

# Index

---

## A

ABEND argument, ABORT statement 753  
 ABORT statement 753  
     compared to STOP statement 1018  
 ABS function 226  
 absolute values 226  
 access levels, shared 12  
 ACCESS= option, LIBNAME statement 915  
 ACCESS=READONLY option  
     CATNAME statement 770  
 ADDR function 227  
 AIRY function 228  
     derivative of 311  
     value of 228  
 aliases, for informats 640  
 alignment  
     character expressions 421, 423  
 alignment of output 1071  
 \_ALL\_CLEAR option  
     CATNAME statement 770  
 \_ALL\_LIST option  
     CATNAME statement 770  
 ALTER= data set option 9  
 amortization 455  
 ampersand (&) format modifier 899  
 ampersand (&) logical and operator, where statement 1031  
 ampersand () argument  
     INPUT statement, list input 897  
 and operator, where statement 1031  
 applet location 1059  
 APPLETLOC= system option 1059  
 arc cosine 229  
 arc sine 229  
 arc tangent 230  
 ARCOS function 229  
 arguments 242, 328  
     converting to lowercase 442  
     data type, returning 616  
     difference between nthlag 328  
     extracting a substring from 425  
     extracting a substring from, based on byte position 426  
     format decimal values, returning 592  
     format names, returning 594  
     format width, returning 596  
     informat decimal values, returning 603  
     informat names, returning 605  
     informat width, returning 607

length of, returning 422  
 lowercase, converting to 422  
 resolving 242  
 returning length of 436  
 size, returning 612  
 uppercase letters, converting to 429  
 array reference, explicit 759  
     compared to ARRAY statement 758  
 ARRAY statement 755  
     compared to array reference, explicit 760  
 arrays 330  
     defining elements in 755  
     describing elements to process 759  
     finding contents 600  
     finding dimensions 330  
     finding values in 587  
     identifying 586  
     lower bounds 434  
     upper bounds of 392  
     writing to 970  
 ARSIN function 229  
 ASCII characters, returning 241  
     a string of 292  
     by number 241  
     number of 516  
 ASCII data 71  
     converting character data to 71  
     converting to native format 644  
 \$ASCIIw. format 71  
 \$ASCIIw. informat 644  
 assignment statements 762  
 asterisk (\*) multiplication operator, where statement 1030  
 asterisks (\*\*) exponentiation operator, where statement 1031  
 asymmetric spelling differences 547  
 ASYNCHIO system option 1060  
 asynchronous I/O 1060  
 at sign (@) argument  
     INPUT statement 877  
     INPUT statement, column input 891  
     INPUT statement, formatted input 894  
     INPUT statement, list input 898  
     INPUT statement, named input 903  
     PUT statement 964  
     PUT statement, column output 978  
     PUT statement, formatted output 980  
     PUT statement, list output 984  
     PUT statement, named output 988  
 at sign (@) column pointer control  
     INPUT statement 878  
     PUT statement 964  
     WINDOW statement 1037  
 at sign (@) line-hold specifier  
     PUT statement 969  
     PUT statement, column output 969  
 at signs (@@) argument  
     INPUT statement 878  
     INPUT statement, column input 892  
     INPUT statement, formatted input 894  
     INPUT statement, list input 898  
     INPUT statement, named input 903  
     PUT statement 964  
     PUT statement, column output 978  
     PUT statement, formatted output 980  
     PUT statement, list output 984  
     PUT statement, named output 988  
 at signs (@@) line-hold specifier, PUT statement 969  
 ATAN function 230  
 ATTRC function 231  
 ATTRIB statement 763  
     compared to FORMAT statement 844  
     compared to INFORMAT statement 874  
     compared to LENGTH statement 911  
     examples 764  
     INFORMAT= option 763  
     specifying formats with 54  
     specifying informats with 633  
 ATTRN function 233  
 autocall libraries, searching for files in 1119  
 autocall macro library 1149  
 AUTOEXEC file  
     echoing to the log 1094  
 AUTOSKIP= option, WINDOW statement 1039  
 averages (arithmetic mean) 444

## B

BAND function 236  
 batch processing  
     error handling 1096  
 batch settings, using when SAS executes 1061  
 BATCH system option 1061  
 BELL argument, DISPLAY statement 786  
 Bernoulli distributions 274, 324  
     cumulative distribution functions 274  
     probability density functions 465

bessel function, returning value of 398, 416  
**BESTw.** format 84  
  compared to **Dw.** format 88  
**beta distributions** 237  
  cumulative distribution functions 275  
  probabilities from 484  
  probability density functions 466  
  quantiles 237  
**BETAINV** function 237  
**between-and** operator, where statement 1031  
**big endian** platforms, byte ordering 55  
**big endian** platforms, byte ordering on 634  
**bin specification**, for printed output 1134  
**bin specification**, for sending paper to  
  printer 1136  
**binary data**, converting to  
  character 645  
  integers 660  
**binary zeros**, converting to blanks 648  
**\$BINARYw.** format 72, 72  
  compared to **BINARYw.** format 85  
  compared to **\$BINARYw.** format 72  
**\$BINARYw.** informat 645  
**BINARYw.d** informat 660  
**binding edge**, specifying 1062  
**BINDING=** system option 1062  
**binomial distributions** 248, 276, 325  
  cumulative distribution functions 276  
  probabilities from 485  
  probability density functions 466  
  random numbers 248, 511  
**bits**, extracting 661  
**BITSw.d** informat 661  
**bitwise logical operations**  
  AND 236  
  EXCLUSIVE OR 240  
  NOT 239  
  OR 239  
  shift left 238  
  shift right 240  
**BLANK argument**, **DISPLAY** statement 786  
**\_BLANKPAGE\_** option, **PUT** statement 966  
**blanks** 294  
  compressing 294  
  converting binary zeros to 648  
  converting to zeros 662  
  trimming trailing 571, 572  
**BLKSIZE=** option  
  FILE statement 804  
  INFILE statement 858  
**BLOCKSIZE=** option  
  FILENAME statement, FTP access 830  
  FILENAME statement, SOCKET access 836  
  FILENAME statement, URL access 840  
**BLSHIFT** function 238  
**BNOT** function 239  
**bookmarks** 370  
  finding 481  
  setting 370  
**BOR** function 239

**BOTTOMMARGIN=** system option 1063  
**BREAK** command, DATA step debugger 1206  
**BRSHIFT** function 240  
**buffer size**, specifying 1065  
**buffers**  
  number for processing SAS data sets 10  
  number to use for SAS data sets 1064  
  page buffers for catalogs 1071  
  page size and 11  
  size for output SAS data sets 11  
  size, for SAS/CONNECT and SASSHARE software 1166  
**BUFNO=** data set option 10  
  compared with **BUFNO=** system option 1064  
**BUFNO=** system option 1064, 1065  
**BUFSIZE=** data set option 11  
**BUFSIZE=** system option  
  compared with **BUFSIZE=** data set option 1065  
**BXOR** function 240  
**BY** lines, printing 1067  
**BY** statement 765  
**BYE** command, compared to ENDSAS statement 800  
**BYERR** system option 1066  
  compared with DSNFERR system option 1092  
**BYLINE** system option 1067  
**BYTE** function 241  
**byte ordering** 55, 634  
**BZw.d** informat 662  
  compared to **w.d** informat 732

## C

**CALCULATE** command, DATA step debugger 1208  
**CALL** routines 206  
  calling 768  
  pattern matching with 213  
  random-number CALL routines 211  
  syntax 207  
**CALL** statements 768  
**CAPS** command, compared with CAPS system option 1068  
**CAPS** system option 1068  
**CARDIMAGE** system option 1069  
**CARDS** statement 768  
**CARDS4** statement 769  
**cashflow stream**, periodic  
  convexity for 301  
  modified duration for 341  
  present value for 508  
**cashflow**, enumerated  
  convexity for 300  
  modified duration for 340

**CATALOG** argument  
  FILENAME statement, CATALOG access 827  
**catalogs**  
  concatenating 769, 770  
  error handling 1089  
  numer to open 1070  
  page buffers 1071  
  search order, setting 1100  
**CATCACHE=** system option 1070  
**CATNAME** statement 769  
  ACCESS=READONLY option 770  
  \_ALL\_CLEAR option 770  
  \_ALL\_LIST option 770  
  arguments 769  
  assigning and using a catalog concatenation (example) 771  
  CLEAR option 769  
  compared with LIBNAME statement 770  
  examples 771  
  LIST option 770  
  nested catalog concatenation (example) 771  
  rules for catalog concatenation 770  
**catrefs** 769  
**Cauchy distributions** 250, 276  
  cumulative distribution functions 276  
  probability density functions 467  
  random numbers 250, 512  
**CBUFNO=** system option 1071  
**\$CBw.** informat 646  
**CBw.d** informat 663  
**CD=** option  
  FILENAME statement, FTP access 830  
**CDF** function 273  
**CEIL** function 286  
**ceiling values** 286  
**CENTER (CENTRE)** system option 1071  
**CENTRE** system option 1071  
**CEXIST** function 287  
**change expressions** 536  
**change items** 536  
**character combinations** 1072  
**character conversion**, translation tables for 42  
**character data**, converting to 71  
  ASCII 71  
  binary 72  
  EBCDIC 74  
  hexadecimal 75  
  octal 77  
  uppercase 77, 81  
**character data**, reading  
  from column-binary files 646  
  from right to left 655  
  standard format 659  
  varying length fields 657  
  with blanks 646  
**character data**, writing 73, 83  
  in reverse order 79  
  variable-length records 81  
**character expressions** 399  
  converting to uppercase 575  
  deleting character value contents 429

deleting character value contents, based on byte unit 430  
 encoding for searching 546  
 first unique character 589  
 inserting character value contents 429  
 inserting character value contents, based on byte unit 430  
 left aligning 436  
 left-aligning 421  
 missing values, returning a result for 446  
 position of first unique character, returning 432  
 removing trailing blanks and SO/SI 427  
 repeating 522  
 replacing character value contents 429  
 replacing character value contents, based on byte unit 430  
 replacing characters in 567  
 replacing specific characters 426  
 replacing words in 568  
 reversing 423, 523  
 right aligning 525  
 right-aligning 423  
 searching by index 399  
 searching for specific character 420  
 searching for specific characters 400, 420  
 searching for words 401  
 selecting a given word from 424  
 selecting a word from 541  
 substringing 554, 555  
 translating 426  
 trimming 427  
 updating 429  
 updating, based on byte unit 430  
 verifying 432  
 character formats 66  
 character strings  
   comparing 418  
   concatenating 425  
   double-byte characters, returning number of 419  
   passing to SAS programs 1165  
   removing characters from 419  
 CHARCODE system option 1072  
 character classes 529  
   complements 531  
   default 530  
   reusing 532  
   user-defined 531  
 \$CHARw. format 73  
 \$CHARw. informat 647  
   compared to \$ASCII informat 644  
   compared to \$CHARZBw. informat 648  
   compared to \$EBCDICw. informat 649  
   compared to \$w. informat 659  
 \$CHARZBw. informat 648  
 chi-squared distributions 277  
   cumulative distribution functions 277  
   noncentrality parameters 290  
   probabilities 486  
 probability density functions 467  
   quantiles 288  
 CINV function 288  
 CLEANUP system option 1073  
 CLEAR option  
   CATNAME statement 769  
 CLOSE function 289  
 CMDMAC system option 1075  
 \_CMD\_ SAS variable, WINDOW statement 1040  
 CMPOPT system option 1075  
 CNONCT function 290  
 CNTLLEV= data set option 12  
 coefficient of variation 305  
 COLLATE function 292  
 COLLATE system option 1076  
 collating sequence, for SORT procedure 1158  
 colon (:) argument  
   INPUT statement, list input 898  
   PUT statement, list output 984  
 colon (:) format modifier 899  
 COLOR= argument, WINDOW statement 1034  
 COLOR= option, WINDOW statement 1039  
 color printing 1077  
 COLORPRINTING system option 1077  
 column input 881, 891  
 COLUMN= option  
   FILE statement 804  
   INFILE statement 858  
 column output 967, 977  
 column pointer controls  
   INPUT statement 878  
   PUT statement 964  
 column-binary data, reading  
   down a column 710  
   punch-card code 705  
 column-binary files, reading 646  
 column-binary, reading  
   with blanks 647  
 COLUMNS= argument, WINDOW statement 1034  
 COMB function 293  
 combinations, computing 293  
   See permutations, computing  
 commas for decimal places 142  
 commas, removing 733  
 COMMAw.d format 86  
   compared to COMMAXw.d format 87  
   compared to DOLLARw.d format 98  
   compared to NEGPARENw.d format 140  
 COMMAw.d informat 664  
   compared to COMMAXw.d informat 665  
 COMMAXw.d format 86, 87  
   compared to COMMAw.d. format 86  
   compared to DOLLARXw.d format 99  
 COMMAXw.d informat 665  
   compared to COMMAw.d informat 664  
 comment statement 772  
 comments 772  
 comparing character strings 418  
 COMPBL function 294  
 compiler optimization 1075  
 complementary error function 344  
 composite indexes 27  
 COMPOUND function 295  
 compound interest 295  
 COMPRESS= data set option 13  
   compared with COMPRESS= system option 1079  
 COMPRESS function 294, 296  
   compared to COMPBL function 294  
 COMPRESS= system option 1078  
 compressed data sets  
   processing with random access 32  
   reusing space 39  
 compressing 294  
   blanks 294  
   specified characters 296  
 compressing observations 1078  
 compressing SAS data sets 13  
 concatenating catalogs 769  
   assigning and using a catalog concatenation (example) 771  
   nested catalog concatenation (example) 771  
   rules for 770  
 concatenating SAS data libraries 917  
 concatenation  
   character strings 425  
 confidence intervals, computing 498  
 CONNECTREMOTE= system option 1079  
 CONNECTSTATUS system option 1080  
 CONNECTWAIT system option 1081  
 console log 1081  
 CONSOLELOG= system option 1081  
 CONSTANT function 297  
 constants, calculating  
   double-precision numbers, largest 298  
   double-precision numbers, smallest 299  
   Euler constant 298  
   exact integer 298  
   machine precision 300  
   natural base 297  
   overview 297  
 contains operator, where statement 1031  
 CONTINUE argument, DM statement 788  
 CONTINUE statement 773  
   compared to LEAVE statement 910  
 convexity, for enumerated cashflow 300  
 convexity, for periodic cashflow stream 301  
 CONVX function 300  
 CONVXP function 301  
 COPIES= system option 1082  
 copies, specifying number of 1082  
 corrected sum of squares 304  
 COS function 303  
 COSH function 303  
 cosine 303  
 CPUID system option 1083  
 CREMOTE system option 1079  
 CSS function 304  
 CSTATUS system option 1080

cumulative distribution functions 273  
 Bernoulli distribution 274  
 beta distribution 275  
 binomial distribution 276  
 Cauchy distribution 276  
 chi-squared distribution 277  
 exponential distribution 277  
 F distribution 278  
 gamma distribution 278  
 geometric distribution 279  
 hypergeometric distribution 279  
 Laplace distribution 280  
 logistic distribution 280  
 lognormal distribution 281  
 negative binomial distribution 281  
 normal distribution 282  
 Pareto distribution 282  
 Poisson distribution 283  
 T distribution 283  
 uniform distribution 284  
 Wald (Inverse Gaussian) distribution 284  
 Weibull distribution 284  
 CUROBS function 305  
 currency 97  
 European dollar 98  
 U.S. dollar 97  
 Yen 186  
 CV function 305  
 CWAIT system option 1081

**D**

DACCDB function 306  
 DACCDBSL function 307  
 DACCSL function 308  
 DACCSYD function 309  
 DACCTAB function 310  
 DAIRY function 311  
 damaged data sets 14  
 damaged data sets or catalogs 1089  
 data lines  
 as card images 1069  
 including 851  
 reading 768, 783  
 Data Set Data Vector (DDV), reading observations into 352, 353  
 data set names, returning 340  
 data set options 6  
 by category 7  
 interactions with system options 1051  
 syntax 6  
 system option interactions 7  
 with input data sets 6  
 with output data sets 6  
 data set pointer, positioning at start of data set 524  
 DATA statement 775  
 arguments 775  
 DEBUG option 1198

examples 779  
 keywords allowed in 1083  
 stored compiled DATA step programs 778  
 syntax 775  
 DATA step 269, 271  
 assigning data to macro variables 271  
 linking SAS data set variables 269, 271  
 starting 775  
 stopping 1004, 1018  
 stored compiled programs 778  
 terminating 753  
 DATA step debugger 1194  
 attributes of variables, displaying 1210  
 BREAK command 1206  
 breakpoints, deleting 1209  
 CALCULATE command 1208  
 commands, assigning to ENTER key 1211  
 commands, assigning to function keys 1196  
 commands, by category 1205  
 commands, customized debugging commands with macros 1196  
 commands, entering 1195  
 commands, help on 1214  
 commands, list of 1205  
 DEBUG option, DATA statement 1198  
 DEBUGGER LOG window 1195  
 debugger sessions 1195  
 DEBUGGER SOURCE window 1195  
 debugging a simple DATA step (example) 1197  
 debugging, defined 1194  
 defined 1194  
 DELETE command 1209  
 DESCRIBE command 1210  
 displaying continuous record of DATA step execution 1219  
 displaying variable values 1212  
 DO loops, debugging (example) 1204  
 ENTER command 1211  
 EXAMINE command 1212  
 examples 1197  
 executing statements one at a time 1218  
 expressions and 1196  
 expressions, evaluating 1208  
 formats and (example) 1201  
 formatted values of variables, examining (example) 1204  
 GO command 1213  
 HELP command 1214  
 JUMP command 1214  
 jumping to a specific program line 1214  
 LIST command 1215  
 listing items 1215  
 LOG window 1219  
 macro facility with 1196  
 macros as debugging tools 1196  
 macros, debugging DATA step generated by 1197  
 QUIT command 1216  
 quitting 1216

restarting execution of suspended program 1214  
 resuming execution of DATA step 1213  
 SET command 1217  
 SOURCE window 1219  
 starting execution of DATA step 1213  
 STEP command 1218  
 suspending execution when value of specified variable changes 1220  
 suspending program execution 1206  
 SWAP command 1219  
 switching control between SOURCE window and LOG window 1219  
 TRACE command 1219  
 variables, assigning new values to 1217  
 WATCH command 1220  
 watch status, deleting 1209  
 windows in 1195  
 DATA step functions, within macro functions 210  
 DATA step programs  
 stored compiled, executing 802  
 DATA step programs, retrieving source code from 785  
 DATA step statements 745  
 declarative 745  
 executable 745  
 global, by category 750  
 global, definition 750  
 DATA step views  
 creating 778  
 describing 778  
 retrieving source code from 785  
 data type, returning 616  
 data values, reading  
*See* informats  
 data values, writing  
*See* formats  
 datalines  
 sequence field, length of numeric portion 1153  
 DATALINES statement  
 compared to DATALINES4 statement 783  
 compared to INFILE statement 868  
 length of data on lines following 1147  
 DATALINES4 statement 783  
 DATASTMCHK= system option 1083  
 DATDIF function 312  
 date and time formats 66  
 date and time values  
 SHR records 712  
 date calculations  
 days between dates 312  
 years between dates 620  
 date formats, international 60  
 DATE function 313  
 date stamp 1084  
 DATE system option 1084  
 date/time functions  
 current date, returning 567

- date values, incrementing 410  
 date values, returning 443  
 dates, extracting from datetime value 314  
 dates, returning current 313, 315  
 datetime value, creating 327  
 day of the month, returning 316  
 day of week, returning 617  
 hour value, extracting 395  
 Julian dates, converting to SAS values 313  
 Julian dates, from SAS date values 416  
 minute values, returning 445  
 month values, returning 451  
 seconds value, returning 542  
 time intervals, extracting integer values of 408  
 time values, creating 394  
 time values, incrementing 410  
 time, extracting from datetime values 564  
 time, returning current 315  
 year quarter, returning 509  
 year quarter, returning date value from 621  
 year value, returning 618  
**date/time values**  
 international, specifying language for 1086  
 year 2000 accommodation 1178  
 year cutoff 1178  
**date/time values, reading**  
 date values, dddmmmyy 666  
 date values, dddmmmyy hh:mm:ss.ss 667  
 date values, dddmmmyyyy 666  
 date values, dddmmmyyyy hh:mm:ss.ss 667  
 date values, ddmmyy 669  
 date values, ddmmyyyy 669  
 date, yyymm 735  
 date, yymmn 735  
 dates, mmddyy 688  
 dates, mmddyyyy 688  
 dates, yyymmdd 734  
 dates, yyyyymmdd 734  
 IBM mainframes 699  
 IBM mainframes, RMF records 709  
 IBM mainframes, SMF records 713  
 international date values 672  
 international datetime values 673  
 international month and year values 675  
 Japanese date format 692  
 Julian dates 685  
 month and year values 689  
 RMF records 699  
 SMF records 699  
 Taiwanese date format 686  
 TIME MIC values 691  
 time values, IBM mainframe 691  
 time, hh:mm:ss.ss 728  
 time-of-day stamp 729  
 timer units 730  
 year quarter 737  
**date/time values, writing** 89  
 AM/PM 90, 92, 174  
 day-of-month 93  
 day-of-week 178, 179  
 day-of-week name 100  
 dd month-name yyyy 183  
 ddmmmyy 89, 94  
 ddmmmyyyy 94  
 fractions, hours as 123  
 hh:mm 122  
 hours as decimal fractions 123  
 international, day-of-week and date 116  
 international, day-of-week name 108  
 international, day-of-week number 105  
 international, dd.mm.yy 101  
 international, ddmmmyy 103  
 international, ddmmmyy:hh:mm:ss.ss 106  
 international, mmmyy 112  
 international, month name 110, 113  
 Japanese 141  
 Julian day of the year 128  
 minutes and seconds since midnight 134  
 mmddyy 131  
 mmddyyyy 131  
 month abbreviation 192  
 month and year separated by a character 135  
 month and year, mmmyy 138  
 month name 137  
 month number 138  
 month-name dd,yyy 182  
 Roman numerals, dates as 155  
 Roman numerals, year and quarter 194  
 Taiwanese 129  
 time 173, 175  
 year and month, with separator character 187  
 year and quarter, Roman numerals with separator character 194  
 year and quarter, with separator character 193  
 year quarter, Arabic numerals 154  
 year quarter, in Roman numerals 155  
 year, extracting from date value 186  
 yyymmdd 189  
 yyyyymmdd 189  
 DATEAMPW.d format 90  
 DATEJUL function 313  
 DATEPART function 314  
 dates, Julian 416  
 dates, writing  
   mmddyy 132  
   mmddyyyy 132  
   yyymmdd 190  
   yyyyymmdd 190  
 datetime formats, international 60  
 DATETIME function 315  
 DATETIMEW. informat 667  
 DATETIMEW.d format 92  
 DATETIMEW.d format, compared to DATEAMPW.d format 91  
 DATEW. format 89  
 DATEW. informat 666  
 DAY function 316  
 DAYW. format 93  
 DBCS data  
   adding shift-code data to 75, 652  
 removing shift-code data from 76, 651  
 DBMS tables, joining (example) 922  
 DCLOSE function 316  
 DCOM/CORBA server mode 1129  
 DDMYYW. format 94  
 DDMYYW. informat 669  
 DDV (Data Set Data Vector), reading observations into 353  
 DDV (Data Set Data Vector), reading observations into 352  
**DEBUG option**  
 FILENAME statement, FTP access 830  
 FILENAME statement, URL access 840  
**DEBUG option, DATA statement** 1198  
**debugging** 1075  
*See* DATA step debugger  
**DEC format**  
 reading integer binary values in 681  
 reading positive integer binary values in 703  
 writing integer binary values in 126  
**DEC format, writing fixed-point data in** 151  
 decimal points, reading as commas 693  
 decimal points, removing 733  
 declarative DATA step statements 745  
 declarative statements 745  
**DEFAULT= argument**  
 INFORMAT statement 873  
 LENGTH statement 911  
**DELETE argument, DISPLAY statement** 786  
**DELETE command, DATA step debugger** 1209  
**DELETE statement** 784  
 compared to DROP statement 797  
 compared to IF statement, subsetting 848  
**DELIMITER= option, INFILE statement** 858  
**DEPDB function** 318  
**DEPDBSL function** 319  
**depreciation** 306  
 accumulated declining balance 306, 307  
 accumulated from tables 310  
 accumulated straight-line 308  
 accumulated straight-line, converting from declining balance 307  
 accumulated sum-of-years 309  
 declining balance 318  
 from tables 322  
 straight-line 308, 320  
 straight-line, converting from declining balance 319  
 sum-of-years-digits 321  
**depreciation functions** 209  
**DEPSL function** 320  
**DEPSYD function** 321  
**DEPTAB function** 322  
**DEQUOTE function** 323  
**DESC= argument**  
 FILENAME statement, CATALOG access 827  
**DESCENDING argument, BY statement** 765  
**DESCRIBE command, DATA step debugger** 1210  
**DESCRIBE statement** 785

descriptive statistic functions 209  
 DETAILS system option 1084  
 DDEVIANCE function 324  
 deviance, computing  
   Bernoulli distribution 324  
   binomial distribution 325  
   Gamma distribution 325  
   inverse Gaussian (Wald) distribution 326  
   normal distribution 326  
   overview 324  
   Poisson distribution 326  
 DEVICE= system option 1085  
 DFLANG= system option 1086  
 DHMS function 327  
 DIF function 328  
 difference between nthlag 328  
 DIGAMMA function 329  
 DIM function 330, 393  
   compared to HBOUND function 393  
 DINFO function 332  
 directories 316  
   closing 316, 348  
   filerefs for 358  
   opening 334  
 directories, returning  
   attribute information 335  
   information about 332  
   number of information items 337  
   number of members in 333  
 directory members 338  
   closing 348  
   name of, returning 338  
%DISPLAY macro  
   compared to WINDOW statement 1041  
DISPLAY= option, WINDOW statement 1039  
DISPLAY statement 786  
   compared to WINDOW statement 1041  
DKRICOND= system option 1087  
DKROCOND= system option 1088  
DLDMGACTION= data set option 14  
DLDMGACTION= system option 1089  
DM statement 787  
DMR system option 1089  
DMS system option 1090  
DMSEXP system option 1091  
DNUM function 333  
DO loops  
   debugging 1204  
DO statement 789  
   compared to DO UNTIL statement 795  
   compared to DO WHILE statement 796  
DO statement, iterative 790  
   compared to DO statement 789  
   compared to DO UNTIL statement 795  
   compared to DO WHILE statement 796  
DO UNTIL statement 794  
   compared to DO statement 789  
   compared to DO statement, iterative 792  
   compared to DO WHILE statement 796  
DO WHILE statement 796  
   compared to DO statement 789

compared to DO statement, iterative 792  
   compared to DO UNTIL statement 795  
DO-loops  
   DO statement 789  
   DO statement, iterative 790  
   DO UNTIL statement 794  
   DO WHILE statement 796  
   ending 798  
   GO TO statement 846  
   resuming 773, 909  
   stopping 773, 909  
DOCLOC= system option 1091  
documentation, online 1091  
dollar sign (\$) argument  
   INPUT statement 877  
   INPUT statement, column input 891  
   INPUT statement, list input 897  
   INPUT statement, named input 903  
   LENGTH statement 911  
DOLLARw.d format 97  
   compared to COMMAw.d format 86  
   compared to DOLLARXw.d format 99  
DOLLARXw.d format 98  
   compared to DOLLARw.d format 98  
DOPEN function 334  
DOPTNAME function 335  
DOPTNUM function 337  
double quotation marks, surrounding values  
   with 78  
double-byte characters, in a character string 419  
double-precision number constants  
   largest 298  
   smallest 299  
DOWNNAMEw. format 100  
DREAD function 338  
DROP= data set option 15  
   compared to DROP statement 797  
   error detection for input data sets 1087  
DROP= data step option  
   error detection for output data sets 1088  
DROP statement 797  
   compared to DELETE statement 784  
   compared to KEEP statement 906  
   error detection for output data sets 1088  
DROPNOTE function 339  
DROPOVER option, FILE statement 804  
DSD option, INFILE statement 859  
DSNAME function 340  
DSNFERR system option 1092  
Dunnett's one-sided test 492  
Dunnett's two-sided test 493  
duplex printing 1093  
DUPLEX system option 1093  
duplex-printed output  
   binding edge, specifying 1062  
DUR function 340  
DURP function 341  
Dw. format 88

## E

EBCDIC characters 241  
   getting by number 241  
   returning a string of 292  
   returning numeric value of 516  
EBCDIC data 71  
   convert to native format 649  
   converting to ASCII 71  
   reading 714  
\$EBCDICw. format 74, 159  
   compared to S370FFw.d format 159  
\$EBCDICw. informat 649  
   compared to S370FFw.d informat 715  
ECHOAUTO system option 1094  
embedded characters, removing 664, 665  
ENCRYPT= data set optoin 16  
encryption  
   SAS data files 16  
encryption, network communications 1124  
   algorithm for 1125  
   key length 1125  
END= argument  
   MODIFY statement 934  
   SET statement 1010  
   UPDATE statement 1024  
END= option, INFILE statement 859  
END statement 798  
ENDSAS command, compared to ENDSAS statement 800  
ENDSAS statement 800  
ENGINE= system option 1095  
ENTER command, DATA step debugger 1211  
enumerated cashflow  
   convexity for 300  
   modified duration for 340  
EOF= option, INFILE statement 859  
EOV= option, INFILE statement 859  
equal (=) operator, where statement 1031  
equal asterisk (=\*) sounds-like operator, where statement 1031  
ERF function 343  
ERFC function 344  
ERRABEND system option 1095  
error detection levels  
   input data sets 1087  
   output data sets 1088  
error function 343  
error function, complementary 344  
error handling  
   catalogs 1089  
   format not found 1100  
   macro-like names not found 1116  
   numeric data 1109  
error handling, in batch processing 1096  
error messages 559  
   formatted 414  
   logging 1140  
   maximum number printed 1097

- returning 559  
 SORT porcedure 1066  
 writing 801  
 error response 1095  
 ERROR statement 801  
 ERRORABEND system option 1095  
 ERRORCHECK= system option 1096  
 ERRORS= system option 1097  
 \_ERROR\_ variable 801  
 Euler constants 298  
 EURDFDDw. format 101  
 EURDFDEw. format 103  
 EURDFDEw. informat 672  
 EURDFDNw. format 105  
 EURDFDTw. format 106  
 EURDFDTw. informat 673  
 EURDFDWnW. format 108  
 EURDFMNw. format 110  
 EURDFMYw. format 112  
 EURDFMYw. informat 675  
 EURDFwdxw. format 113  
     compared to EURDFWKXw. format 115  
 EURDFwdxw. format, compared to EURDFWKXw. format 115  
 EURDFWKXw. format, compared to EURDFwdxw. format 115  
 EURDFWKXw. format 115, 116  
     compared to EURDFwdxw. format 115  
 EURDFWKXw. format, compared to EURDFwdxw. format 115  
 Ew. format 101  
 Ew.d informat 671  
 exact integer constants 298  
 EXAMINE command, DATA step debugger 1212  
 executable DATA step statements 745  
 executable statements 745  
 EXECUTE CALL routine 242  
 EXECUTE statement 802  
 execution environment 1169  
 EXIST function 344  
 EXP function 345  
 EXPANDTABS option, INFILE statement 859  
 EXPLORER system option 1097  
 Explorer window 1091, 1097  
     SOLUTIONS folder 1157  
 exponential distribution 252  
 exponential distributions 277  
     cumulative distribution functions 277  
     probability density functions 468  
         random numbers 252, 513  
 exponential functions 345  
 expressions, summing 1019  
 external files 339  
     appending records to 347  
     attribute listing of 822  
     closing 348  
     definition 823  
     deleting 351  
     filerefs 358, 359, 822  
     getting information about 375  
     including 855  
     MPRINT option and 1116  
     names of information items 373  
     note markers, returning 339  
     number of information items 375  
     opening 371  
     opening by directory id 452  
     opening by member name 452  
     pathnames, returning 463  
     pointer to next record 376  
     reading 380  
     SAS catalogs as 827  
     size of current record 382  
     size of last record read 382  
     specifying as output 802  
     verifying existence 354, 357  
     writing 385, 962  
 external files, reading 380  
     delimited data 866  
     missing values 869  
     multiple 865, 870  
     past end of line 867  
     pointer location, listing 872  
     specifying for input 857  
     to File Data Buffer (FDB) 380  
     truncation 872  
     updating in place 865, 871  
     variable length records 870  
 external programs, invoking with a PROC statements 1141
- F**
- F distributions 278  
     cumulative distribution functions 278  
     noncentrality parameter 368  
     probabilities from 487  
     probability density functions 468  
     quantiles 363  
 FACT function 346  
 factorials, computing 346  
 FAPPEND function 347  
 FCLOSE function 348  
 FCOL function 350  
 FDELETE function 351  
 FETCH function 352  
 FETCHOBS function 353  
 FEXIST function 354  
 FGET function 356  
     setting token delimiters for 383  
 FILE command, compared to FILE statement 812  
 File Data Buffer (FDB) 350  
     column pointer, setting 377  
     copying data from 356  
     current column position 350  
     moving data to 378  
     reading external files to 380  
 file information items, value of 362  
 file manipulation, with functions 210  
 file pointer, setting to start of file 381  
 FILE statement 802  
     compared to INFILE statement 868  
 FILECLOSE= data set option 18  
 FILEEXIST function 357  
 FILENAME function 358  
 FILENAME= option  
     FILE statement 805  
     INFILE statement 860  
 FILENAME statement 822  
     arguments 822  
     CATALOG access method 827  
     compared to LIBNAME statement 918  
     compared with LIBNAME statement, SAS/ACCESS 922  
     compared with REDIRECT statement 993  
     examples 824  
     FTP access method 830  
     host information 823  
     host options 823  
     SOCKET access method 836  
     URL access method 839  
 FILEREF function 360  
 filerefs  
     assigning 358  
     deassigning 358  
     definition 824  
     directories 358  
     external files 358, 359, 822  
     output devices 358, 822  
     pipe files 360  
     system-generated 360  
     verifying 360  
 files not found  
     searching autocal libraries for 1119  
 files, master  
     updating 1023  
 FILEVAR= option, FILE statement 805  
 FILEVAR= option, INFILE statement 860  
 financial functions 209  
 FINFO function 362  
     compared to FOPTNUM function 375  
 FINV function 363  
 FIPNAME function 364  
     compared to FIPNAMEL function 365  
     compared to FIPSTATE function 366  
 FIPNAMEL function 364, 365  
     compared to FIPNAME function 364  
     compared to FIPSTATE function 366  
 FIPS codes, converting to 364  
     postal codes 366  
     state names 364  
 FIPSTATE function 364, 366  
     compared to FIPNAME function 365  
     compared to FIPNAMEL function 364  
 FIRSTOBS= data set option 18  
     compared to FIRSTOBS= system option 1099  
 FIRSTOBS= option, INFILE statement 860  
 FIRSTOBS= system option 1098

fixed-point values 149, 151  
 reading in Intel and DEC formats 681, 703  
 writing in Intel and DEC formats 126  
 floating-point data (IEEE), reading 682  
 floating-point data, converting to hexadecimal 121  
 floating-point data, reading 677  
 floating-point data, writing 118  
 IBM mainframe format 166  
 IEEE 127  
 FLOATw.d format 118  
 FLOATw.d informat 677  
 FLOOR function 367  
 floor values 367  
 FLOWOVER option, FILE statement 805  
 FLOWOVER option, INFILE statement 860  
 FMTERR system option 1100  
 FMTSEARCH= system option 1100  
 FNONCT function 368  
 FNNOTE function 370  
 FOOTNOTE statement 842  
 footnotes, procedure output 842  
 FOPEN function 371  
 FOPTNAME function 362, 373  
 compared to FINFO function 362  
 compared to FOPTNUM function 375  
 FOPTNUM function 362, 375  
 compared to FINFO function 362  
 format catalogs, search order 1100  
 format decimal values, returning 591  
 arguments 592  
 variables 591  
 format names, returning 593  
 arguments 594  
 variables 593  
 FORMAT statement 843  
 compared to ATTRIB statement 764  
 specifying formats with 53  
 format width, returning 593  
 arguments 596  
 variables 593, 595  
 formats 51, 503  
 applying 503  
 associating with variables 763, 843  
 byte ordering 55  
 categories of 66  
 character formats 66  
 character, specifying at run time 505  
 DATA step debugger and (example) 1201  
 date and time formats 66  
 integer binary notation 56  
 international date and datetime formats 60  
 language for international dates 1086  
 not found 1100  
 numeric formats 66  
 numeric, specifying at run time 507  
 packed decimal data 57  
 permanent 54  
 returning 579, 590, 597  
 specifying 52

specifying, with ATTRIB statement 54  
 specifying, with %SYSFUNC macro 53  
 specifying, with FORMAT statement 53  
 specifying, with PUT function 53  
 specifying, with PUT statement 53  
 syntax 52  
 temporary 54  
 user-defined 54  
 user-written 66  
 zoned decimal data 57  
 formatted error messages 414  
 formatted input 881, 893  
 formatted output 968, 979  
 formatting characters 1102  
 FORMCHAR= system option 1102  
 FORMDLIM= system option 1102  
 FORMS= system option 1103  
 {fourth} 4th moment 431  
 FPOINT function 376  
 FPOS function 377  
 FPUT function 378  
 fractions, converting to 120  
 FRACTw. format 120  
 FREAD function 380  
 FREWIND function 381  
 FRLEN function 382  
 FRMDLIM= system option 1102  
 FRMS= system option 1103  
 FSEP function 383  
 FTP access 830  
 FTP argument  
 FILENAME statement, FTP access 830  
 functions 206  
 by category 213  
 COMB 293  
 CONSTANT 297  
 DATA step functions within macro functions 210  
 DATDIF 312  
 depreciation functions 209  
 descriptive statistic functions 209  
 DEVIANC 324  
 FACT 346  
 file manipulation with 210  
 financial functions 209  
 for Web applications 213  
 JULDATE 416  
 pattern matching with RX functions 213  
 PERM 480  
 PROBBNRM 486  
 PROBMC 491  
 random-number functions 211  
 regular expression (RX) functions 213  
 restrictions on arguments 208  
 seed values 211  
 syntax 206  
 target variables 208  
 YRDIF 620  
 future value of periodic savings 540  
 FUZZ function 384

FWRITE function 385

## G

GAMINV function 386  
 gamma distributions 254, 278, 325  
 cumulative distribution functions 278  
 probability density functions 469  
 probabilities from 488  
 quantiles 386  
 random numbers 254, 514  
 GAMMA function 387  
 natural logarithm of 437  
 returning value of 387  
 generations 20, 21  
 GENMAX= data set option 20  
 GENNUM= data set option 21  
 geometric distributions 279  
 cumulative distribution functions 279  
 probability density functions 469  
 GETOPTION function 388  
 GETVARC function 390  
 GETVARN function 391  
 global DATA step statements  
 by category 750  
 definition 750  
 GO command, DATA step debugger 1213  
 GO TO statement 846  
 GRAPH window 1105  
 graphics options, returning value of 388  
 greater than (>) operator, where statement 1031  
 greater than or equal (>=) operator, where statement 1031  
 GROUP= operator, WINDOW statement 1035  
 GROUPFORMAT argument, ABORT statement 765  
 GWINDOW system option 1105

## H

hardware information, writing to SAS log 1083  
 HBOUND function 330, 392  
 compared to DIM function 330  
 HEADER= option, FILE statement 806  
 help  
 online training, location of 1171  
 viewer, text and index file location 1105  
 HELP command, DATA step debugger 1214  
 HELPLOC= system option 1105  
 hexadecimal binary values, converting to integers 678  
 hexadecimal binary values, converting to real binary 678  
 hexadecimal data, converting to character 650  
 hexadecimal values  
 reading packed Julian date values in, for IBM 696  
 reading packed Julian dates in, for IBM 698

writing packed Julian dates in, for IBM 145, 146  
\$HEXw. format 75, 121, 75, 121  
compared to HEXw. format 121  
compared to \$HEXw. format 75  
\$HEXw. informat 650, 678  
compared to \$BINARYw. informat 645  
compared to \$HEXw. informat 650  
HHMMw.d format 122  
compared to TIMEw.d format 173  
HMS function 394  
HOST= option  
  FILENAME statement, FTP access 830  
HOUR function 395  
HOURw.d format 123  
HTML  
  decoding 396  
  encoding 397  
HTML destination 951  
HTML output 951  
HTMLDECODE function 396  
HTMLENCODE function 397  
hyperbolic cosine 303  
hyperbolic sine 545  
hyperbolic tangents 563  
hypergeometric distributions 279  
  cumulative distribution functions 279  
  probabilities from 489  
  probability density functions 470

**I**  
IBESSEL function 398  
IBM packed decimal data, reading 695  
IBRw.d format 126  
IBRw.d informat 681  
IBw.d format 124  
  compared to PIBw.d format 150  
IBw.d informat 679  
  compared to S370FIBw.d informat 716  
ICOLUMN= argument, WINDOW statement 1035  
IDXNAME= data set option 22  
IDXWHERE= data set option 23  
IEEE floating-point values  
  reading 682  
  writing 127  
IEEEw.d format 127  
IF statement, subsetting 847  
  compared to DELETE statement 784  
  compared to WHERE statement 1032  
IF, THEN/ELSE statements 849  
  compared to IF statement, subsetting 848  
  compared to SELECT statement 1008  
IMPLMAC system option 1106  
IN= data set option 25  
in operator, where statement 1031  
INCLUDE command, compared to %INCLUDE statement 855

%INCLUDE statement 851  
  examples 855  
  external files, including (example) 855  
  including previously submitted lines (example) 856  
  keyboard input, including (example) 856  
  rules for using 854  
  sources of data for 854  
  with several entries in a single catalog (example) 857  
including programming statements and data lines 851  
INDEX= data set option 26  
INDEX function 399  
  compared to INDEXC function 400  
  compared to INDEXW function 402  
INDEXC function 400  
indexes  
  composite 27  
  defining, at data set creation 26  
  name specification, for WHERE expression 22  
  overriding SAS System decisions on 23  
INDEXW function 401  
INFILE statement 857  
  compared to FILE statement 812  
  compared to INPUT statement 886  
\_INFILE\_option  
  INFILE statement 864  
  PUT statement 963  
informat decimal values, returning 602  
  arguments 603  
  variables 602  
informat names, returning 604  
  arguments 605  
  variables 604  
INFORMAT= option, ATTRIB statement 763  
INFORMAT statement 873  
  compared to ATTRIB statement 764  
  specifying informats with 633  
informat width, returning 606  
  arguments 607  
  variables 606  
informats 402, 631  
  aliases 640  
  associating with variables 763, 873  
  byte ordering 634  
  categories of 640  
  integer binary notation 635  
  language for international dates 1086  
  permanent 633  
  reading results of expressions 402  
  returning 580, 601, 608  
  specifying 632  
  specifying at run time 404, 406  
  specifying, with ATTRIB statement 633  
  specifying, with INFORMAT statement 633  
  specifying, with INPUT function 632  
  specifying, with INPUT statement 632  
  syntax 631  
temporary 633  
user-defined 634  
INFORMATW function 606  
INITCMD system option 1107  
INITSMT= system option 1108  
input  
  as card images 1069  
  assigning to variables 876  
  column 881, 891  
  describing format of 876  
  end-of-data indicator 949  
  error detection levels 1087  
  formatted 881, 893  
  invalid data 885, 928  
  list 881, 897  
  listing for current session 925  
  logging 925  
  missing records 928  
  missing values 932  
  named 881, 903  
  resynchronizing 928  
  sequence field, length of numeric portion 1153  
  upcasing 1068  
input column 894  
input data sets  
  data set options with 6  
  redirecting 992  
INPUT function 402  
  specifying informats with 632  
INPUT statement 403, 876  
  column 891  
  compared to INPUT function 403  
  compared to PUT statement 971  
  compared to SET statement 1014  
  formatted 893  
  list 897  
  named 903  
  specifying informats with 632  
INPUTC function 404  
  compared to INPUTN function 406  
INPUTN function 404, 406  
  compared to INPUTC function 404  
INT function 407  
INTCK function 408  
integer binary data, writing 160  
  IBM mainframe format 160  
integer binary format, writing 124  
integer binary notation 56, 635  
integer binary values  
  reading in Intel and DEC formats 681  
  writing in Intel and DEC formats 126  
Intel format  
  reading integer binary values in 681  
  reading positive integer binary values in 703  
  writing integer binary values in 126  
Intel format, writing fixed-point data in 151  
interger binary data, reading  
  IBM mainframe format 715, 720  
interger binary values, reading 679, 701

internal rate of return 413  
 as fraction 413  
 as percentage 415  
 international date and datetime formats 60  
 international numerical format 113, 116  
 INTNX function 410  
 INTRR function 415  
 compared to IRR function 415  
 invalid data  
 numeric 1109  
 INVALIDDATA= system option 1109  
 inverse Gaussian (Wald) distributions 326  
 IORCMMSG function 414  
 IROW= argument, WINDOW statement 1035  
 IRR function 413  
 is missing operator, where statement 1031  
 is null operator, where statement 1031  
 IS system option 1108

**J**

Japanese numerical format 141  
 Java applet location 1059  
 JBESSEL function 416  
 joining DBMS tables (example) 922  
 JULDATE function 416  
 JULDAYw. format 128  
 Julian date values  
 writing in hexadecimal form for IBM 146  
 Julian date values, packed  
 reading in hexadecimal form, for IBM 696  
 writing in hexadecimal form for IBM 145  
 Julian dates 58, 637  
 returning 416  
 Julian dates, packed  
 reading in hexadecimal format, for IBM 698  
 JULIANw. format 129  
 JULIANw. informat 685  
 JUMP command, DATA step debugger 1214

**K**

\$KANJIw. format 75  
 \$KANJIw. informat 651  
 \$KANJIw. format 76  
 \$KANJIw. informat 652  
 KCOMPARE function 418  
 KCOMPRESS function 419  
 KCOUNT function 419  
 KEEP= data set option 27  
 compared to KEEP statement 906  
 error detection for input data sets 1087  
 KEEP= data step option  
 error detection for output data sets 1088  
 KEEP statement 905  
 compared to DROP statement 797  
 compared to RETAIN statement 1001  
 error detection for output data sets 1088

KEY= argument  
 MODIFY statement 935  
 SET statement 1011  
 key length, encrypted data 1125  
 keyboard 1072  
 keyboard input 856  
 KEYS= argument, WINDOW statement 1035  
 keywords, allowed in DATA statement 1083  
 KINDEX function 420  
 KINDEXC function 420  
 KLEFT function 421  
 KLENGTH function 422  
 KLOWCASE function 422  
 KREVERSE function 423  
 KRIGHT function 423  
 KSCAN function 424  
 KSTRCAT function 425  
 KSUBSTR function 425  
 KSUBSTRB function 426  
 KTRANSLATE function 426  
 KTRIM function 427  
 KTRUNCATE function 428  
 KUPCASE function 429  
 KUPDATE function 429  
 KUPDATEB function 430  
 kurtosis 431  
 KURTOSIS function 431  
 KVERIFY function 432

**L**

LABEL CALL routine 243  
 LABEL= data set option 28  
 LABEL statement 907  
 compared to ATTRIB statement 764  
 compared to statement labels 908  
 LABEL system option 1110  
 labels  
 for SAS data sets 28  
 statement labels 908  
 labels, associating with variables 763  
 labels, with variables in SAS procedures 1110  
 LAG function 432  
 landscape orientation 1131  
 languages, for international date informats and formats 1086  
 Laplace distributions 280  
 cumulative distribution functions 280  
 probability density functions 470  
 \_LAST\_= system option 1110  
 LBOUND function 434  
 LEAVE statement 773, 909  
 compared to CONTINUE statement 773  
 LEFT function 436  
 LEFTMARGIN= system option 1111  
 LENGTH function 436  
 compared to VLENGTH function 611  
 LENGTH= option, INFILE statement 860

LENGTH statement 911  
 compared to ATTRIB statement 764  
 length, associating with variables 763  
 less than (<) operator, where statement 1031  
 less than or equal (<=) operator, where statement 1031  
 LGAMMA function 437  
 LIBNAME function 438  
 LIBNAME statement 914  
 arguments 914  
 compared with CATNAME statement 770  
 engine-host-options 916  
 examples 918  
 options 915  
 LIBNAME statement, SAS/ACCESS 920  
 arguments 920  
 compared with FILENAME statement 922  
 data from a DBMS 921  
 examples 922  
 joining two DBMS tables (example) 922  
 ORACLE data, accessing (example) 922  
 SAS/ACCESS-engine-connection-options 921  
 SAS/ACCESS-engine-LIBNAME-options 921  
 specifying SAS/ACCESS information with macros (example) 922  
 LIBREF function 439  
 librefs 439  
 associating with SAS/ACCESS table or view 920  
 keeping previous libref in current SAS session 1162  
 SAS data libraries 439, 914  
 verifying 439  
 license information, altering 1155  
 like operator, where statement 1031  
 LINE= option  
 FILE statement 806  
 INFILE statement 861  
 line pointer controls  
 INPUT statement 879  
 PUT statement 966  
 line-hold specifiers  
 INPUT statement 883  
 PUT statement 969  
 LINESIZE= option, FILE statement 806  
 compared to LRECL= option, FILE statement 807  
 LINESIZE= option, INFILE statement 861  
 LINESIZE= system option 1112  
 LINESLEFT= option, FILE statement 806  
 LINK statement 923  
 compared to GO TO statement 846  
 LIST command, DATA step debugger 1215  
 list input 881, 897  
 LIST option  
 CATNAME statement 770  
 FILENAME statement, FTP access 830  
 list output 967, 983  
 LIST statement 927, 925  
 Listing destination 953

- literals 1182  
 SAS name literals 1187
- little endian platforms, byte ordering 55
- little endian platforms, byte ordering on 634
- LOG argument, FILE statement 803
- LOG function 439
- LOG window 1091  
 suppressing 1107
- log, console 1081
- LOG10 function 440
- LOG2 function 441
- logarithms 437  
 base 10 440  
 base 2 441  
 natural logarithms 439  
 of gamma function 437  
 of probability functions 441  
 of survival functions 441
- logistic distributions 280  
 cumulative distribution functions 280  
 probability density functions 471
- lognormal distributions 281  
 cumulative distribution functions 281  
 probability density functions 471
- LOGPDF function 441
- LOGSDF function 441
- LOSTCARD statement 928
- LOWCASE function 442
- lowercase letters  
 in arguments 422
- lowercase, converting arguments to 442
- LRECL= argument  
 FILENAME statement, CATALOG access 827
- LRECL= option, FILE statement 807  
 compared to LINESIZE= option, FILE statement 806
- LRECL= option, FILENAME statement  
 FTP access 831  
 SOCKET access 836  
 URL access 840
- LRECL= option, INFILE statement 861
- LS option  
 FILENAME statement, FTP access 831
- LSFILE= option  
 FILENAME statement, FTP access 831
- M**
- machine precision constants 300
- macro autocall 1114
- macro facility  
 autocall macro library 1149  
 DATA step debugger with 1196  
 searching for stored compiled macros 1121
- macro functions, DATA step functions  
 within 210
- macro language 1113
- macro language processor 1118
- MACRO system option 1113
- macro variable references  
 unmatched, message for 1154
- macro variable symbol tables  
 memory, specifying 1122
- macro variables 269, 271  
 assigning DATA step data 271  
 linking SAS data set variables 269, 271  
 minimum size for 1123  
 returning during DATA step 557
- macros 523  
 as debugging tools 1196  
 command-style invocation 1075  
 customized debugging commands with 1196  
 debugging a DATA step generation by 1197  
 displaying statements generated by 1118  
 macro-like names not found 1116  
 returning values from 523  
 specifying SAS/ACCESS information with (example) 922  
 statement-style calls, enabling 1106  
 stored compiled, library of 1151
- MACs (Message Authentication Codes) 1126
- many-one t-statistics, Dunnett's one-sided test 492
- many-one t-statistics, Dunnett's two-sided test 493
- MAPS= system option 1114
- macro variable references  
 writing to SAS log 1164
- margins, for printed output  
 top margin 1170
- margins, printed output  
 bottom margin 1063  
 left margin 1111  
 right margin 1145
- master files, updating 1023
- match-merge 931
- matching words 547
- MAUTOSOURCE system option 1114
- MAX function 442
- maximum values, returning 442
- MDY function 443
- MEAN function 444
- means  
 multiple comparisons of 491, 497
- memory 483  
 for SORT procedure 1159  
 freeing memory allocated by RX functions and CALL routines 267  
 specifying limits for 1163  
 writing directly to 483
- memory address of variables 227
- memory addresses, storing contents of 476  
 as character variables 477  
 as numeric variables 476
- MENU= argument, WINDOW statement 1035
- menus  
 SOLUTIONS choice 1157
- MERGE processing, without BY statement 1115
- MERGE statement 930  
 compared to MODIFY statement 940  
 compared to UPDATE statement 1025
- MERGENOBY system option 1115
- MERROR system option 1116
- Message Authentication Codes (MACs) 1126
- messages, across a network 1126
- messages, level of detail 1120
- messages, news file for writing to SAS log 1127
- messages, printing to SAS log 1140
- metadata, location of repository manager 1143
- MFILE system option 1116
- MGET option  
 FILENAME statement, FTP access 831
- MIN function 445
- MINGUOw. format 130
- MINGUOw. informat 686
- minimum values, returning 445
- minus (-) operator, where statement 1030
- minus sign (-) negative number operator, where statement 1031
- MINUTE function 445
- MISSING function 446
- missing records, input 928
- MISSING statement 932
- MISSING= system option 1117  
 compared to MISSING statement 933
- missing values 457  
 input 932  
 MISSING statement 932  
 number of 457  
 reading external files 869  
 returning a value for 446  
 substitute characters for 932, 1117
- MISSOVER option, INFILE statement 861
- MLOGIC system option 1118
- MMDDYYw. format 131
- MMDDYYw. informat 688
- MMDDYYxw. format 132
- MMSSw.d format 134
- MMYYw. format 135
- MOD argument  
 FILENAME statement, CATALOG access 827
- MOD function 448
- MOD option, FILE statement 807
- MODIFY statement 934
- modulus 448
- MONNAMEw. format 137
- MONTH function 451
- MONTHw. format 138
- MONYYw. format 138
- MONYYw. informat 689
- MOPEN function 452
- MORT function 455
- MPRINT system option 1118  
 output to external file 1116
- MPROMPT option  
 FILENAME statement, FTP access 831
- MRECALL system option 1119

MSECw. informat 691  
\$MSGCASEw. format 77  
MSGLEVEL= system option 1120  
\_MSG\_ SAS variable, WINDOW statement 1040  
MSTORED system option 1121  
MSYMTABMAX= system option 1122  
MULTENVAPPL system option 1122  
MVARSIZE= system option 1123

**N**

N function 456  
name tokens 1182  
SAS names 1184  
named input 881, 903  
named output 968, 987  
natural base constants 297  
natural logarithms 439  
NBYTE= option  
FILE statement 808  
INFILE statement 862  
negative binomial distributions 281  
cumulative distribution functions 281  
probabilities from 501  
negative values in parentheses 139  
NEGPARENw.d format 139  
NENGW. format 141  
NENGW. informat 692  
nested catalog concatenation (example) 771  
net present value 456, 460  
as fraction 456  
as percentage 460  
NETENCRYPT system option 1124  
NETENCRYPTALGORITHM= system option 1125  
NETENCRYPTKEYLEN= system option 1125  
NETMAC system option 1126  
NETPV function 456  
network communications, encrypting  
algorithm for 1125  
network communications, encrypting 1124  
key length 1125  
NEWS= system option 1127  
nibble 57, 636  
NMISS function 457  
NOBS= argument  
MODIFY statement 935  
SET statement 1011  
NODUP option, SORT procedure 1157  
NOEXPANDTABS option, INFILE statement 859  
NOINPUT argument, DISPLAY statement 786  
noncentrality parameters 290  
chi-squared distribution 290  
F distribution 368  
t distribution 565  
nonmissing values 456  
NOPAD option  
FILE statement 808

INFILE statement 862  
NOPRINT option  
FILE statement 809  
INFILE statement 862  
normal distributions 256, 282  
cumulative distribution functions 282  
deviance from 326  
probability density functions 472  
random numbers 256, 458, 517  
NORMAL function 458  
not equal (^=) operator, where statement 1031  
not operator, where statement 1031  
not sign (¬) logical not operator, where statement 1031  
NOTE function 458  
NOTES system option 1128  
NOTSORTED argument, ABORT statement 766  
NPV function 460  
null statements 949  
\_NULL\_ data sets 1174  
NUMBER system option 1128  
number tokens 1182  
numeric data 72, 407  
commas for decimal places 142  
converting to binary 72, 85  
converting to octal 143  
converting to words 184  
invalid data, substitute characters for 1109  
missing values, substitute characters for 1111  
truncating 407, 573  
writing, in INTEL and DEC formats 151  
numeric data, reading  
commas for decimal points 693  
from column-binary files 663  
standard format 732  
numeric data, writing 72, 177  
commas 87  
commas for decimal places 142  
converting to binary 72, 85  
converting to EBCDIC 158  
converting to octal 143  
converting to words 184  
currency, European dollar format 98  
currency, U.S. dollar format 97  
currency, Yen 186  
decimal points 87  
double quotation marks, surrounding values with 78  
EBCDIC data, converting to ASCII 71  
fixed-point values 149  
floating-point data, IBM mainframe format 166  
floating-point numbers, writing 118  
floating-point values (IEEE), writing 127  
floating-point values, converting to hexadecimal 121  
fractions, converting to 120  
IEEE floating-point values, writing 127  
integer binary data, IBM mainframe format 160

integer binary data, writing 124  
international format 113, 116  
Japanese format 141  
leading zeros 196  
negative values in parentheses 139  
p-values 153  
packed decimal data, IBM mainframe format 162  
packed decimal data, writing 144  
percentages 148  
positive integer binary data, IBM mainframe format 165  
RBW.d 156  
Roman numerals, numeric values as 157  
SAS chooses best notation 84  
scientific notation 101  
significant digits, writing 88  
social security numbers 158  
Taiwanese format 130  
unsigned integer binary data, IBM mainframe format 161  
unsigned packed decimal data, IBM mainframe format 164  
unsigned packed decimal format 152  
unsigned zoned decimal data, IBM mainframe format 172  
zoned decimal data, IBM mainframe format 167  
zoned decimal format 197  
zoned decimal leading sign data, IBM mainframe format 168  
zoned decimal separate leading sign data, IBM mainframe format 169  
zoned decimal separate trailing sign data, IBM mainframe format 170  
numeric expressions  
missing values, returning a result for 446  
numeric formats 66  
numeric values  
truncating 428  
NUMXw.d format 142  
NUMXw.d informat 693

**O**

OBJECTSERVER system option 1129  
OBS= data set option 30  
OBS= option, INFILE statement 862  
OBS= system option 1129  
observations 305  
bookmarks, setting 370  
bookmarks, finding 481  
compressing on output 1078  
contributing data sets 25  
deleting 784, 993  
dropping 797  
ending point for processing 30  
grouping 765

maximum allowed errors 1097  
merging 930  
multi-observation exchanges, number to transmit 41  
multiple records for 884  
number of current 305  
observation ID, returning 458  
reading 352, 353, 1010  
replacing 997  
selecting, to meet WHERE expression 43  
sorting 765  
starting at a specific 1098  
starting point for processing 18  
stopping at a specific 1129  
updates, evaluating against WHERE expression 45  
updating in place 934  
writing 959  
observations, selecting  
IF, subsetting 847  
IF, THEN/ELSE statement 849  
WHERE statement 1028  
octal data  
converting to character 652  
converting to integers 694  
\$OCTALw. format 77, 143, 143  
compared to OCTALw. format 143  
compared to \$OCTALw. format 78  
OCTALw. informat 652  
compared to \$OCTALw. informat 652  
OCTALw.d informat 694  
ODS (Output Delivery System)  
creating SAS data sets from output objects 953  
excluding output objects 951  
exclusion lists, writing to SAS log 956  
HTML destination 951  
Listing destination 953  
Output destination 953  
output objects, logging 957  
output objects, specifying 955  
Printer destination 954  
printer specification for Printer destination 1138  
searching for definitions 954  
selection lists, writing to SAS log 956  
verifying definitions 957  
ODS EXCLUDE statement 951  
ODS HTML statement 951  
ODS LISTING statement 953  
ODS OUTPUT statement 953  
ODS PATH statement 954  
ODS PRINTER statement 954  
ODS SELECT statement 955  
ODS SHOW statement 956  
ODS TRACE statement 957  
ODS VERIFY statement 957  
OLD option, FILE statement 808  
one-to-one merge 931  
online documentation 1091

online training 1171  
OPEN function 461  
operating environment, requirements vector for output file 31  
operating system commands 272, 562  
executing 272  
issuing from SAS session 562  
issuing from SAS sessions 1043  
operating system variables, returning 558  
OPTIONS statement 958  
or operator, where statement 1031  
ORACLE data  
accessing with LIBNAME statement 922  
ORDINAL function 462  
ORIENTATION= system option 1131  
orientation, for printing 1131  
out-of-resource conditions 1073  
output  
aligning 1071  
collating 1076  
column 967, 977  
compressing 1078  
delimiting page breaks 1102  
error detection levels 1088  
formatted 968, 979  
formatting characters, default 1102  
list 967, 983  
named 968, 987  
overprinting lines 1132  
page size, specifying 1133  
skipping lines 1156  
spooling 1161  
title lines 1020  
windowing, default form 1103  
output data sets  
buffer size 11  
creating 777  
data set options with 6  
dropping variables 15  
keeping variables 27  
redirecting 992  
Output destination 953  
output devices, and filerefs 358, 822  
output files, requirements vector for 31  
OUTPUT statement 959  
compared to REMOVE statement 994  
compared to REPLACE statement 998  
OUTPUT window  
suppressing 1107  
invoking 1091  
output, printed  
bin specification 1134  
bottom margin 1063  
duplexing controls 1093  
left margin 1111  
right margin 1145  
top margin 1170  
OUTREP= data set option 31  
OUTREP= option, LIBNAME statement 915  
OVERPRINT option, PUT statement 966

overprinting output lines 1132  
OVP system option 1132

## P

p values, specifying significant digits 1141  
p-values 153  
P-VALUEw.d format 153  
packed data, reading in IBM mainframe format 718  
packed decimal data 57, 636  
defined 57, 636  
formats and informats for 59, 638  
languages supporting 58, 637  
platforms supporting 58, 637  
packed decimal data, writing 144  
IBM mainframe format 162  
packed hexadecimal data, converting to character 653  
packed Julian date values  
reading in hexadecimal form, for IBM 696  
writing in hexadecimal form for IBM 145, 146  
packed Julian dates 58, 637  
reading in hexadecimal format, for IBM 698  
PAD option  
FILE statement 808  
INFILE statement 862  
page breaks, delimiting 1102  
page buffers, for catalogs 1071  
page numbers  
printing 1128  
resetting 1133  
page size, and buffers 11  
PAGE statement 962  
PAGENO= system option 1133  
PAGESIZE= option, FILE statement 809  
PAGESIZE= system option 1133  
\_PAGE\_ option, PUT statement 966  
paper orientation 1131  
PAPERDEST= system option 1134  
PAPERSIZE= system option 1135  
PAPERSOURCE= system option 1136  
PAPERTYPE= system option 1136  
parameters  
passing to external programs 1137  
passing to SAS programs 1165  
returning system parameter string 559  
parentheses order of operations operator, where statement  
flow into main entry 1031  
Pareto distributions 282  
cumulative distribution functions 282  
probability density functions 473  
PARM= system option 1137  
PARMCARDS file 1138  
PARMCARDS= system option 1138  
parsing a pattern  
*See* patterns, parsing

- PASS= option  
 FILENAME statement, FTP access 831  
 FILENAME statement, URL access 840  
**passwords**  
 alter, assigning 9  
 assigning 33  
 pop-up request for 33  
 read, assigning 34  
 recording 17  
 write, assigning 46  
 PATHNAME function 463  
 pattern abbreviations 533  
 pattern matching, with functions and CALL routines 213  
 patterns, parsing 527  
   change expressions 536  
   change items 536  
   character classes 529  
   example 538  
   matching balanced symbols 533  
   pattern abbreviations 533  
   quotation marks in expressions 537  
   scores 535  
   special symbols 534  
   tag expressions 535  
 PDF function 464  
 PDJULGw. format 145  
 PDJULGw. informat 696  
 PDJULIw. format 146  
 PDJULIw. informat 698  
 PDTIMEw. informat 699  
   compared to RMFSTAMPw. informat 710  
 PDw.d format 144  
   compared to PKw.d format 152  
 PDw.d informat 695  
   compared to \$PHEXw. informat 653  
   compared to PKw.d informat 704  
   compared to S370FPDw.d informat 719  
 PEEK function 476  
   compared to PEEKC function 478  
 PEEKC function 477  
   compared to PEEK function 476  
 percentages  
   converting to numeric values 700  
   printing numbers as 148  
 PERCENTw.d format 148  
 PERCENTw.d informat 700  
 periodic cashflow stream  
   convexity for 301  
   modified duration for 341  
   present value for 508  
 PERM function 480  
 permutations, computing 480  
   *See* combinations, computing  
 PERSIST= option, WINDOW statement 1039  
 PIBRw.d format 151  
 PIBRw.d informat 703  
 PIBw.d format 149  
 PIBw.d informat 701  
   compared to S370FPIBw.d informat 721  
 pipe files, filerefs for 360  
 PKw.d format 152  
 PKw.d informat 704  
 plus (+) operator, where statement 1030  
 plus sign (+) column pointer control  
   INPUT statement 879  
   PUT statement 965  
   WINDOW statement 1037  
 plus sign (+) positive number operator, where statement  
   flow into main entry 1031  
 POINT function 481  
 POINT= option  
   MODIFY statement 935  
   SET statement 1012  
 pointer controls  
   INPUT statement 882  
   PUT statement 968  
 POINTOBS= data set option 32  
 Poisson distributions 258, 283, 326  
   cumulative distribution functions 283  
   probabilities from 482  
   probability density functions 473  
   random numbers 258, 518  
 POISSON function 482  
 POKE CALL routine 247  
 POKE function 483  
 population size, returning 456  
 portrait orientation 1131  
 positive integer binary data, writing in IBM mainframe format 165  
   flow to main entry 165  
 positive integer binary values 149, 151  
   reading in Intel and DEC formats 703  
 postal codes 552  
   converting to FIPS codes 552  
   converting to state names 552, 553  
 pound sign (#) line pointer control  
   INPUT statement 879  
   PUT statement 966  
 PRINT argument, FILE statement 803  
 PRINT option  
   FILE statement 809  
   INFILE statement 862  
 printed output  
   bin specification 1134  
   left margin 1111  
   right margin 1145  
   top margin 1170  
 Printer destination 954, 1138  
 PRINTERPATH= system option 1138  
 printing  
   bin specification 1136  
   color printing 1077  
   duplexing controls 1093  
   number of copies 1082  
   orientation 1131  
   overprinting output lines 1132  
   page numbers 1128  
   paper size 1135  
 paper type 1136  
 print file, initializing 1139  
 PRINTINIT system option 1139  
 PRINTMSGLIST system option 1140  
 probabilities 482  
   beta distributions 484  
   binomial distributions 485  
   chi-squared distributions 486  
   F distribution 487  
   gamma distribution 488  
   hypergeometric distributions 489  
   negative binomial distributions 501  
   Poisson distributions 482  
   standard normal distributions 502  
   t distributions 503  
 probabilities, computing  
   confidence intervals, computing 498  
   examples 497  
   for multiple comparisons of means 491  
   for multiple comparisons of means, example 497  
   from bivariate normal distribution 486  
   many-one t-statistics, Dunnett's one-sided test 492  
   many-one t-statistics, Dunnett's two-sided test 493  
   studentized maximum modulus 494  
   studentized range 494  
   Williams' test 495  
   Williams' test, example 500  
 probability density functions 464  
   Bernoulli distributions 465  
   beta distributions 466  
   binomial distributions 466  
   Cauchy distributions 467  
   chi-squared distributions 467  
   exponential distributions 468  
   F distributions 468  
   gamma distributions 469  
   geometric distributions 469  
   hypergeometric distributions 470  
   Laplace distributions 470  
   logistic distributions 471  
   lognormal distributions 471  
   normal distributions 472  
   Pareto distributions 473  
   Poisson distributions 473  
   uniform distributions 474  
   Wald distributions 474  
   Weibull distributions 475  
 probability functions 441  
   logarithms of 441  
 PROBBETA function 484  
 PROBBNML function 485  
 PROBBNRM function 486  
 PROBCHI function 486  
 PROBF function 487  
 PROBGAM function 488  
 PROBHYP function 489  
 PROBIT function 490  
 PROBMC function 491

PROBNEGB function 501  
 PROBNORM function 502  
 PROBSIG= system option 1141  
 PROBT function 503  
 PROC statements, invoking external programs 1141  
 PROC system option 1141  
 procedure output  
   footnotes 842  
   linesize 1112  
   submitting as SAS statements 787  
 product license, verifying 560  
 Program Editor commands, submitting as SAS statements 787  
   flow into main entry 787  
 Program Editor window 1091  
 PROGRAM EDITOR window, suppressing 1107  
 programming statements, including 851  
 PROMPT option  
   FILENAME statement, FTP access 831  
   FILENAME statement, URL access 840  
 PROTECT= option, WINDOW statement 1040  
 PROXY= option  
   FILENAME statement, URL access 840  
 PS= system option 1133  
 PUNCH.d informat 705  
 PUT function 53, 503  
 PUT statement 962  
   compared to INPUT statement 886  
   compared to LIST statement 925  
   compared to PUT function 504  
   specifying formats with 53  
 PUT statement, column 977  
 PUT statement, formatted 979  
 PUT statement, list 983  
 PUT statement, named 987  
 PUTC function 505  
   compared to PUTN function 507  
 PUTN function 505, 507  
   compared to PUTC function 505  
 PVP function 508  
 PW= data set option 33  
 PWREQ= data set option 33

**Q**

QTR function 509  
 QTRRw. format 155  
 QTRw. format 154  
 quantiles 237  
   beta distribution 237  
   chi-squared distribution 288  
   F distribution 363  
   from standard normal distribution 490  
   from t distribution 565  
   gamma distribution 386  
   quantiles, computing  
     for multiple comparisons of means 491

question mark (?) character string operator, where  
   statement  
     flow into main entry 1031  
 question mark (?) format modifier 402  
   INPUT function 402  
   INPUT statement 880  
 question marks (??) format modifier 402  
   INPUT function 402  
   INPUT statement 880  
 queues, returning values from 432  
 QUIT command, DATA step debugger 1216  
 quotation marks 323  
   adding 510  
   removing 323, 654  
 QUOTE function 510  
 \$QUOTEw. format 78  
 \$QUOTEw. informat 654

**R**

RANBIN CALL routine 248  
 RANBIN function 511  
 RANCAU CALL routine 250  
 RANCAU function 512  
 random numbers 248, 250, 252, 254, 256, 258,  
   260, 262, 264, 458  
   binomial distribution 248, 511  
   Cauchy distribution 250, 512  
   exponential distribution 252, 513  
   gamma distribution 254, 514  
   normal distribution 256, 458, 517  
   Poisson distribution 258, 518  
   tabled probability distribution 260, 519  
   triangular distribution 262, 520  
   uniform distribution 264, 521, 574  
 random-number CALL routines 211  
 random-number functions 211  
 RANEXP CALL routine 252  
 RANEXP function 513  
 RANGAM CALL routine 254  
 RANGAM function 514  
 RANGE function 515  
 ranges of values, returning 515  
 RANK function 516  
 RANNOR CALL routine 256  
   compared to RANNOR function 517  
 RANNOR function 517  
 RANPOI CALL routine 258, 518  
   compared to RANPOI function 518  
 RANPOI function 518  
 RANTBL CALL routine 260, 519  
   compared to RANTBL function 519  
 RANTBL function 519  
 RANTRI CALL routine 262  
   compared to RANTRI function 520  
 RANTRI function 520  
 RANUNI CALL routine 264, 521  
   compared to RANUNI function 521

RANUNI function 521  
 RBw.d format 156  
 RBw.d informat 706  
   compared to S370FRBw.d informat 722  
   compared to VAXRBw.d informat 731  
 RCMD= option  
   FILENAME statement, FTP access 831  
 READ= data set option 34  
 reading data values  
   See informats  
 real binary data, reading 706  
   IBM mainframe format 721  
   VMS format 731  
 RECFM= argument  
   FILENAME statement, CATALOG access 827  
 RECFM= option  
   FILE statement 809  
   FILENAME statement, FTP access 832  
   FILENAME statement, SOCKET access 836  
   FILENAME statement, URL access 840  
   INFILE statement 862  
 RECONN= option  
   FILENAME statement, SOCKET access 837  
 REDIRECT statement 992  
   arguments 992  
   examples 993  
 redirecting data sets 992  
 regular expression (RX) functions 213  
 remainder values 448  
 remote SAS sessions 1089  
 remote SAS sessions, invoking 1150  
 remote session ID 1079  
 remote submit statement 1081  
 REMOTE= system option 1079  
 REMOVE statement 993  
   compared to MODIFY statement 940  
   compared to OUTPUT statement 960  
   compared to REMOVE statement 993  
   compared to REPLACE statement 998  
 RENAME= data set option 35  
   compared to RENAME statement 996  
   error detection for input data sets 1087  
 RENAME= data step option  
   error detection for output data sets 1088  
 RENAME statement 995  
   error detection for output data sets 1088  
 REPEAT function 522  
 REPEMPTY= data set option 37  
 REPEMPTY= option, LIBNAME statement 915  
 REPLACE= data set option 38  
   compared with REPLACE= system option 1142  
 REPLACE statement 997  
   compared to MODIFY statement 940  
   compared to OUTPUT statement 960  
   compared to REMOVE statement 994  
 REPLACE system option 1142  
 repository manager, for common metadata 1143  
 REP\_MGRLOC= system option 1143  
 REQUIRED= option, WINDOW statement 1040

- requirements vector, for output file 31  
 RESOLVE function 523  
 resolving arguments 242  
 RETAIN statement 1000  
     compared to KEEP statement 906  
     compared to SUM statement 1020  
 RETURN argument, ABORT statement 754  
 return codes 1140  
 RETURN statement 1004  
     compared to GO TO statement 846  
 REUSE data set option 39  
     compared with REUSE= system option 1144  
 REUSE= system option 1144  
 \$REVERJw. format  
     compared to \$REVERSw. format 79  
 \$REVERJw. informat 655  
     compared to \$REVERSw. informat 656  
 REVERSE function 523  
 reversing character expressions 423  
 \$REVERSw. format 80  
     compared to \$REVERJw. format 80  
 \$REVERSw. informat 655  
     compared to \$REVERJw. informat 655  
 REWIND function 524  
 RHELP option  
     FILENAME statement, FTP access 832  
 RIGHT function 525  
 RIGHTMARGIN= system option 1145  
 RMF records, reading duration intervals 707  
 RMFDURw. informat 707  
 RMFSTAMPw. informat 709  
     compared to RMFDURw. informat 708  
 Roman numerals, numeric values as 157  
 ROMANw. format 157  
 ROUND function 525  
 rounding 525  
 ROWS= argument, WINDOW statement 1035  
 ROWw.d informat 710  
 RSASUSER system option 1146  
 RSTAT option  
     FILENAME statement, FTP access 832  
 RUN statement 1006, 1005  
 RX functions 213  
 RXCHANGE CALL routine 266  
 RXFREE CALL routine 267  
 RXMATCH function 526  
 RXPARSE function 527  
 RXSUBSTR CALL routine 268
- S**
- S= system option 1147  
     compared with S2= system option 1148  
 S2= argument, %INCLUDE statement 853  
 S2= system option 1148  
     compared with S= system option 1147  
 S370FFw.d format 158  
 S370FFw.d informat 714  
 S370FIBUw.d format 161
- S370FIBUw.d informat 717  
 S370FIBw.d format 160  
     compared to S370FIBUw.d format 161  
     compared to S370FPBw.d format 165  
 S370FIBw.d informat 715  
 S370FPDUw.d format 164  
 S370FPDUw.d informat 719  
 S370FPDw.d format 162  
     compared to S370FPDUw.d format 164  
 S370FPDw.d format, compared to S370FPDUw.d format 164  
 S370FPDw.d informat 718  
     compared to S370FPDUw.d informat 719  
 S370FPBw.d format 165  
 S370FPBw.d informat 720  
     compared to S370FIBUw.d informat 717  
 S370FRBw.d format 166  
 S370FRBw.d informat 721  
 S370FZDLw.d format 168  
     compared to S370FZDSw.d format 170  
 S370FZDLw.d informat 724  
 S370FZDSw.d format 169  
     compared to S370FZDTw.d format 170  
 S370FZDTw.d format 170  
 S370FZDTw.d informat 726  
 S370FZDUw.d format 172  
 S370FZDUw.d informat 727  
 S370FZDw.d format 167, 172  
     compared to S370FZDLw.d format 169  
     compared to S370FZDUw.d format 172  
 S370FZDw.d informat 722  
     compared to S370FZDUw.d informat 727  
 S370V option  
     FILENAME statement, FTP access 832  
 S370VS option  
     FILENAME statement, FTP access 832  
 same-and operator, where statement 1031  
 SAS/ACCESS software  
     associating librefs with tables or views 920  
     LIBNAME statement 920  
     specifying SAS/ACCESS information with macros (example) 922  
 SAS/AF software  
     multiple-environment support 1122  
     suppressing windows 1107  
 SAS CALL routines  
     *See* CALL routines  
 SAS catalog entries, verifying existence 287  
 SAS catalogs 287  
     referencing as external files 827  
     verifying existence 287  
 SAS/CONNECT software  
     buffer size, specifying 1166  
     remote session ability 1089  
     remote session ID 1079  
     remote submit statement, waiting for 1081  
     script files 1152  
     SIGNON portion 1150  
     TCP/IP port, specifying 1167, 1168  
     transfer status window, displaying 1080
- SAS data files, encrypting 16  
 SAS data libraries 438  
     concatenating 917  
     damaged data sets or catalogs 1089  
     default access method 1095  
     default permanent, specifying 1173  
     librefs 438, 914  
     listing attributes of 914  
     listing details 1084  
     pathnames, returning 463  
     writing attributes to SAS log 917  
 SAS data library member, verifying existence of 344  
 SAS data sets 231  
     *See also* data set options  
     buffer number 10  
     buffer size 1065  
     buffer size for output data sets 11  
     buffers, number to use 1064  
     character attributes, returning 231  
     character variables, returning values of 390  
     closing 289  
     combining 1013  
     compressed, processing with random access 32  
     compressed, reusing space in 39  
     compressing 13  
     compressing on output 1078  
     contributing to current observation 25  
     creating, from output objects 953  
     damaged data sets 14, 1089  
     deleting observations 993  
     dropping variables 15  
     generations for 20, 21  
     indexes, defining at data set creation 26  
     keeping variables 27  
     labeling 28  
     most recently created, specifying 1110  
     not found 1092  
     note markers, returning 339  
     numeric attributes, returning 233  
     numeric variables, returning values of 391  
     opening 461  
     reading 1010  
     redirecting 992  
     replacing 1142  
     replacing empty data sets 37  
     replacing like-named data sets 38  
     reusing free space 39, 1144  
     setting data set pointer to start of 524  
     shared access levels 12  
     sorting 40  
     special types 42  
     updating in place 934  
     variable data type, returning 588  
     variable labels, returning 580  
     variable length, returning 582  
     variable names, returning 583  
     variable position, returning 584  
     writing to 959

SAS expressions  
 compound expressions 1189  
 DATA step debugger and 1196  
 simple expressions 1189

SAS formats  
*See* formats

SAS/FSP software, multiple-environment support 1122

SAS functions  
*See* functions

SAS/GRAFH software  
 displaying output in GRAPH window 1105  
 maps, specifying list of catalogs to search for 1114  
 terminal device driver, specifying 1085

SAS informats  
*See* informats

SAS jobs, terminating 753, 800

SAS language compiler 1075

SAS log  
 AUTOEXEC input 1094  
 date and time, printing 1084  
 detail level of messages 1120  
 error messages 1140  
 logging input 925  
 macro variable references, writing results of 1164  
 news file 1127  
 notes 1128  
 results of macro variable references 1164  
 secondary source statements 1161  
 skipping to new page 962  
 source statements 1160  
 writing data library attributes to 917  
 writing hardware information to 1083  
 writing ODS lists to 956  
 writing output objects to 957  
 writing to 962

SAS name literals 1187

SAS names 1184  
 user-supplied 1184  
 variable names 1186

SAS online documentation 1091

SAS operators 1189  
 order of evaluation 1189

SAS OPTIONS window, compared to OPTIONS statement 958

SAS print file, initializing 1139

SAS procedure output  
 aligning 1071  
 writing 962

SAS procedures  
 labels with variables 1110

SAS sessions  
 DCOM/CORBA server mode 1129  
 issuing operating-system commands 1043  
 terminating 753, 800

SAS/SHARE software  
 buffer size, specifying 1166

SAS source lines, as card images 1069

SAS statements  
*See also* statements  
 executing at startup 1108  
 generated by macros, displaying 1118  
 writing to utility data set in WORK data library 1161

SAS System  
 invoking with Explorer window 1097

SAS system options 1048  
 APPLETLOC= 1059  
 ASYNCHIO 1060  
 BATCH 1061  
 BINDING= 1062  
 BOTTOMMARGIN= 1063  
 BUENO= 1064  
 BUFSIZE= 1065  
 by category 1052  
 BYERR 1066  
 BYLINE 1067  
 CAPS 1068  
 CARDIMAGE 1069  
 CATCACHE= 1070  
 CBUENO= 1071  
 CENTER 1071  
 changing settings 1049  
 changing values of 958  
 CHARCODE 1072  
 CLEANUP 1073  
 CMDMAC 1075  
 CMPOPT 1075  
 COLLATE 1076  
 COLORPRINTING 1077  
 comparisons 1051  
 COMPRESS= 1078  
 CONNECTREMOTE= 1079  
 CONNECTSTATUS 1080  
 CONNECTWAIT 1081  
 CONSOLE= 1081  
 COPIES= 1082  
 CPUID 1083  
 current settings, determining 1049  
 data set interactions 7  
 DATASTMTCHK= 1083  
 DATE 1084  
 default settings 1048  
 DETAILS 1084  
 DEVICE= 1085  
 DFLANG= 1086  
 DKRICOND= 1087  
 DKROCOND= 1088  
 DLDMGACTION= 1089  
 DMR 1089  
 DMS 1090  
 DMSEXP 1091  
 DOCLOC= 1091  
 DSNFERR 1092  
 DUPLEX 1093  
 duration of settings 1050  
 ECHOAUTO 1094  
 ENGINE= 1095

ERRORABEND 1095  
 ERRORCHECK= 1096  
 ERRORS= 1097  
 EXPLORER 1097  
 FIRSTOBS= 1098  
 FMTERR 1100  
 FMTSEARCH= 1100  
 FORMCHAR= 1102  
 FORMDLIM= 1102  
 FORMS= 1103  
 GWINDOW 1105  
 HELPLOC= 1105  
 IMPLMAC 1106  
 INITCMD 1107  
 INITSTMT= 1108  
 interactions with data set options 1051  
 INVALIDDATA= 1109  
 LABEL 1110  
 \_LAST\_= 1110  
 LEFTMARGIN= 1111  
 LINESIZE= 1112  
 MACRO 1113  
 MAPS= 1114  
 MAUTOSOURCE 1114  
 MERGENOBY 1115  
 MERROR 1116  
 MFILE 1116  
 MISSING= 1117  
 MLOGIC 1118  
 MPRINT 1118  
 MRECALL 1119  
 MSGLEVEL= 1120  
 MSTORED 1121  
 MSYMTABMAX= 1122  
 MULTENVAPPL 1122  
 MVARSIZE= 1123  
 NETENCRYPT 1124  
 NETENCRYPTALGORITHM= 1125  
 NETENCRYPTKEYLEN= 1125  
 NETMAC 1126  
 NEWS= 1127  
 NOTES 1128  
 NUMBER 1128  
 OBJECTSERVER 1129  
 OBS= 1129  
 order of precedence 1050  
 ORIENTATION= 1131  
 OVP 1132  
 PAGENO= 1133  
 PAGESIZE= 1133  
 PAPERDEST= 1134  
 PAPERSIZE= 1135  
 PAPERSOURCE= 1136  
 PAPERTYPE= 1136  
 PARM= 1137  
 PARMCARDS= 1138  
 PRINTERPATH= 1138  
 PRINTINIT 1139  
 PRINTMSGLIST 1140  
 PROC 1141  
 REMOTE= 1079

REPLACE 1142  
 REP\_MGRLOC= 1143  
 returning value of 388  
 REUSE= 1144  
 RIGHTMARGIN= 1145  
 RSASUSER 1146  
 S= 1147  
 S2= 1148  
 SASAUTOS= 1149  
 SASCMD 1150  
 SASFRSCR 1150  
 SASHELP= 1151  
 SASMSTORE= 1151  
 SASSCRIPT= 1152  
 SASUSER= 1153  
 SEQ= 1153  
 SERROR 1154  
 SETINIT 1155  
 SKIP= 1156  
 SOLUTIONS 1157  
 SORTDUP= 1157  
 SORTSEQ= 1158  
 SORTSIZE= 1159  
 SOURCE 1160  
 SOURCE2 1161  
 SPOOL 1161  
 STARTLIB 1162  
 SUMSIZE= 1163  
 SYMBOLGEN 1164  
 SYNCIO 1164  
 syntax 1048  
 SYSPARM= 1165  
 TBUFSIZE= 1166  
 TCPPORTFIRST= 1167  
 TCPPORTLAST= 1168  
 TERMINAL 1169  
 TOPMARGIN= 1170  
 TRAINLOC= 1171  
 TRANTAB= 1171  
 USER= 1173  
 VALIDVARNAME= 1173  
 VNFERR 1174  
 WORK= 1175  
 WORKINIT 1176  
 WORKTERM 1177  
 YEARCUTOFF= 1178  
 SAS windowing environment, invoking 1090  
 SASAUTOS system option 1149  
 SASCMD system option 1150  
 SASFRSCR system option 1150  
 SASHELP library, location of 1151  
 SASHELP= system option 1151  
 SASMSTORE= system option 1151  
 SASSCRIPT system option 1152  
     fileref generated by 1150  
 SASUSER library  
     access control 1146  
     name, specifying 1153  
 SASUSER= system option 1153  
 SAVING function 540  
 SCAN function 541  
 SCANOVER option, INFILE statement 863  
 scientific notation 101  
     reading 671  
     writing 101  
 scores  
     for parsing patterns 535  
 script files, location of 1152  
 SDF function 542  
 searching  
     for specific characters in a character expression 420  
     for specific characters in a character expression 420  
 SECOND function 542  
 secondary source statements  
     length, specifying 1148  
     writing to SAS log 1161  
 seed values 211  
 SELECT groups, compared to IF, THEN/ELSE statement 850  
 SELECT statement 1007  
 semicolon (;), in data lines 769, 783  
 SEQ= system option 1153  
 sequence field, length of numeric portion 1153  
 SERROR system option 1154  
 SERVER argument  
     FILENAME statement, SOCKET access 836  
 server SAS sessions, invoking 1150  
 SET CALL routine 269, 271  
 SET command, DATA step debugger 1217  
 SET statement 1010  
     compared to INPUT statement 886  
     compared to MERGE statement 931  
 SETINIT system option 1155  
 SGEN system option 1164  
 SHAREBUFFERS option, INFILE statement 863  
 shift-code data  
     adding to DBCS data 75, 652  
     removing from DBCS data 76, 651  
 SHR records  
     reading data and time values of 712  
 SHRSTAMPw. informat 712  
 SIGN function 543  
 significant digits, writing 88  
 signs, returning 543  
 SIN function 544  
 sine 544  
 SINH function 545  
 skewness 545  
 SKEWNESS function 545  
 SKIP statement 1017  
 SKIP= system option 1156  
 skipping lines 1156  
 slash (/) division operator, where statement 1030  
 slash (/) line pointer control  
     INPUT statement 880  
     PUT statement 966  
     SMFSTAMPw. informat 713  
 social security numbers 158  
 SOCKET argument  
     FILENAME statement, SOCKET access 836  
 SOLUTIONS folder 1157  
 SOLUTIONS menu choice 1157  
 SOLUTIONS system option 1157  
 SORT procedure  
     collating sequence for 1158  
     error messages 1066  
     memory, specifying 1159  
     NODUP option 1157  
 SORTDUP= system option 1157  
 SORTEDBY= data set option 40  
 sorting SAS data sets 40  
 SORTSEQ= system option 1158  
 SORTSIZE= system option 1159  
 SOUNDEX function 546  
 source statements  
     secondary, writing to SAS log 1161  
     writing to SAS log 1160  
 source statements, secondary  
     length, specifying 1148  
 source statements, specifying length of 1147  
 SOURCE system option 1160  
 SOURCE2 argument, %INCLUDE statement 853  
 special characters not on keyboard 1072  
 special-character tokens 1182  
 SPEDIS function 547  
 SPOOL system option 1161  
 SQRT function 549  
 square roots 549  
 SRC2 system option 1161  
 SSNw. format 158  
 standard deviations 550  
 standard error of means 550  
 standard normal distributions 490  
     probabilities from 502  
     quantiles 490  
 START= option, INFILE statement 863  
 STARTLIB system option 1162  
 statement labels 908  
 statement labels, jumping to 923  
 statements 745  
     DATA step statements 745  
     declarative 745  
     executable 745  
     spacing of words 1183  
 STD function 550  
 STDERR function 550  
 STEP command, DATA step debugger 1218  
 STFIPS function 551  
     compared to STNAME function 552  
     compared to STNAMEL function 553  
 STNAME function 551, 552  
     compared to STFIPS function 551  
     compared to STNAMEL function 553  
 STNAMEL function 551, 553  
     compared to STFIPS function 551  
     compared to STNAME function 552

- STOP statement 1018  
     compared to ABORT statement 754
- STOPOVER option  
     FILE statement 809  
     INFILE statement 863
- stored compiled DATA step programs 778  
     executing 802  
     retrieving source code from 785
- stored compiled macros  
     data library of 1151  
     searching for 1121
- studentized maximum modulus 494
- studentized range 494
- SUBSTR function 554, 555
- substrings  
     beginning of, finding 526  
     changing 266  
     changing substrings that match a pattern 266  
     extracting from an argument 425  
     extracting from an argument, based on byte position 426  
     length of, finding 268  
     position of, finding 268  
     score of, finding 268
- SUM function 556  
     compared to SUM statement 1020
- SUM statement 1019
- summarization procedures  
     specifying memory limits for 1163
- summing expressions 1019
- summing values 556
- survival functions 441  
     computing 542  
     logarithms of 441
- SWAP command, DATA step debugger 1219
- SYMBOLGEN system option 1164
- SYMGET function 557
- SYMPUT CALL routine 271
- SYNCHIO system option 1164
- synchronous I/O 1164
- \$SYSEXEC statement, compared to SYSTEM function 562
- %SYSFUNC macro 53
- SYSGET function 558
- SYMSG function 559
- SYSPARM function 559
- SYSPARM= system option 1165
- SYSPROD function 560
- SYSRC function 561
- SYSTEM CALL routine 272
- system error numbers, returning 561
- SYSTEM function 562
- system options  
     *See* SAS system options
- system parameter string, returning 559
- T**
- T distributions 283, 565  
     cumulative distribution functions 283
- probability density functions 473  
     noncentrality parameter 565  
     probabilities from 503  
     quantiles 565
- tabbed probability distribution, random numbers 260
- tables, SAS/ACCESS  
     associating with a libref 920
- tag expressions 535
- Taiwanese date format 130
- TAN function 562
- tangents 562
- TANH function 563
- tape files, closing 18
- target variables 208
- TBUFSIZE=system option 1166
- TCP/IP port, for SAS/CONNECT software 1168
- TCP/IP port, specifying for SAS/CONNECT software 1167
- TCP/IP socket access 836
- TCPPORTFIRST= system option 1167
- TCPPORTLAST= system option 1168
- TEMPLATE procedure 954
- terminal availability 1169
- terminal device driver 1085
- TERMINAL system option 1169
- TERMSTR= option  
     FILENAME statement, SOCKET access 837
- text editor commands, submitting as SAS statements 787  
     flow into main entry 787
- tilde (~) argument  
     INPUT statement, list input 898  
     tilde (~) format modifier 899  
     tilde (~) logical not operator, where statement 1031
- time/date functions  
     time, returning current 564
- TIME function 564
- time stamp 1084
- TIMEAMPw.d format 174
- TIMEw.d format, compared to TIMEAMPw.d format 175
- TIMEPART function 564
- TIMEw. informat 728
- TIMEw.d format 122, 173  
     compared to HHMMw.d format 122
- TINV function 565
- TITLE statement 1020
- TITLES option, FILE statement 809
- TITLES window, compared to TITLE statement 1022
- TNONCT function 565
- TO statement, compared to LINK statement 924
- TOBSNO= data set option 41
- TODAY function 567
- TODSTAMPw. informat 729  
     compared to MSECw. informat 691
- TODw. format 175
- tokens 1181  
     literals 1182, 1187  
     name tokens 1182, 1184  
     number tokens 1182  
     special-character tokens 1182  
     types of 1181
- TOPMARGIN= system option 1170
- TRACE command, DATA step debugger 1219
- trailing blanks, trimming 571
- training, online 1171
- TRAINLOC= system option 1171
- transfer status window 1080
- TRANSLATE function 567  
     compared to TRANWRD function 568
- translating character expressions 426
- translation tables 42
- translation tables, specifying 1171
- TRANTAB= data set option 42
- TRANTAB= option, LIBNAME statement 916
- TRANTAB= system option 1171
- TRANWRD function 567, 568  
     compared to TRANSLATE function 567
- triangular distributions, random numbers 262, 520
- TRIGAMMA function 570  
     returning value of 570
- TRIM function 571  
     compared to TRIMN function 572  
     trimming character expressions 427  
     trimming trailing blanks 571
- TRIMN function 571, 572  
     compared to TRIM function 571
- TRUNC function 573
- truncating numeric values 428
- TRUNCOVER option, INFILE statement 863
- TUw. informat 730
- TYPE= data set option 42
- U**
- UNBUFFERED option, INFILE statement 864
- uncorrected sum of squares 577
- uniform distributions 264, 284  
     cumulative distribution functions 284  
     probability density functions 474  
     random numbers 264, 521, 574
- UNIFORM function 574
- UNIQUE argument  
     MODIFY statement 936  
     SET statement 1013
- unsigned integer binary data, writing 161  
     IBM mainframe format 161
- unsigned interger binary data, reading  
     IBM mainframe format 717
- unsigned packed decimal data, reading 704  
     IBM mainframe format 719
- unsigned packed decimal data, writing 164  
     IBM mainframe format 164
- unsigned packed decimal format 152

unsigned zoned decimal data, reading  
 IBM mainframe format 727  
 unsigned zoned decimal data, writing 172  
 IBM mainframe format 172  
**UPCASE** function 575  
**\$UPCASEw.** format 81  
**\$UPCASEw.** informat 656  
**UPDATE** statement 1023  
 compared to **MERGE** statement 931  
**UPDATEMODE=** argument  
**MODIFY** statement 936  
**UPDATE** statement 1024  
 uppercase 77, 575  
 converting character data to 77, 81  
 converting character expressions to 575  
**\$MSGCASEw.** format 77  
 reading data as 656  
**UPCASE** function 575  
**\$UPCASEw.** format 81  
**\$UPCASEw.** informat 656  
 writing data as 81  
 uppercase input 1068  
 uppercase letters  
 in arguments 429  
 URL access 839  
 URL argument  
**FILENAME** statement, URL access 839  
**URLDECODE** function 575  
**URLENCODE** function 576  
 URLs  
 decoding 575  
 encoding 576  
 escape syntax 575, 576  
**USER=** option  
**FILENAME** statement, FTP access 833  
**FILENAME** statement, URL access 840  
**USER=** system option 1173  
**USS** function 577

**V**

**VALIDVARNAME=** system option 1173  
 values 462  
 returning nth of a list 462  
 signs, returning 543  
 writing to memory 483  
**VAR** function 578  
**VARFMT** function 579  
 variables 227, 243, 272  
 assigning input to 876  
 associating formats with 763, 843  
 associating informats with 763, 873  
 character, returning values of 390  
 data type, returning 588  
 dropping 15  
`_ERROR_`, setting 801  
 format decimal values, returning 591  
 format names, returning 593  
 format not found 1100

format width, returning 595  
**informat** decimal values, returning 602  
**informat** names, returning 604  
**informat** width, returning 606  
 keeping 27, 903  
 labeling 907  
 labels 763  
 labels with, in SAS procedures 1110  
 labels, assigning 243  
 labels, returning 581, 609  
 length, associating with 763  
 length, returning 582  
 length, specifying 911  
 memory address of 227  
 names, assigning 272  
 names, defining 1173  
 names, returning 583, 613  
 naming conventions 1186  
 numeric, returning values of 391  
 operating system, returning 558  
 position, returning 584  
 renaming 35, 995  
 retaining values 1000  
 size, returning 611  
 target variables 208  
 type, returning 615  
 values, returning 614  
 variance 578  
**VARINFMT** function 580  
**VARLABEL** function 581  
**VARLEN** function 582  
**VARNAME** function 583  
**VARNUM** function 584  
**VARRAY** function 586  
 compared to **VARRAYX** function 587  
**VARRAYX** function 586, 587  
 compared to **VARRAY** function 586  
**VARTYPE** function 588  
**\$VARYINGw.** format 81  
**\$VARYINGw.** informat 657  
**VAXRBw.d** informat 731  
**VERIFY** function 589  
 vertical bar (|) logical or operator, where statement 1031  
 vertical bars (||) concatenation operator, where statement 1031  
**VFORMAT** function 590  
 compared to **VFORMATX** function 598  
**VFORMATD** function 591  
 compared to **VFORMATDX** function 592  
**VFORMATDX** function 591, 592  
 compared to **VFORMATD** function 591  
**VFORMATN** function 593  
 compared to **VFORMATNX** function 594  
**VFORMATNX** function 593, 594  
 compared to **VFORMATN** function 593  
**VFORMATW** function 595  
 compared to **VFORMATWX** function 596  
**VFORMATWX** function 596

**VFORMATX** function 590, 597  
 compared to **VFORMAT** function 590  
 views, SAS/ACCESS  
 associating with a libref 920  
**VINARRAY** function 598  
 compared to **VINARRAYX** function 600  
**VINARRAYX** function 600  
 compared to **VINARRAY** function 599  
**VINFORMAT** function 601  
 compared to **VINFORMATX** function 608  
**VINFORMATD** function 602  
 compared to **VINFORMATDX** function 603  
**VINFORMATDX** function 603  
 compared to **VINFORMATD** function 602  
**VINFORMATN** function 604  
 compared to **VINFORMATNX** function 605  
**VINFORMATNX** function 605  
 compared to **VINFORMATN** function 604  
**VINFORMATW** function  
 compared to **VINFORMATWX** function 608  
**VINFORMATWX** function 607  
 compared to **VINFORMATW** function 607  
**VINFORMATX** function 601, 608  
 compared to **VINFORMAT** function 601  
**VLABEL** function 581, 609  
 compared to **VARLABEL** function 581  
 compared to **VLABELX** function 610  
**VLABELX** function 610  
 compared to **VLABEL** function 609  
**VLENGTH** function 582, 611  
 compared to **VARLEN** function 582  
 compared to **VLENGTH** function 612  
**VLENGTHX** function 612  
**VNAME CALL** routine 272  
**VNAME** function 613  
**VNAMEX** function 614  
 compared to **VNAME** function 613  
**VNFERR** system option 1174  
 compared to **BYERR** system option 1066  
 compared to **DSNFERR** system option 1092  
**VTYPE** function 615  
 compared to **VTYPEPEX** function 616  
**VTYPEPEX** function 616  
 compared to **VTYPE** function 615

**W**

**w.** format 83  
**w.** informat 659  
 compared to **\$CHARw.** informat 647  
**w.d** format 177  
 compared to **Zw.d** format 196  
**w.d** informat 732, 740  
 compared to **Ew.d** informat 671  
 compared to **NUMXw.d** informat 693  
 compared to **ZDw.d** informat 739  
 Wald distributions 284  
 cumulative distribution functions 284  
 probability density functions 474

warning message, for unmatched macro variable references 1154

**WATCH** command, DATA step debugger 1220

**Web** applications, functions for 213

**WEEKDATEw.** format 178  
compared to **WEEKDATXw.** format 180

**WEEKDATXw.** format 178, 179  
compared to **WEEKDATEw.** format 178

**WEEKDAY** function 617

**WEEKDAYw.** format 181

Weibull distributions 284  
cumulative distribution functions 284  
probability density functions 475

**WHERE=** data set option 43  
compared to **WHERE** statement 1031

**WHERE** expressions  
evaluating updated observations for 45  
index name for 22  
overriding software decision on index name 23  
selecting observations for 43

**WHERE** statement 1028  
compared to IF statement, subsetting 848

**WHEREUP=** data set option 45

Williams' test 495, 500

**%WINDOW** macro, compared to **WINDOW** statement 1041

**WINDOW** statement 1034

windowing applications  
multiple-environment support 1122

windowing environment, invoking 1090

windowing output, default form 1103

windows, displaying 786, 1034

**WORDDATEw.** format 182  
compared to **WORDDATXw.** format 182

**WORDDATXw.** format 182, 183  
compared to **WORDDATEw.** format 182

**WORDFw.** format 184  
compared to **WORDSw.** format 184

words 1181  
spacing in SAS statements 1183  
types of 1181

**WORDSw.** format 185  
compared to **WORDFw.** format 185

**WORK** data library  
specifying 1176  
writing SAS statements to a utility data set in 1161

**WORK** files, erasing at end of session 1177

**WORK** library, specifying 1175

**WORK=** system option 1175

**WORKINIT** system option 1176

**WORKTERM** system option 1177  
compared with **WORKINIT** system option 1176

**WRITE=** data set option 46  
writing data values  
*See* formats

writing values to memory 247

**WRKINIT** system option 1176

**WRKTERM** system option 1177

## X

**X** command, compared to X statement 1044

**X** statement 562, 1043  
compared to **SYSTEM** function 562

## Y

year 2000 accommodation 1178

**YEAR** function 618

**YEARCUTOFF=** system option 1178

**YEARw.** format 186  
yen signs, removing 733

**YENwd** format 186

**YENwd** informat 733

**YRDIF** function 620

**YYMMDDw.** format 189

**YYMMDDw.** informat 734

**YYMMDDxw.** format 190

**YYMMNw.** informat 735

**YYMMxw.** format 187

**YYMONw.** format 192

**YYQ** function 621

**YYQRxw.** format 194

**YYQw.** informat 737

**YYQxw.** format 193

## Z

**ZDBw.d** informat 740

**ZDVw.d** informat 740  
*See also* **ZDw.d** informat

**See also** **w.d** informat  
compared to **ZDw.d** informat 739

**ZDw.d** format 197

**ZDw.d** informat 738, 740  
compared to **ZDVw.d** 741

zeros, binary  
converting to blanks 648

**ZIP** codes 622  
converting to FIPS codes 622  
converting to postal codes 625  
converting to state names 623, 624

**ZIPFIPS** function 622

**ZIPNAME** function 623  
compared to **ZIPNAMEL** function 625  
compared to **ZIPSTATE** function 626

**ZIPNAMEL** function 624  
compared to **ZIPNAME** function 623  
compared to **ZIPSTATE** function 626

**ZIPSTATE** function 625  
compared to **ZIPNAME** function 623  
compared to **ZIPNAMEL** function 625

**znoed** decimal data

defined 636

**zoned** decimal data 57, 58, 637  
defined 57  
formats and informats for 59, 638  
languages supporting 58, 637  
platforms supporting 58, 637

**zoned** decimal data, IBM mainframe format 167

**zoned** decimal data, reading 738, 740  
IBM mainframe format 722

**zoned** decimal format 197

**zoned** decimal leading sign data, IBM mainframe format 168

**zoned** decimal leading-sign data, reading  
IBM mainframe format 724

**zoned** decimal separate leading sign data, IBM mainframe format 169

**zoned** decimal separate trailing sign data, IBM mainframe format 170

**zoned** decimal separate trailing-sign data, reading  
IBM mainframe format 726

**zoned** separate leading-sign data, reading  
IBM mainframe format 725

**Zw.d** format 177, 196  
compared to **w.d** format 177

## Special Characters

/ (slash) division operator, where statement 1030

& (ampersand) argument  
INPUT statement, list input 897

& (ampersand) format modifier, definition 899

& (ampersand) logical and operator, where statement 1031

= (equal) operator, where statement 1031

<= (less than or equal) operator, where statement 1031

< (less than) operator, where statement 1031

¬ (not sign) logical not operator, where statement 1031

~ (tilde) argument  
INPUT statement, list input 898

~ (tilde) format modifier, definition 899

~ (tilde) logical not operator, where statement 1031

() (parentheses) order of operations operator, where statement 1031

\* (asterisk) multiplication operator, where statement 1030

=\* (equal asterisk) sounds-like operator, where statement 1031

\*\* (asterisks) exponentiation operator, where statement 1031

+ (plus sign) positive number operator, where statement 1031

+ (plus) operator, where statement 1030

- (minus sign) negative number operator, where statement 1031

- (minus) operator, where statement 1030

: (colon) format modifier, definition 899

; (semicolon), in data lines 769, 783

- >= (greater than or equal) operator, where statement 1031
- > (greater than) operator, where statement 1031
- ? (question mark) character string operator, where statement 1031
  
- @ (at sign) line-hold specifier, PUT statement 969
- @@ (at signs) line-hold specifier, PUT statement 969
  
- ^ (carat) logical not operator, where statement 1031
- = (not equal) operator, where statement 1031
- | (vertical bar) logical or operator, where statement 1031
- || (vertical bars) concatenation operator, where statement 1031

The correct bibliographic citation for this manual is as follows: SAS Institute Inc., *SAS® Language Reference, Version 8*, Cary, NC: SAS Institute Inc., 1999.

**SAS® Language Reference, Version 8**

Copyright © 1999 by SAS Institute Inc., Cary, NC, USA.

ISBN 1-58025-369-5

All rights reserved. Printed in the United States of America. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise, without the prior written permission of the publisher, SAS Institute Inc.

**U.S. Government Restricted Rights Notice.** Use, duplication, or disclosure of the software and related documentation by the U.S. government is subject to the Agreement with SAS Institute and the restrictions set forth in FAR 52.227-19 Commercial Computer Software-Restricted Rights (June 1987).

SAS Institute Inc., SAS Campus Drive, Cary, North Carolina 27513.

1st printing, October 1999

SAS® and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries.® indicates USA registration.

Other brand and product names are registered trademarks or trademarks of their respective companies.

The Institute is a private company devoted to the support and further development of its software and related services.