Math 221

Hypothetical Exam 4, Wi2008, (Chapter 6, 21, 23, 24, 25 in Moore, 4th)

31415927

July 16, 2186

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Show all your work to receive credit. All answers must be justified to get full credit.

These questions are intended to give students in Math 221 some idea of the types of questions which could be asked on an exam. They may not cover all of the topics which will be on your exam (and they may cover more topics than are on your exam). The length of your exam may be shorter than this practice exam. Working these problems is not a substitute for studying your notes and reading the book.

Multiple Choice

Circle the letter corresponding to the best answer for each of the problems below (4 pts each)

For the following description, answer questions 1 to 2. The F test statistic was calculated for a hypothesis test involving the means of four different groups. In each group, there were 35 individuals randomly selected from each of the four independent populations.

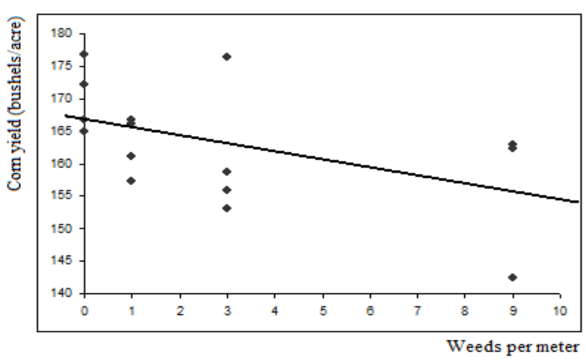
1. The degrees of freedom for error are:

   A. 4. B. 3. C. 136. D. 140.

2. The degrees of freedom for groups are:

   A. 140. B. 4. C. 136. D. 3.

For the following description, answer questions 3 to 6.
Lamb's-quarter is a common weed that interferes with the growth of corn. An agriculture researcher planted corn at the same rate in 16 small plots of ground, then weeded the plots by hand to allow a fixed number of lamb's-quarter plants to grow in each meter of corn row. No other weeds were allowed to grow. A scatterplot is given below with the least square regression of the 16 collected data. In order to investigate if lamb's-quarter plants reduce corn yield, the following computer software (Minitab) output is provided based on the researcher's data and a prediction value using 6 weeds per meter.



Minitab output

The regression equation is Corn = 166 - 1.10 Weeds

Predictor	Coef	Stdev	t-ratio	p
Constant	166.483	2.725	61.11	0.000
Weeds	-1.0987	0.5712	-1.92	0.038

s = 7.977 R-sq = 20.9% R-sq (adj) = 15.3%

Fit	Stdev.Fit	95.0% C.I.	95.0% P.I.
159.89	2.54	(154.44, 165.34)	(141.93, 177.85)

3. Which of the following statement about the regression line is true?

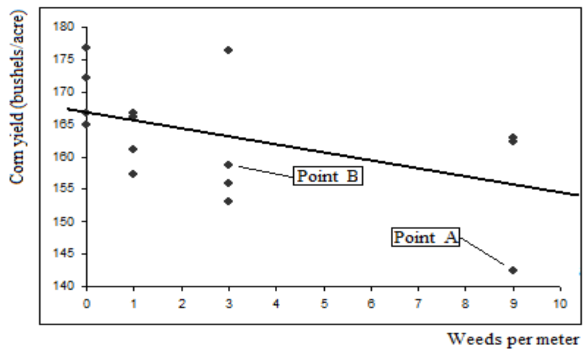
   A. The value of r^2 is relatively large, which means the regression is useful for precise prediction.
   B. The value of r^2 is relatively large, which means the regression is not useful for precise prediction.
   C. The value of r^2 is relatively small, the regression is useful for precise prediction.
   D. The value of r^2 is relatively small, the regression is not useful for precise prediction.

4. Using $\alpha = 5\%$, which one is an appropriate statistical conclusion?

   A. The population correlation is significantly negative.
   B. The population correlation is not significantly negative.
   C. There is not enough evidence to suggest a positive population correlation.
   D. There is not enough evidence to suggest a negative population correlation.

5. Look at the least-squares regression line again. Compare the squared errors (residuals) from the two Points A and B.

   A. The squared error for point A is larger than the squared error for Point B.
   B. The squared error for point A is smaller than the squared error for Point B.
   C. The squared error for point A is the same as the squared error for Point B.
   D. There is not enough information.



6. The degree of freedom of the regression standard error is

   A. 5 B. 8 C. 14 D. 15

7. A random-digit dialing sample of 1750 adults found that 1140 used the Internet. Of the 1140 that used the Internet, 940 said they expect businesses to have Web sites containing product information; 320 of the 610 nonusers said this too. Let p_1 and p_2 be the proportions of all Internet users and nonusers, respectively, that expect businesses to have Web sites containing product information. A 90% confidence interval for $p_1 - p_2$ is

   A. 0.300 ± 0.023.
   B. 0.300 ± 0.038.
   C. 0.300 ± 0.045.
   D. 0.300 ± 0.054.

8. Is it appropriate to use the Large-Sample method for the previous exercise?

   A. Yes, because there are at least 5 in each group, where the number of successes and failures doesn't matter.
   B. Yes, because the numbers of successes and failures are each 10 or more in both samples.
   C. Yes, because the numbers of successes and failures are each 20 or more in both samples.
   D. No, because the conditions for the plus four method are satisfied so we should use it instead.

9. A sample survey interviews SRSs of 500 female college students and 550 male college students. Each student is asked if he or she has ever watched college basketball. In all, 410 of the women and 484 of the men say "Yes". The pooled sample proportion of those that answered "Yes" is

   A. $\hat{p} = 1.70$.
   B. $\hat{p} = 0.89$.
   C. $\hat{p} = 0.82$.
   D. $\hat{p} = 0.85$.

10. In a large Midwestern university, an SRS of 100 entering freshmen in 1999 found that 20 finished in the bottom third of their high school class. In 2001, an SRS of 100 entering freshmen found that 10 finished in the bottom third of their high school class. Let p_1 and p_2 be the proportion of all entering freshmen in 1999 and 2001, respectively, who graduated in the bottom third of their high school class. Is there evidence that the proportion of freshmen who graduated in the bottom third of their high school class in 2001 has been reduced, compared to the proportion in 1999? To determine this, you test the hypotheses $H_0 : p_1 = p_2$, $H_a : p_1 > p_2$. The value of the z-statistic for testing these hypotheses is

    A. $z = 1.20$. B. $z = 1.65$. C. $z = 1.96$. D. $z = 1.98$.

11. In an experiment to learn if studying helps students pass exams, 20 students were selected and randomly placed into two groups of 10 students. The students were taught to do statistics by a highly qualified BYU-H statistics instructor. The next day, one group of 10 students studied all day and 7 of them passed an exam; only 2 of the 10 students in the other group that went to the beach all day passed the exam. The plus four 90% confidence interval for the difference between the proportion of students that passed when they studied and that passed when they didn't is

    A. 0.455 ± 0.312.
    B. 0.417 ± 0.304.
    C. 0.417 ± 0.185.
    D. The plus four method doesn't apply.

For the following description, answer questions 12 to 18. The National Survey of Adolescent Health interviewed several thousand teens (grades 7 to 12). One question asked was "What do you think are the chances you will be married in the next ten years?" Here is a two-way table of the responses by gender:

	Female	Male
Almost no chance	119	103
Some chance, but probably not	150	171
A 50-50 chance	447	512
A good chance	735	710
Almost certain	1174	756

12. How many females were among the respondents?

    A. 2625
    B. 4877
    C. 2252
    D. need more information

13. What percent of those who thought they were almost certain to be married were female?

    A. about 40%
    B. about 45%
    C. about 61%
    D. need more information

14. The percent of males among the respondents was

    A. about 46%
    B. about 54%
    C. about 86%
    D. about 14%

15. The percent from the previous exercise is part of

    A. the marginal distribution of gender.
    B. the marginal distribution of chance of marriage.
    C. the conditional distribution of gender given chance of marriage.

16. How many individuals are described by this table?

    A. 2625
    B. 4877
    C. 2252
    D. need more information

17. Compute the chi-squared statistic to test to see if there is a relationship between gender and their marriage opinion.

    A. 69.776
    B. 72.343
    C. 3.245
    D. 1.986

18. Compute the expected frequency for a male who feels he has a good change of getting married.

    A. 710
    B. 735
    C. 667.2422
    D. 777.7578

Show Your Work
Show all work clearly and neatly. No work shown means no credit will be given. Use correct notation to get full credit. Reserve scratch paper work for scratch paper, which means only include necessary work on the exam. Erase all mistakes neatly. Keep it neat!

19. A major land developer is considering building a shopping center containing high-end outlet stores. There are three areas in the suburbs that he is considering, but wants to see if there is a significant difference in the mean family incomes for the three areas. He randomly selects five families from each suburb and records their total annual income in thousands of dollars. Below is the sample data and ANova output that resulted.

Mean	n	Std Dev	
51.0	5	5.70	Brentwood
49.2	5	4.76	Cedar Hill
59.2	5	3.19	Chadwin
53.1	15	6.24	Total

ANOVA table

Source	SS	df	MS	F	P-Value
Group	284.13		142.067		0.0121
Error	261.60				
Total	545.73	14			

(a) (4 pts) Complete the blanks in the ANOVA table above.

(b) (10 pts) Conduct a hypothesis test that the mean family income for the three areas are the same.

H_0:

H_a:

$\alpha =$

Test Statistic:

P-value:

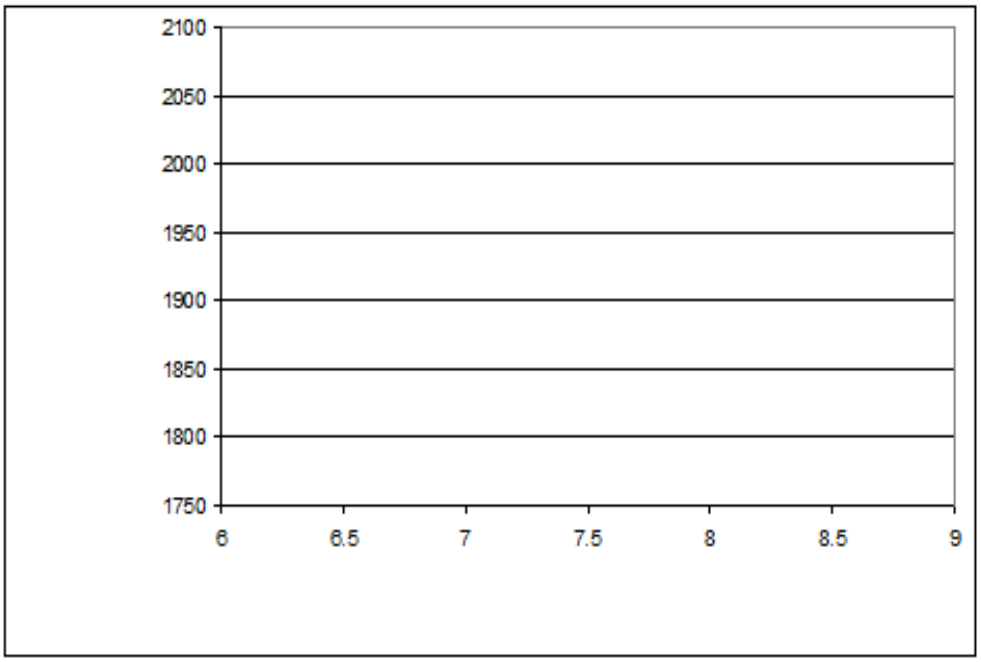
Decision: (Circle one:) Reject H_0 or Fail to Reject H_0

Conclusion:

20. A principal theory in finance states that as bond yields rise, investors take funds out of the stock market, causing it to fall, and buy debt securities (bonds). Consecutive weekly data, which use the federal funds rate as a proxy for bond yields and Dow Jones Index as a measurement of the value of the stock market, as reported by the Commerce Department in the winter of 1988 are shown.

Week	Federal Funds Rates (%)	Dow Jones
1	6.8	2050
2	6.95	2010
3	7.3	1983
4	7.5	2038
5	7.7	1995
6	7.7	1955
7	8.3	1878
8	8.7	1802

(a) (5 pts) Describe the relationship in a graph by completing a scatter plot with a regression line.



(b) (10 pts) Test to see if there is a linear correlation in the population. Use $\alpha = 5\%$.

H_0:
H_a:
$\alpha =$
Test Statistic:
P-value:
Decision: (Circle one:) Reject H_0 or Fail to Reject H_0
Conclusion:

(c) (3 pts) Based on this study, what are the factors to believe that interest rates (or Federal Funds Rates between 6.8% to 8.7%) serve as a reliable forecasting tool for the stock market?

(d) (2 pts) What is a weakness of this study?

21. (10 pts) At $\alpha = 0.05$ is there a significant difference in the PROPORTION of strokes in the two Aspirin groups?

	Number of strokes	Number of patients
Aspirin alone	206	1649
Aspirin+dipyridamole	157	1650

H_0:
H_a:
$\alpha =$
Test Statistic:
P-value:
Decision: (Circle one:) Reject H_0 or Fail to Reject H_0
Conclusion:

22. (10 pts) Because of erratic rainfall patterns and low water-holding capacities of soils in Florida, supplemental irrigation is required for producing most crops. A research team has developed five alternative water management strategies for irrigating crop land in central Florida. A random sample of 100 agricultural engineers were interviewed and asked which of the strategies he or she believes would yield maximum productivity. A summary of their responeses is shown in the table.

Strategy	A	B	C	D	E
Frequency	17	27	22	15	19

Is there evidence that there is a difference in the strategies?

H_0:
H_a:
$\alpha =$
Test Statistic:
P-value:
Decision: (Circle one:) Reject H_0 or Fail to Reject H_0
Conclusion:

Table entry for z is the area under the standard Normal curve to the left of z

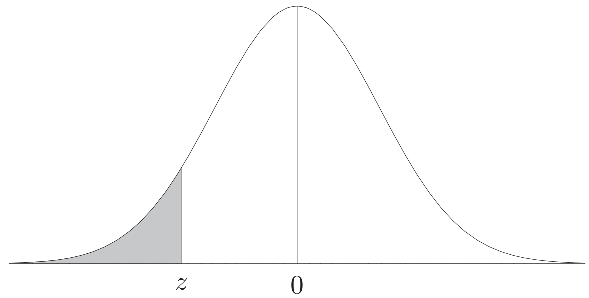


Table A: Standard Normal probabilities										
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-3.4	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0002
-3.3	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0004	.0004	.0003
-3.2	.0007	.0007	.0006	.0006	.0006	.0006	.0006	.0005	.0005	.0005
-3.1	.0010	.0009	.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

Table entry for z is the area under the standard Normal curve to the left of z

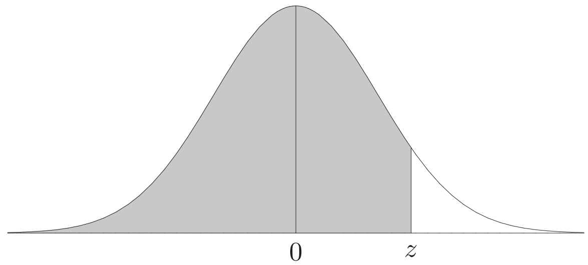


Table A: Standard Normal probabilities										
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.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

Table entry for C is the critical value t^* required for a confidence level C. To approximate one- and two-sided P-values, compare the value of the t statistic with the critical values of t^* that match the P-values given at the bottom of the table.

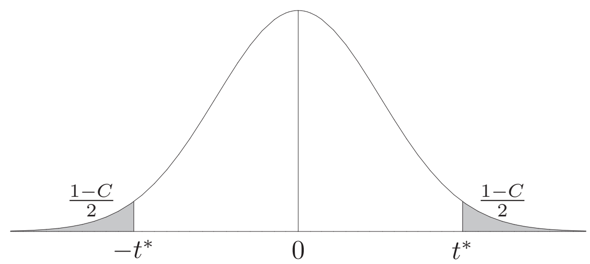


Table C	t-Distribution critical values											
Degrees	Confidence level C											
of Freedom	50%	60%	70%	80%	90%	95%	96%	98%	99%	99.5%	99.8%	99.9%
1	1.000	1.376	1.963	3.078	6.314	12.706	15.895	31.821	63.657	127.321	318.309	636.619
2	0.816	1.061	1.386	1.886	2.920	4.303	4.849	6.965	9.925	14.089	22.327	31.599
3	0.765	0.978	1.250	1.638	2.353	3.182	3.482	4.541	5.841	7.453	10.215	12.924
4	0.741	0.941	1.190	1.533	2.132	2.776	2.999	3.747	4.604	5.598	7.173	8.610
5	0.727	0.920	1.156	1.476	2.015	2.571	2.757	3.365	4.032	4.773	5.893	6.869
6	0.718	0.906	1.134	1.440	1.943	2.447	2.612	3.143	3.707	4.317	5.208	5.959
7	0.711	0.896	1.119	1.415	1.895	2.365	2.517	2.998	3.499	4.029	4.785	5.408
8	0.706	0.889	1.108	1.397	1.860	2.306	2.449	2.896	3.355	3.833	4.501	5.041
9	0.703	0.883	1.100	1.383	1.833	2.262	2.398	2.821	3.250	3.690	4.297	4.781
10	0.700	0.879	1.093	1.372	1.812	2.228	2.359	2.764	3.169	3.581	4.144	4.587
11	0.697	0.876	1.088	1.363	1.796	2.201	2.328	2.718	3.106	3.497	4.025	4.437
12	0.695	0.873	1.083	1.356	1.782	2.179	2.303	2.681	3.055	3.428	3.930	4.318
13	0.694	0.870	1.079	1.350	1.771	2.160	2.282	2.650	3.012	3.372	3.852	4.221
14	0.692	0.868	1.076	1.345	1.761	2.145	2.264	2.624	2.977	3.326	3.787	4.140
15	0.691	0.866	1.074	1.341	1.753	2.131	2.249	2.602	2.947	3.286	3.733	4.073
16	0.690	0.865	1.071	1.337	1.746	2.120	2.235	2.583	2.921	3.252	3.686	4.015
17	0.689	0.863	1.069	1.333	1.740	2.110	2.224	2.567	2.898	3.222	3.646	3.965
18	0.688	0.862	1.067	1.330	1.734	2.101	2.214	2.552	2.878	3.197	3.610	3.922
19	0.688	0.861	1.066	1.328	1.729	2.093	2.205	2.539	2.861	3.174	3.579	3.883
20	0.687	0.860	1.064	1.325	1.725	2.086	2.197	2.528	2.845	3.153	3.552	3.850
21	0.686	0.859	1.063	1.323	1.721	2.080	2.189	2.518	2.831	3.135	3.527	3.819
22	0.686	0.858	1.061	1.321	1.717	2.074	2.183	2.508	2.819	3.119	3.505	3.792
23	0.685	0.858	1.060	1.319	1.714	2.069	2.177	2.500	2.807	3.104	3.485	3.768
24	0.685	0.857	1.059	1.318	1.711	2.064	2.172	2.492	2.797	3.091	3.467	3.745
25	0.684	0.856	1.058	1.316	1.708	2.060	2.167	2.485	2.787	3.078	3.450	3.725
26	0.684	0.856	1.058	1.315	1.706	2.056	2.162	2.479	2.779	3.067	3.435	3.707
27	0.684	0.855	1.057	1.314	1.703	2.052	2.158	2.473	2.771	3.057	3.421	3.690
28	0.683	0.855	1.056	1.313	1.701	2.048	2.154	2.467	2.763	3.047	3.408	3.674
29	0.683	0.854	1.055	1.311	1.699	2.045	2.150	2.462	2.756	3.038	3.396	3.659
30	0.683	0.854	1.055	1.310	1.697	2.042	2.147	2.457	2.750	3.030	3.385	3.646
40	0.681	0.851	1.050	1.303	1.684	2.021	2.123	2.423	2.704	2.971	3.307	3.551
50	0.679	0.849	1.047	1.299	1.676	2.009	2.109	2.403	2.678	2.937	3.261	3.496
60	0.679	0.848	1.045	1.296	1.671	2.000	2.099	2.390	2.660	2.915	3.232	3.460
80	0.678	0.846	1.043	1.292	1.664	1.990	2.088	2.374	2.639	2.887	3.195	3.416
100	0.677	0.845	1.042	1.290	1.660	1.984	2.081	2.364	2.626	2.871	3.174	3.390
1000	0.675	0.842	1.037	1.282	1.646	1.962	2.056	2.330	2.581	2.813	3.098	3.300
z^*	0.674	0.842	1.036	1.282	1.645	1.960	2.054	2.326	2.576	2.807	3.090	3.291
One-sided p	0.2500	0.2000	0.1500	0.1000	0.0500	0.0250	0.0200	0.0100	0.0050	0.0025	0.0010	0.0005
Two-sided p	0.5000	0.4000	0.3000	0.2000	0.1000	0.0500	0.0400	0.0200	0.0100	0.0050	0.0020	0.0010

Table entry for p is the critical value χ^* with probability p lying to its right.

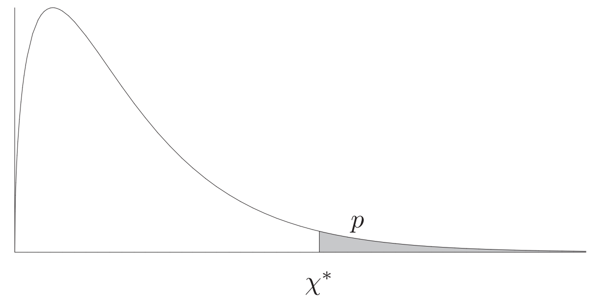


Table E	Chi-square distribution critical values											
	p											
df	0.25	0.20	0.15	0.10	0.05	0.025	0.02	0.01	0.005	0.0025	0.001	0.0005
1	1.32	1.64	2.07	2.71	3.84	5.02	5.41	6.63	7.88	9.14	10.83	12.12
2	2.77	3.22	3.79	4.61	5.99	7.38	7.82	9.21	10.60	11.98	13.82	15.20
3	4.11	4.64	5.32	6.25	7.82	9.35	9.84	11.35	12.84	14.32	16.27	17.73
4	5.38	5.99	6.75	7.78	9.49	11.14	11.67	13.28	14.86	16.42	18.47	20.00
5	6.63	7.29	8.12	9.24	11.07	12.83	13.39	15.09	16.75	18.39	20.52	22.11
6	7.84	8.56	9.45	10.64	12.59	14.45	15.03	16.81	18.55	20.25	22.46	24.10
7	9.04	9.80	10.75	12.02	14.07	16.01	16.62	18.48	20.28	22.04	24.32	26.02
8	10.22	11.03	12.03	13.36	15.51	17.54	18.17	20.09	21.95	23.77	26.12	27.87
9	11.39	12.24	13.29	14.68	16.92	19.02	19.68	21.67	23.59	25.46	27.88	29.67
10	12.55	13.44	14.53	15.99	18.31	20.48	21.16	23.21	25.19	27.11	29.59	31.42
11	13.70	14.63	15.77	17.27	19.68	21.92	22.62	24.73	26.76	28.73	31.26	33.14
12	14.85	15.81	16.99	18.55	21.03	23.34	24.05	26.22	28.30	30.32	32.91	34.82
13	15.98	16.98	18.20	19.81	22.36	24.74	25.47	27.69	29.82	31.88	34.53	36.48
14	17.12	18.15	19.41	21.06	23.68	26.12	26.87	29.14	31.32	33.43	36.12	38.11
15	18.25	19.31	20.60	22.31	25.00	27.49	28.26	30.58	32.80	34.95	37.70	39.72
16	19.37	20.46	21.79	23.54	26.30	28.84	29.63	32.00	34.27	36.46	39.25	41.31
17	20.49	21.61	22.98	24.77	27.59	30.19	31.00	33.41	35.72	37.95	40.79	42.88
18	21.61	22.76	24.16	25.99	28.87	31.53	32.35	34.80	37.16	39.42	42.31	44.43
19	22.72	23.90	25.33	27.20	30.14	32.85	33.69	36.19	38.58	40.88	43.82	45.97
20	23.83	25.04	26.50	28.41	31.41	34.17	35.02	37.57	40.00	42.34	45.31	47.50
21	24.93	26.17	27.66	29.61	32.67	35.48	36.34	38.93	41.40	43.77	46.80	49.01
22	26.04	27.30	28.82	30.81	33.92	36.78	37.66	40.29	42.80	45.20	48.27	50.51
23	27.14	28.43	29.98	32.01	35.17	38.08	38.97	41.64	44.18	46.62	49.73	52.00
24	28.24	29.55	31.13	33.20	36.41	39.36	40.27	42.98	45.56	48.03	51.18	53.48
25	29.34	30.68	32.28	34.38	37.65	40.65	41.57	44.31	46.93	49.44	52.62	54.95
26	30.43	31.80	33.43	35.56	38.88	41.92	42.86	45.64	48.29	50.83	54.05	56.41
27	31.53	32.91	34.57	36.74	40.11	43.20	44.14	46.96	49.65	52.22	55.48	57.86
28	32.62	34.03	35.72	37.92	41.34	44.46	45.42	48.28	50.99	53.59	56.89	59.30
29	33.71	35.14	36.85	39.09	42.56	45.72	46.69	49.59	52.34	54.97	58.30	60.73
30	34.80	36.25	37.99	40.26	43.77	46.98	47.96	50.89	53.67	56.33	59.70	62.16
40	45.62	47.27	49.24	51.80	55.76	59.34	60.44	63.69	66.77	69.70	73.40	76.09
50	56.33	58.16	60.35	63.17	67.50	71.42	72.61	76.15	79.49	82.66	86.66	89.56
60	66.98	68.97	71.34	74.40	79.08	83.30	84.58	88.38	91.95	95.34	99.61	102.69
80	88.13	90.41	93.11	96.58	101.88	106.63	108.07	112.33	116.32	120.10	124.84	128.26
100	109.14	111.67	114.66	118.50	124.34	129.56	131.14	135.81	140.17	144.29	149.45	153.17

Various Formulas

$$(\hat{p}_1 - \hat{p}_2) \pm z^* SE \qquad SE = \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}} \qquad z = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\tilde{p}(1-\tilde{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \qquad \tilde{p} = \frac{x_1 + x_2}{n_1 + n_2}$$

$$F = \frac{s_1^2}{s_2^2} \qquad E = \frac{\text{row total} \times \text{column total}}{\text{table total}} \qquad \chi^2 = \sum \frac{(O-E)^2}{E}$$

$$b \pm t^* SE_b \qquad SE_b = \frac{s}{\sqrt{\sum (x - \bar{x})^2}} \qquad t = \frac{b}{SE_b}$$

$$\hat{y} \pm t^* SE_{\hat{\mu}} \qquad SE_{\hat{\mu}} = s\sqrt{\frac{1}{n} + \frac{(x^* - \bar{x})^2}{\sum (x - \bar{x})^2}}$$

$$\hat{y} \pm t^* SE_{\hat{y}} \qquad SE_{\hat{y}} = s\sqrt{1 + \frac{1}{n} + \frac{(x^* - \bar{x})^2}{\sum (x - \bar{x})^2}}$$