hp 33s
2-line display
scientific calculator

for engineers, surveyors, college students, scientists and medical professionals

electronic specification
• CPU: SPLB31A
• LCD: 14 dot matrix
  \((5 \times 7\) dots) \(\times\) 2 lines
• power supply: CR2032 \(\times\) 2
• battery life expectancy:
  0.73 year @ 1 hr/day
  (approximately 9 months)
• power consumption:
  0.03 W
• auto power OFF:
  approximately 10 minutes

material specification
• plastic/rubber
  (with upper nameplate)
• material of key top: plastic
• dimensions:
  158.0 \(\times\) 83.0 \(\times\) 16.1mm
  6.2 \(\times\) 3.2 \(\times\) .06in
• weight:
  119 grams
menu type function selection
• MODES: DEG, RAD, GRAD, 
• DISPLAY: FIX, SCI, ENG, ALL
key in logic:
• RPN, algebraic
program memory: 32KB
• keystroke programming
• FLAGS: 0–11; SF, CF, FS?
• SHOW: press and hold [SHOW] to display CK=value length
• MEM: press [MEM] for the catalog of program labels
• XEQ, R/S: execute a labeled program
• GTO, LBL, SOLVE, INPUT, VIEW, ISG, DSE, FN=, RTN, PSE key
• (i) indirect address
• solving and integrating programs
• statistics programs:
  – curve fitting: straight line, exponential, logarithmic, power
  – normal and inverse-normal distributions
  – grouped standard deviation
• miscellaneous programs and equations
statistical function
• one/two-variable statistics
• linear regression
• \(\Sigma:\) enter data point
• \(\Sigma:\) remove data point
• SUM: \( n, \Sigma x, \Sigma y, \Sigma x^2, \Sigma xy \)
• \( s, \sigma x, \sigma y, \sigma x, \sigma y \)
• \( L.R.: r, m, b, x', y' \)
base-n function
• binary, octal, decimal, and hexadecimal number calculation and conversion
• complement calculation
equations:
• equalities: the equation contains an “\(=\)”, and the left side contains more than just a single variable
• assignments: the equation contains an “\(=\)”, and the left side contains just a single variable
• expressions: the equation does not contain an “\(=\)“
• “EQN” key
• “SPACE” key
• \( \text{SOLVE} \): the equation then prompts for a value for every other variable in the equation
• \( \text{XEQ} \): returns the value of the equation, regardless of the type of equation
• integration calculation
system
• internal Napier precision
• 13-level parenthesis or maximum number of pending operation: 13 @ALG
• memory protection while power off
• automatic power off
• decimal point selection
• adjustable contrast
• angle conversions: \( \rightarrow \text{RAD}, \rightarrow \text{DEG} \)
• “SHOW” key
• “MEM” key
• LASTx function
• “1” key: left shift function key
• “r” key: right shift function key
• C key: CLEAR, ON/OFF
• R↓ RT function
• \( \text{A, Y} \) function in equation list and program

edit
• “←” key: deletes
• 4-arrow key in menu:
  – “\(=\)” displays previous entry in catalog in equation list and program
  – “\(\downarrow\)” displays next entry in catalog in equation list and program
• display of error message description
• clear display expression
memory
• 27-independent memory (A–Z, i)
• storage arithmetic
• recall arithmetic
• store and clear variable
• recall variable
mathematical function
• trigonometric, inverse-trigonometric, hyperbolic
• polar-rectangular coordinate conversion
• power, square root, square, cube root, cube, reciprocal
• logarithmic and exponential
• natural logarithmic and exponential
• factorial
• RND
• Int +
• IP: truncate to be integer
• FP: truncate to be fraction
• ABS: absolute value
• permutation and combination
• RAND: random number \(<0,1>\)
• seed
• SGN: sign
fraction mode
• \( /c \) function
• \( \text{FDISP} \) function: fraction, decimal conversion
• most precise fraction
• factors of denominator
• fixed denominator
40-physics constants scientific, engineering notation unit conversions:
• unit conversions: \( \rightarrow \text{cm}, \rightarrow \text{in}, \rightarrow \ell, \rightarrow \text{gal} \)
• \( \rightarrow \text{kg}, \rightarrow \text{lb}, \rightarrow \text{°F}, \rightarrow \text{°C} \)
• time conversions: \( \rightarrow \text{HR}, \rightarrow \text{HMS} \)
• engineering notation conversions:
  – \( \rightarrow \text{ENG}, \leftarrow \text{ENG} \)
%CHG key

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