selected, what is the expected number of voters that will support candidate A in such a group?
(A) 8 (B) 20 (C) 32 (D) 30 (E) None of these

20-24. Suppose the scores on an examination are normally distributed with a mean of 50 and a standard deviation of 10.

20. [**2.4.4**] What is the probability that the score of a student will be higher than 56.5?
(A) .2578 (B) .7422 (C) .7578 (D) .2422 (E) .65

21. [**2.4.4**] What proportion of the students score below 45?
(A) .1915 (B) .6915 (C) .50 (D) .3085 (E) 1

22. [**2.4.1**] What is the z score that corresponds to the score 44?
(A) .60 (B) –.60 (C) –6.0 (D) 6.0 (E) .85

23. [**2.4.1**] What is the raw score that corresponds to $z = 1.5$?
(A) 35 (B) 15 (C) 65 (D) 50 (E) None of these

24. [**2.5.2**] If repeated samples of size $n = 25$ is taken from the scores, what is the standard deviation of the distribution of the sample mean?
(A) 10 (B) 4 (C) 0.4 (D) 2 (E) None of these

25-27. In order to estimate the mean diameter of a variety of orange, a sample of 25 oranges were selected and the sample mean was found to be 7.5 cm with a sample standard deviation of 1.5 cm.

25. [**3.1.1**] The point estimate of the population mean is
(A) 1.2 (B) 25 (C) 1.44 (D) 75 (E) None of these

26. [**3.1.2**] A 95% confidence interval for the population mean is

(A) (6.91, 8.09) (B) (5.44, 9.56) (C) (6.88, 8.12)
(D) (5.54, 9.46)

27. [**3.1.4**] If a 90% confidence interval is constructed, it will be _____ the 95% confidence interval.

(A) wider than (B) narrower than (C) the same as

28-31. The average annual medical expense per family in a small city was \$750 in 1998. A random sample of 49 families was selected and their expenses for 1999 had a mean of \$800 with a standard deviation of \$140. Based on this information, can we conclude at $\alpha = 5\%$ that the average annual medical expenses had increased from the 1998 average?

28. [**3.2.2**] Let μ represent the population mean expenditure for 1999. Which of the following is the appropriate alternative hypothesis?

(A) $\mu \neq 750$ (B) $\mu = 750$ (C) $\mu > 750$ (D) $\mu < 750$ (E) $\mu > 800$

29. [**3.2.2**] Which of the following is the appropriate rejection region?

(A) $Z < -1.96$ or $Z > 1.96$ (B) $Z < -1.96$ (C) $Z < -1.645$ (D) $Z > 1.645$
(E) $-1.96 < Z < 1.96$

30. [**3.2.2**] Which of the following is the value of the test statistic?

(A) 50 (B) –0.36 (C) 0.36 (D) –2.5 (E) 2.5

31. [**3.2.2**] Which of the following is the appropriate conclusion?

(A) The mean medical expenses have not increased from the 1998 average.
(B) The mean medical expenses have increased from the 1998 average.
(C) A Type II error has occurred.
(D) A larger sample is needed in order to draw conclusions.
(E) The probability of a type I error is equal to .95.

32-35. The general partner of a limited partnership firm has told a potential investor that the mean monthly rent for a 3-bedroom home in the area is \$500. The investor wants to check out this claim on her own. She obtains the monthly rental charges for a random sample of 9 three-bedroom homes in order to test H_0: $\mu = 500$ against H_a: $\mu \neq 500$, at $\alpha = 10\%$. The sample mean is \$520 with a sample standard deviation of \$48.

32. [**3.2.3**] Which of the following is the appropriate rejection region?

(A) $t > 2.306$ (B) $-1.86 < t < 1.86$ (C) $t > 1.833$ (D) $t < -1.86$ or $t > 1.86$
(E) $t < -2.306$ or $t > 2.306$

33. [**3.2.3**] What is the value of the test statistic?

(A) 1.25 (B) –1.25 (C) .42 (D) –.42 (E) 20

34. [**3.2.3**] Which of the following is the correct conclusion?
(A) The mean monthly rent is less than \$500.
(B) The mean monthly rent differs from \$500.
(C) The mean monthly rent is more than \$500.
(D) A Type II error has occurred.
(E) None of the above

35. [**3.2.3**] In order for the above procedure to be valid, what assumption will be necessary?
(A) The population distribution of the monthly rent is approximately normal.
(B) The population distribution of the monthly rent is uniform.
(C) The population distribution of the monthly rent is skewed.
(D) No assumption will be necessary.

36. [**3.2.4**] A consumer advocate claims that more than 10% of the bolts from supplier A are defective. To test this claim, the correct alternative hypothesis is
(A) $p = .1$ (B) $p \neq .1$ (C) $p < .1$ (D) $p > .1$ (E) $p < .9$

37. [**3.3.1**] A consumer claims that car model of type 1 has a lower average miles per gallon than car model of type 2. Let μ_1 and μ_2 represent the average miles per gallon for types 1 and 2 respectively. Which of the following is the correct null hypothesis?
(A) $\mu_1 > \mu_2$ (B) $\mu_1 \geq \mu_2$ (C) $\mu_1 \leq \mu_2$ (D) $\mu_1 < \mu_2$ (E) $\mu_1 \neq \mu_2$

38. [**4.1.2**] Suppose the coefficient of correlation between the two variables x and y was found to be 0.96, we can say that
(A) x and y have variances that are significantly different.
(B) x and y have means that are significantly different.
(C) x and y have a strong linear relationship.
(D) x and y do not have a strong linear relationship.
(E) The means of x and y are about the same.

39-40. Eleven cars of a certain model, between one and seven years of age, were randomly selected from the classified ads. The following summary statistics on their ages (x in years) and prices (y in 1000 dollars) were used to obtain the regression equation

$$\hat{y} = \hat{\beta}_0 + \hat{\beta}_1 x = 19.8 - 1.56x.$$

39. [**4.2.2**] Which of the following statements is correct?
(A) The price will increase by \$1560 for every 1-year increase in age.
(B) The price will decrease by \$1560 for every 1-year decrease in age.
(C) The relationship between price and age is positive.
(D) The price for a car with 0 year of age is \$19800.
(E) None of the above

40. [**4.2.3**] The predicted price for a 5-year-old car is
(A) \$12000 (B) \$1200 (C) \$27000 (D) \$2700 (E) None of these

Key

1	2	3	4	5	6	7	8	9	10
D	C	E	A	B	B	C	C	C	E

11	12	13	14	15	16	17	18	19	20
A	D	B	D	A	D	A	D	C	A

21	22	23	24	25	26	27	28	29	30
D	B	C	D	E	C	B	C	D	E

31	32	33	34	35	36	37	38	39	40
B	D	A	E	A	D	B	C	D	A

Key to Sample Questions

1. The sample mean = $\overline{x} = \Sigma x_i/n = [42+52+57+63+51]/5 = 265/5 = 53$. The answer is (D).

2. Order the data to get 42, 51, 52, 57, 63. Since n = 5 is odd, there is a single middle value which is in position $(n + 1)/2 = (5 + 1)/2=3$. Median = 52. The answer is (C).

3. Variance = $s^2 = [\Sigma x_i^2 – (\Sigma x_i)^2]/(n–1)$, where $\Sigma x_i^2 = 42^2 + 52^2 + 57^2 + 63^2 + 51^2 = 14287$
So, $s^2 = [14287 – (265^2)/5]/4 = 242/4 = 60.5$. The answer is (E).

4. Range = maximum – minimum = 63 – 42 = 21. The answer is (A).

5. The mean for grouped data = $\overline{x} = \Sigma x_i f_i/[\Sigma f_i] = 178/20 = 8.9$. The answer is (B).

6. Since n is even, the median is the average of values in positions n/2 and the next. That is positions10 and 11. These positions are occupied by values in class 7 – 9. The answer is (B).

7. The modal class is the one with the highest frequency. This is class 10 – 12. Answer is (C).

8. Range and variance are measures of variation. Hence (A) and (E) are incorrect. The median is a measure of Central Tendency and so (B) is incorrect. The variance is always non-negative and so (D) is incorrect. For symmetric distributions, the mean, median, and mode are equal. Hence the answer is (C).

9. The p-th percentile is the value such that p percent of the measurements are less than that value and (100 – p) percent are greater. Thus, John scored as high or better than 80% of those who took the test. The answer is (C).

10. Because of independent, P(Mary and Wendy) = P(Mary)*P(Wendy) = .3*.4 = .12. The answer is (E).

11. Use the addition rule. P(Mary or Wendy) = P(Mary) + P(Wendy) – P(Mary and Wendy)
= .3 + .4 – .12 = .58. The answer is (A)

12. Because of independence, P(Not Mary and Not Wendy) = P(Not Mary)*P(Not Wendy)
= (1 – .3)*(1 – .4) = .7*.6 = .42. The answer is (D). Not that P(Not Mary) is found by using the complementation rule.

13. P(female and against) = 80/200 = .4. The answer is (B). Note that 80 is the number of female students who are against the issue.

14. P(male or for) = (30 + 40 + 50)/200 = 0.6. The answer is (D). The value (30+40+50) are all students who are either male or for the issue.

15. P(male given for) = P(male|for) = 30/80 = .375. The answer is (A). Note that this is a conditional probability with a total of 80 students in the sample space. From this group of 80 students, only 30 are males.

16. P(at least 3) = P(3) + P(4) + P(5) = .2 + .4 + .1 = .7. The answer is (D).

17. Mean = $\mu = E(x) = \Sigma xp(x) = 1(.1) + 2(.2) + 3(.2) + 4(.4) + 5(.1) = 3.2$. Answer is (A).

18. Variance = $\sigma^2 = E(x^2) - \mu^2$,
where $E(x^2) = \Sigma x^2 p(x) = 1(1) + 4(.2) + 9(.2) + 16(.4) + 25(.1) = 11.6$
Hence $\sigma^2 = 11.6 - 3.2^2 = 1.36$. The answer is (D).

19. The number of voters in the city has a binomial distribution with n = 40 and p = .8. Hence the mean is $\mu = np = 40(.8) = 32$. The answer is (C).

20. $P(x > 56.5) = P(z > [56.5 - 50]/10) = P(z > 0.65)$. Go the z-table to look up 0.65. One finds .2422. This is the area between 0 and 0.65. Since we need the area to the right of 0.65, we find the probability as 0.5 – 0.2422 = .2578. The answer is (A).

21. $P(x < 45) = P(z < [45 - 50]/10) = P(z < -0.5)$. Go to the z-table to look up 0.5. One finds .1915. This is the area between 0 and –0.5. Since we need the area to the left of –0.5, we find the probability as 0.5 – 0.1915 = 0.3085. The answer is (D).

22. $z = (x - \mu)/\sigma = (44 - 50)/10 = -0.6$. The answer is (B).

23. $z = 1.5 = (x - 50)/10$. That is $x - 50 = 1.5*10 = 15$. Hence, $x = 15 + 50 = 65$. Answer is (C).

24. The standard deviation of $\bar{x}$ is $s/\sqrt{n}$. Thus, we have $10/\sqrt{25} = 10/5 = 2$. The answer is (D).

25. The point estimate of μ is $\bar{x} = 7.5$. The answer is (E) since 7.5 is not an option.

26. The sample size is small. The 95% confidence interval is given by
$\bar{x} \pm t_{\alpha/2}(s/\sqrt{n}) = 7.5 \pm 2.064(1.5/5) = 7.5 \pm 0.62 = (6.88, 8.12)$. The answer is (C). Note that the degrees of freedom for the $t = n - 1 = 25 - 1 = 24$.

27. When you reduce the confidence level, the interval gets shorter. The answer is (B).

28. We wish to test the claim that 1999 average is greater than that of 1998 and so $\mu > 750$.
The answer is (C).

29. The rejection region is at the upper tail. Since n is large, we use $Z > z_\alpha = 1.645$ from the table. Note that we want an area of .05 above the z_α. The z point that corresponds to this is 1.645. The answer is (D).

30. The vale of the test statistic $= Z = (\bar{x} - \mu_0)/[s/\sqrt{n}] = (800 - 750)/[140/7] = 2.5$. The answer is (E).

31. Since $2.5 > 1.645$, we reject H_0. The conclusion is that the mean medical expenses have increased from 1998 to 1999. The answer is (B).

32. The alternative hypothesis is two-tailed. The rejection region is in terms of t since $n = 9$ is small. Reject H_0 when $t < -t_{\alpha/2}$ or $t > t_{\alpha/2}$. The degrees of freedom for $t = n - 1 = 8$. From the t-table, we obtain 1.86for $\alpha/2 = 0.05$. Reject H_0 if $t < -1.86$ or $t > 1.86$. The answer is (D).

33. Value of test statistics $= t = (\bar{x} - \mu_0)/[s/\sqrt{n}] = (520 - 500)/[48/3] = 1.25$. Answer is (A).

34. Since 1.25 does not fall into the rejection region, we fail to reject H_0. Thus, we do not have sufficient evidence to say that the mean monthly rent differs from $500. None of the options says this, hence the answer is (E).

35. We need to make an assumption that the population is approximately normal because we use the t-distribution. The answer is (A).

36. The claim is that the percentage is more than 10%. Hence, we write $p > .1$. Answer is (D).

37. The claim is that $\mu_1 < \mu_2$. The claim does not contain = and so it is the alternative hypothesis. The null hypothesis is the complement of this claim that is $\mu_1 \geq \mu_2$. Hence the answer is (B).

38. If the correlation is 0.96, it means there is a strong linear relationship between x and y. The answer is (C).

39. The price will decrease by $1560 for every 1-year increase in age. Hence, both (A) and (B) are incorrect. Since the coefficient $\hat{\beta}_1$ is negative, the relationship between x and y is negative and so (C) is incorrect. When x = 0, the price is $19800 and so the answer is (D).

40. The predicted value for x = 5 is given by 19.8 – 1.56*5 = 12. Since the price is given in 1000 dollars, the predicted price for a 5-year-old car is $12000. The answer is (A).

STATISTICS AND PROBABILITY FORMULAS

1. Sample mean: $\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$

2. Sample variance: $s^2 = \frac{\sum_{i=1}^{n} x_i^2 - n\left(\bar{x}^2\right)}{n-1}$

3. Sample standard deviation: $s = \sqrt{s^2}$

4. General addition rule: $P(A \text{ or } B) = P(A \cup B) = P(A) + P(B) - P(A \cap B)$

5. Conditional probability: $P(A \mid B) = \frac{P(A \cap B)}{P(B)}$

6. General multiplication rule: $P(A \text{ and } B) = P(A \cap B) = P(B) \cdot P(A \mid B) = P(A) \cdot P(B \mid A)$

7. Converting to standard units: $z = \frac{x - \mu}{\sigma}$ or $z = \frac{x - \bar{x}}{s}$

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

9. Large sample confidence interval for the population mean μ : $\bar{x} \pm z_{\alpha/2}\left(\frac{s}{\sqrt{n}}\right)$

10. Small sample confidence interval for the population mean μ : $\bar{x} \pm t_{\alpha/2}\left(\frac{s}{\sqrt{n}}\right)$

    The t-distribution has n – 1 degrees of freedom.

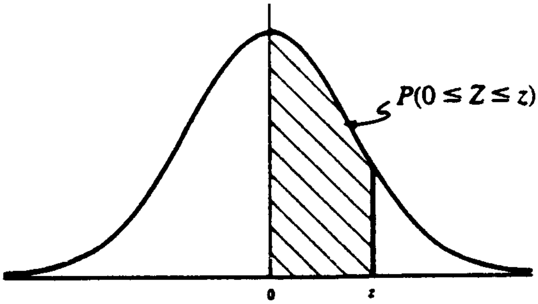
11. Statistic for test concerning the population mean, where $\mu = \mu_0$ (large sample):

    $z = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$

12. Statistic for test concerning the population mean, where $\mu = \mu_0$ (small sample):

    $t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$. The t-distribution has n – 1 degrees of freedom.

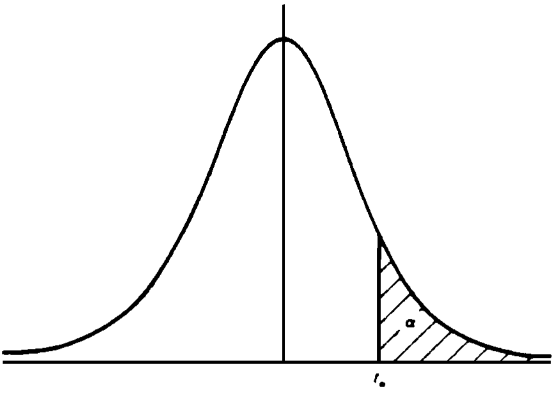
TABLE 4: Probabilities for the Standard Normal Distribution



z	Second decimal phase in z									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
.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	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.4997	.4997	.4497	.4997	.4997	.4997	.4997	.4997	.4997	.4998

From Harcourt Brace Javanovich College Outline Series Statistics II: Estimation and Tests of Hypothesis by Elliot A. Tanis, Books for Professionals, Inc., 1987.

TABLE 6: Student's t Critical Values*



r	.25	.10	.05	.025	.01	.005
	α					
1	1.000	3.08	6.31	12.7	31.8	63.7
2	.816	1.89	2.92	4.30	6.97	9.92
3	.765	1.64	2.35	3.18	4.54	5.84
4	.741	1.53	2.13	2.78	3.75	4.60
5	.727	1.48	2.02	2.57	3.37	4.03
6	.718	1.44	1.94	2.45	3.14	3.71
7	.711	1.42	1.89	2.36	3.00	3.50
8	.706	1.40	1.86	2.31	2.90	3.36
9	.703	1.38	1.83	2.26	2.82	3.25
10	.700	1.37	1.81	2.23	2.76	3.17
11	.697	1.36	1.80	2.20	2.72	3.11
12	.695	1.36	1.78	2.18	2.68	3.05
13	.694	1.35	1.77	2.16	2.65	3.01
14	.692	1.35	1.76	2.14	2.62	2.98
15	.691	1.34	1.75	2.13	2.60	2.95
16	.690	1.34	1.75	2.12	2.58	2.92
17	.689	1.33	1.74	2.11	2.57	2.90
18	.688	1.33	1.73	2.10	2.55	2.88
19	.688	1.33	1.73	2.09	2.54	2.86
20	.687	1.33	1.72	2.09	2.53	2.85
21	.686	1.32	1.72	2.08	2.52	2.83
22	.686	1.32	1.72	2.07	2.51	2.82
23	.685	1.32	1.71	2.07	2.50	2.81
24	.685	1.32	1.71	2.06	2.49	2.80
25	.684	1.32	1.71	2.06	2.49	2.79
26	.684	1.32	1.71	2.06	2.48	2.78
27	.684	1.31	1.70	2.05	2.47	2.77
28	.683	1.31	1.70	2.05	2.47	2.76
29	.683	1.31	1.70	2.05	2.46	2.76
z_α	.674	1.28	1.645	1.96	2.33	2.58

* For df ≥ 30, the critical value t_α is approximated by z_α, given in the bottom row of table.

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