Appendix

Table

A-1. Critical Values of the *F* Test (95% confidence values)

	df_N									
df_D	1	2	3	4	5	6	7	8	9	10
1	648	800	864	900	922	937	948	956	963	968
2	38.5	39.0	39.2	29.3	39.3	39.4	39.4	39.4	39.4	39.4
3	17.4	16.0	15.4	15.1	14.9	14.7	14.6	14.5	14.5	14.4
4	12.2	10.6	9.98	9.60	9.36	9.20	9.07	8.98	8.90	8.84
5	10.0	8.43	7.76	7.39	7.14	6.98	6.85	6.75	6.68	6.62
6	8.81	7.26	6.60	6.23	5.99	5.82	5.70	5.60	5.52	5.46
7	8.07	6.54	5.89	5.52	5.28	5.12	4.99	4.90	4.82	4.76
8	7.57	6.06	5.42	5.05	4.82	4.65	4.53	4.43	4.36	4.29
9	7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03	3.96
10	6.94	5.46	4.82	4.47	4.24	4.07	3.95	3.85	3.78	3.72

Note: df_N is the degrees of freedom in the numerator, and df_D is the degrees of freedom in the denominator of *F*.

Table

A-2. Critical Values of the *F* Test (99% confidence values)

	df_N								
df_D	1	2	3	4	5	6	7	8	9
1	16,211	20,000	21,615	22,500	23,056	23,437	23,715	23,925	24,091
2	198.5	199.0	199.2	199.3	199.3	199.3	199.4	199.4	199.4
3	55.5	49.8	47.5	46.2	45.4	44.8	44.4	44.1	43.9
4	31.3	26.3	24.3	22.2	22.5	22.0	21.6	21.4	21.1
5	22.8	18.3	16.5	15.6	14.9	14.5	14.2	14.0	13.8
6	18.6	14.5	12.9	12.0	11.5	11.1	10.8	10.6	10.4
7	16.2	12.4	10.9	10.0	9.52	9.15	8.89	8.67	8.51
8	14.7	11.0	9.60	8.80	8.30	7.95	7.69	7.50	7.34
9	13.6	10.1	8.72	7.96	7.47	7.13	6.88	6.69	6.54
10	12.8	9.43	8.08	7.34	6.87	6.54	6.30	6.12	5.97

Note: df_N is the degrees of freedom in the numerator, and df_D is the degrees of freedom in the denominator of *F*.

Additional Readings

Journal Articles

Bankston, D. 1984. Elimination of Bias in Sample Selection for Chemical Analysis, *American Laboratory*, pp. 43–48 (December 1984).

Boomer, B., T. Dux, and D. March. Sampling Surveys of Hazardous Waste, *Journal of Air Pollution Control and Waste Management*, 38:1426–1432 (1988).

Dols, T., and B. Armbrecht. Assessment of Analytical Method Performance Characteristics, *Journal of the AOAC*, 60:940–945 (1977).

Dux, J. P. Quality Assurance in the Analytical Laboratory, *American Laboratory*, pp. 212–216 (July 1983).

Glacer, J. L. Trace Analysis for Wastewater, *Environmental Science and Technology*, 15:1426–1455 (1981).

Horwitz, W., L. R. Kampes, and K. W. Boyer. Quality Assurance in the Analysis of Foods for Trace Constituents, *Journal of the Association of Official Analytical Chemists*, 63:1344–1354 (1980).

Hubaux, A., and G. Vos. Precision and Detection Limits for Linear Calibration Curves, *Analytical Chemistry*, 42:849–855 (1970).

Kanzelmyer, J. H. Quality Control for Analytical Methods, *ASTM Standardization News*, pp. 25–28 (October 1977).

Keith, L. H. et al. Principles of Environmental Analysis, *Analytical Chemistry*, 55:2210–2218 (1983).

Kirchmer, C. J. Quality Control in Water Analysis, *Environmental Science and Technology*, 17:174A–184A (1983).

Kratchovil, B., D. Wallace, and J. Taylor. Sampling for Chemical Analysis, *Chemical Reviews*, 56:113R (1984).

MacDougall, D. et al. Guidelines for Data Acquisition and Data Quality Evaluation in Environmental Chemistry, *Analytical Chemistry*, 52:2242–2249 (1980).

Mandel, J. The Analysis of Interlaboratory Test Data, *ASTM Standardization News*, pp. 17–20 (1977).

Mandel, J., and F. C. Linnig. Study of Accuracy in Chemical Analyses Using Linear Calibration Curves, *Analytical Chemistry*, 29:743–749 (1959).

Provost, L. P., and R. S. Elder. Interpretation of Percent Recovery Data, *American Laboratory*, pp. 57–63 (1983).

Saltzman, B. E., D. W. Yeager, and B. G. Meiners. Reproducibility and Quality Control in the Analysis of Biological Samples for Lead and Mercury, *American Industrial Hygiene Association Journal*, 44:163–167 (1983).

Schwartz, L. M. Nonlinear Calibration, *Analytical Chemistry*, 49:2062–2068 (1977).

Youden, W. Accuracy of Analytical Procedures, *Journal of the Association of Official Analytical Chemists*, 45:169–173 (1962).

Books

Beizer, P. *The Frozen Keyboard: Living with Bad Software*, Blue Ridge Summit, Pa.: TAB Books, Inc., 1988.

Dessy, R. *The Electronic Laboratory*, Washington, D.C.: American Chemical Society, 1985.

Dowdey, S., and S. Wearden. *Statistics for Research*. New York: John Wiley and Sons, 1983.

Fites, P., P. Johnston, and M. Kratz. *The Computer Virus Crisis*, New York: Van Nostrand Reinhold, 1989.

Garfield, F. M. *Quality Assurance Principles for Analytical Laboratories,* Arlington, Va.: Association of Official Analytical Chemists, 1984.

Hurst, W., and J. Mortimer. *Laboratory Robotics,* New York: VCH Publishers, 1987.

Inhorn, S. L. (ed.) *Quality Assurance Practices for Health Laboratories,* Washington, D.C.: American Public Health Association, 1978.

Kanare, H. W. *Writing the Laboratory Notebook,* Washington, D.C.: American Chemical Society, 1985.

Mahaffey, R. *LIMS: Applied Information Technology for the Laboratory,* New York: Van Nostrand Reinhold, 1990.

Schulmeyer, G., and J. McManus (eds.) *Handbook of Software Quality Assurance,* New York: Van Nostrand Reinhold, 1987.

Taylor, J. *Quality Assurance of Chemical Measurements,* Chelsea, Mich.: Lewis Publishers, 1988.

Youden, W. J., and E. H. Steiner. *Statistical Manual of the AOAC,* Washington, D.C.: Association of Official Analytical Chemists, 1975.

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