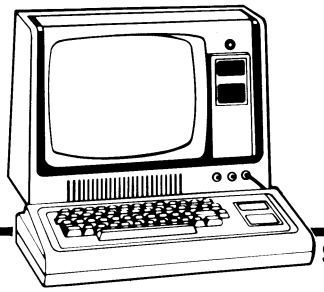

Advanced Statistical Analysis

Cat. No. 26-1705

Suggested Retail Price (may vary at individual stores and dealers) $39.95

General Description

Advanced Statistical Analysis (ASA) is a user-oriented data analysis system designed for use on the Radio Shack TRS-80 Microcomputer. The system is ideally suited for applications in business, education, medicine, government administration and other fields. The programs can be run with little formal knowledge of data analysis techniques and no knowledge of computer programming. Each program was written to interact with you and guide you in conducting statistical analyses. A comprehensive set of instructions and error messages is built into the ASA programs. Advanced Statistical Analysis includes ten programs for describing data sets and conducting statistical data analyses; two utility programs for preparing, updating, and listing data files stored on tape or disk; and a program to aid in selecting data samples. All ASA programs provide the option for printing results on a TRS-80 Line Printer or Quick Printer I.

Format

The 13 programs are supplied on 7 cassette tapes stored in a vinyl binder with a detailed 170-page manual containing step-by-step instructions and sample runs for each program.

Minimum Hardware Required

Level II TRS-80 with 16K RAM.

Hardware Supported

Disk System for storage of data files and ASA programs
Line Printer or Quick Printer I, II or III—for program results.

Limitations

Maximum tape data file size is limited by TRS-80 memory (See Tape Data Files). Maximum disk data file size limited by free space on the diskette. Only one ASA program has significant data set limitations (see Time Series Analysis II).

Single and double precision operations are utilized in various ASA programs. In most cases, since the data collected for use in statistical analysis procedures contain a fair amount of measurement error, rounding errors in the displayed results should be insignificant.

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Programs

TAPE DATA FILES provides all the necessary file handling functions for data files stored on cassette tape. The program is used to prepare new files and to update, correct, copy, and list old files. File names that you supply are used to identify each data file. Approximate maximum tape data file sizes are listed below.

16K RAM	32K RAM
800 single data elements	2000 single data elements
400 data pairs	1000 data pairs
100 multiple regression subjects	250 multiple regression subjects

DISK DATA FILES provides all the necessary file handling functions for data files stored on disk. The program is used to prepare new files and to update, correct, copy and list old files.

RANDOM SAMPLE will aid you in selecting a random sample from a larger group of subjects, items or observations. Stratified random sampling can be performed by running the program more than once. After you specify the size of the population and the size of the desired sample, the Computer selects the sample and lists the numbers of the chosen data elements. Sampling may be performed with or without replacement.

DESCRIPTIVE STATISTICS provides you with an overall picture of your data. Output from the program includes sample statistics (mean, variance, standard deviation, range, minimum, and maximum); sample size; unbiased estimates of population parameters (variance and standard deviation); and data distribution coefficients (skewness and kurtosis).

HISTOGRAM allows you to obtain a graphic description of your data set. The histogram is drawn with from one to eight intervals (you select the number). You may set the limits of each interval or allow the Computer to calculate limits for equal size intervals. Both frequencies and percentages are labeled on the histogram and each interval is plotted with considerable accuracy. The number of intervals on the histogram can be changed at will without the need for re-entering the data. The print option may be selected each time the histogram is reconstructed, and the histogram will be graphically reproduced on your printer.

FREQUENCY DISTRIBUTION provides a tabular description of the distribution of values in a set of data. The table is prepared with from one to ten intervals (you select the number). You may set the limits of each interval or allow the Computer to calculate limits for equal size intervals. The number of intervals in the table can be changed at will without the need for re-entering the data. Entries on the frequency distribution table include interval limits, frequency of occurrence, percentage for each interval and cumulative percentage by interval. The printer option may be selected each time the table is reconstructed.

ANALYSIS OF VARIANCE performs a one-way (single-classification) analysis on two to five groups or samples. Sample sizes may be equal or unequal. Output from the program includes the analysis of variance (ANOVA) summary table, F ratio, estimate of exact chance probability, and summary statistics (N, mean, and standard deviation) for each group in the study.

T-TEST FOR MATCHED PAIRS allows you to test for a significant difference between means. The model may involve matched samples or a pre/post design. A one-tailed or two-tailed hypothesis may be selected. This procedure is also referred to as a t-test for correlated data, related measures, matched samples, etc. Output includes means, standard deviations and standard errors of the means for the two variables; number of pairs; product-moment correlation between X and Y; difference between means; degrees of freedom; t ratio; and a probability estimate.

CORRELATION & LINEAR REGRESSION is a multi-step program which describes the relationship between two variables or sets of measurements, calculates regression coefficients, provides an X by Y plot of the data with or without the regression (prediction) line and allows you to obtain the predicted value of Y at any value of X. The output also includes means and standard deviations for X and Y, number of pairs and degrees of freedom. If you select the print option, the statistical results and the X by Y plot (with or without the regression line) will be reproduced on your printer.

MULTIPLE LINEAR REGRESSION will perform an analysis with up to five independent variables on any number of subjects. Output from the program includes the coefficient of determination; coefficient of multiple correlation; standard error of estimate; regression, residual and total sums of squares; F ratio; degrees of freedom; probability of chance; and means, standard deviations and regression (equation) coefficients for each variable. Any or all independent variables on a data file may be included in the anlaysis and the regression model may be modified without re-creating the data file.

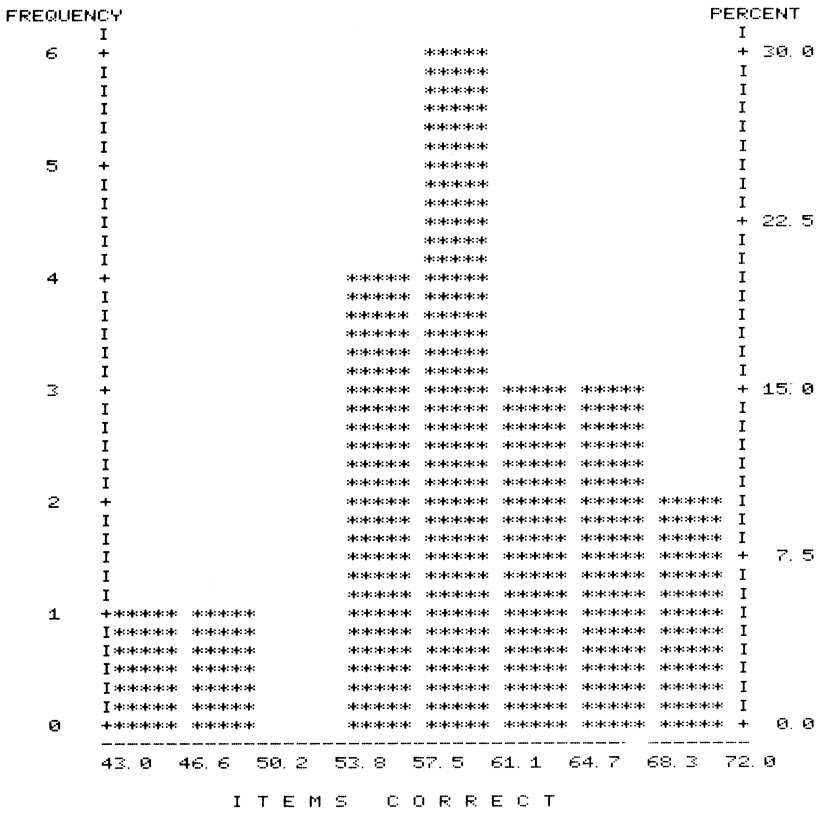
TIME SERIES ANALYSIS I analyzes a set of observations made at different periods of time for trend and allows you to obtain predicted values of the variable under study according to a least squares trend line fitted through the data. The test performed to ascertain whether trend is present in the data is the sign (change of direction) test. Output includes the percentage of variance accounted for by the trend, coefficients for the trend line equation, point of origin and time unit. Additionally, the program plots the time series data with or without the trend line. Results of the analysis and the data plot may be printed on your printer. The program utilizes yearly, quarterly, monthly or weekly data.

TIME SERIES ANALYSIS II calculates seasonal indexes for quarterly or monthly time series data and n-item moving averages for data collected yearly, quarterly, monthly, weekly or daily. Quarterly and monthly seasonal indexes are calculated using the ratio to moving averages method with an adjustment for rounding error. The largest and smallest values for each quarter or month are discarded before the index is derived. All even-item moving averages are automatically centered by taking a 2-item moving total before averaging. You select the number of items comprising the moving average. Approximate internal memory limitations for Time Series Analysis are listed below.

16K Level II BASIC - 825 observations
16K DISK BASIC - 140 observations
32K Level II BASIC - 2150 observations
32K DISK BASIC - 1450 observations

CHI SQUARE ANALYSIS performs a test on data in the form of a contingency table. The table may have any dimensions from 1 X 2 to 8 X 8. Output includes the number of rows and columns in the contingency table, total number of observations, number of expected frequencies less than five, chi square, degrees of freedom and probability of chance. Additionally, tables of observed and expected frequencies are displayed. Expected frequencies may be input by the user or computed automatically. A correction for continuity is automatically applied when necessary.

HISTOGRAM



ANALYSIS OF VARIANCE

SUMMARY TABLE

SOURCE	SS	DF	MS
TOTAL	2351.25	20	
BETWEEN	196.043	3	65.3477
WITHIN	2155.2	17	126.777

F-RATIO = .515455

DEGREES OF FREEDOM = 3 & 17

PROBABILITY OF CHANCE = 0.681

GROUP STATISTICS

GROUP	N	MEAN	S.D.
TREATMENT A	5	21.6	7.79744
TREATMENT B	6	22	15.1262
TREATMENT C	5	20.8	10.3537
NO TREATMENT	5	14.4	9.2087