

TECHNICAL DATA JUNE 1973

# The Scientific Desk-Top Calculator.

48 Functions and Operations  
plus Extended Printout.



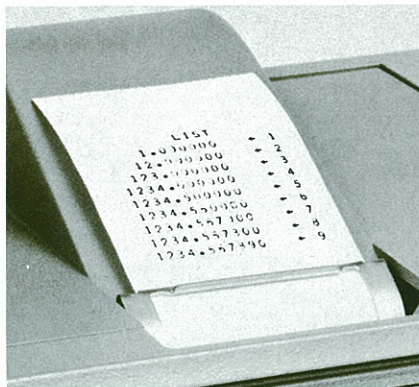
HEWLETT  PACKARD





Now, a desk-top, printing calculator, power packed for scientists and engineers. Complete with power to compute complex equations, trigonometric functions, vector arithmetic, natural and common logarithms and anti-logs, register arithmetic, statistics, and more, with up to 10-digit accuracy.

Enter data in either scientific form or in fixed notation with your choice of 0 to 9 places to the right of the decimal point. HP-46 easily handles numbers as small as  $10^{-99}$  to as large as  $10^{100}$ .



### The Printer

The impact printer, with special alphanumeric capability, gives clear, easy-to-read symbols with all operations you perform, making your hard copy a truly valuable permanent record. And you have the capability to list the contents of the four-register operational stack and the nine extra data storage registers. Certain errors, such as division by zero or factorial of a negative integer, cause the printer to print a message telling you why the calculation cannot be continued.

### Operational Stack

The HP-46, like the HP-35 and HP-80, is provided with an "operational stack" of four registers. The stack is used for solving problems that require intermediate values. It holds the intermediate results and at the appropriate time, automatically brings them back for further processing. This eliminates the need for scratch notes or the re-entry of intermediate answers.

15.00	↑
23.00	×
	√
3.00	÷
0.19	-
5.00	$y^x$
7785.02	◇

Sample Output

## Data Storage Registers

The HP-46 has nine data storage registers in addition to the operational stack. You can easily store data in any or all registers. It is simple to do storage arithmetic for such calculations as conversions, continued products and payroll. And for special problems, like statistics, additional answers are automatically recorded in certain registers.

## Statistics

$\Sigma+$  can be used to add a series of numbers to find a mean and standard deviation.

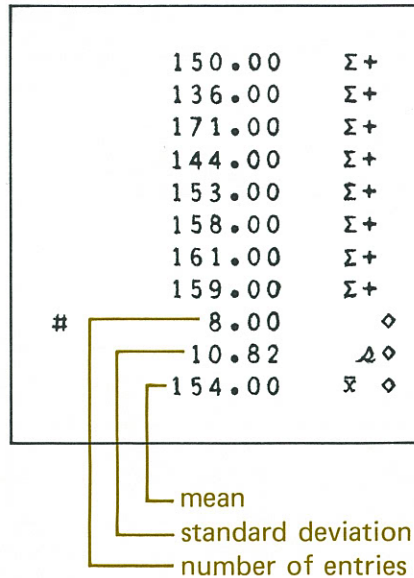
The key sequence  $\text{SHIFT}$   $\Sigma+$  allows correction of erroneous data. (Notice SHIFT key acts like a typewriter shift key, allowing some keys to have dual functions.)

Special data storage registers (5 through 7) contain the number of data entries;  $\Sigma X$ , and  $\Sigma x^2$ . That's not all. You can interact with the machine to correct errors or to add more data after the original calculation.

For example, to find the mean and standard deviation of the following data -- 150, 136, 171, 144, 153, 158, 161, 159 -- simply key in each number followed by the  $\Sigma+$  key; 1 5 0  $\Sigma+$ , 1 3 6  $\Sigma+$ , etc., until all data are entered.

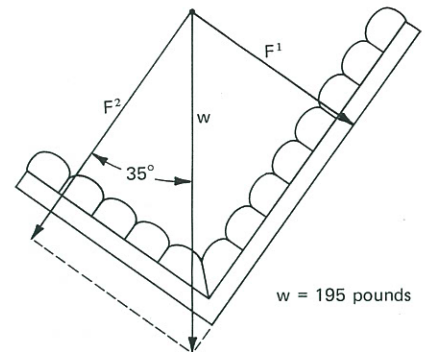
Then key  $\text{SHIFT}$   $R\downarrow$ .

The printer shows:



imum of 35 degrees from the vertical and he assumes the maximum chair load will be 195 pounds. He wishes to know the maximum force on the back of the chair.  $F^1$ , the normal force on the back of the chair, equals 195 sine 35 degrees. Using the

HP-46, 3 5 SIN 1 9 5  $\times$  PRINT = 111.85 pounds.

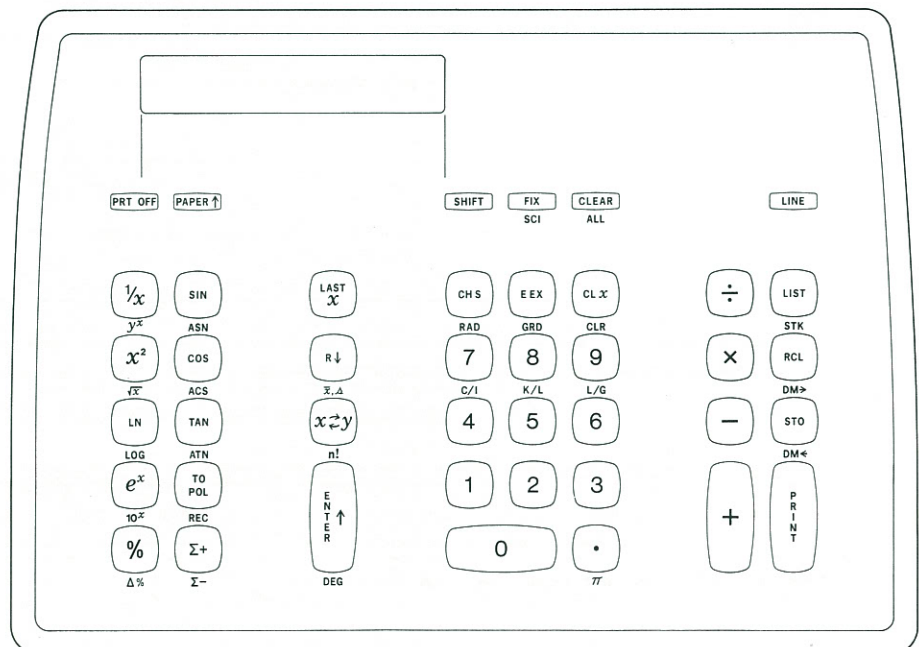


## Trigonometry

The HP-46 calculates sine  $x$ , cosine  $x$ , tangent  $x$ , arc sine  $x$ , arc cosine  $x$ , arc tangent  $x$ . Imagine an engineer designing a reclining office chair. He will allow the chair to recline a max-

## Logarithms and Powers

The HP-46 computes  $e^x$ , LN  $X$ , LOG  $X$ ,  $10^x$ ,  $y^x$ . These keys can be used to solve such problems as  $10^{\frac{x}{20}}$  and  $\sqrt[5]{23}$ .





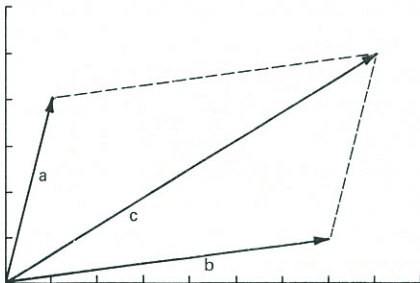
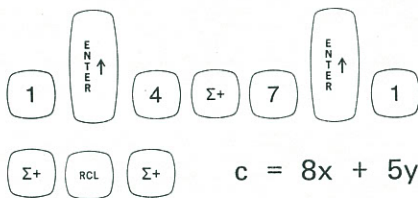
## Modes

Trigonometric functions can be calculated in decimal degrees, radians, or grads.

## Vector Arithmetic

The  $\Sigma+$  can also be used for vector addition and subtraction. For example, suppose you wish to know the resultant vector of the following diagram:

$$a = x + 4y, \quad b = 7x + y$$



## Coordinate Conversion

The HP-46 can convert polar coordinates to rectangular and rectangular to polar. This facilitates multiplication and division of vectors.

	12.60	↑
	21.40	
TO POLAR		
	30.49	◇
	24.83	◇

## Angular Conversion

Angles can be converted to or from degrees, minutes and seconds in any mode.

## Common Conversion Constants

Centimeters to inches. Kilograms to U.S. pounds. Liters to U.S. gallons.

## Mathematics

Add, subtract, multiply, divide  $1/x$ ,  $x^2$ ,  $\sqrt{x}$ ,  $\%$ ,  $\Delta\%$ .

## Capabilities

$1/x$	$\Delta\%$
$y^x$	Sine
$x^2$	Arc sine
$\sqrt{x}$	Cosine
LN X	Arc cosine
LOG X	Tangent
$e^x$	Arc tangent
$10^x$	Factorial
$\%$	Mean

Standard deviation

Register arithmetic

Vector arithmetic

Liter-to-gallon conversion

Kilogram-to-pound conversion

Centimeter-to-inch conversion

Decimal degree mode

Radian mode

Grad mode

Angular conversion to or from degrees, minutes, seconds in any mode

Polar-to-rectangular coordinate conversion

Rectangular-to-polar coordinate conversion

## Display Option

The HP-46 has an optional LED display. With this option you can use the display and the printer simultaneously or use the display only.

## Specifications

Temperature:

0 - 45° C

Power:

117 V.  $\pm$  10%

230 V.  $\pm$  10%

20 VA Nominal

48--66 Hz

Dynamic Range:

$10^{-9.9}$  to  $10^{10.0}$

Weight:

13 lbs., 8 oz. (6.12 kg)

Dimensions:

10.9 inches wide (27.6 cm)

15.5 inches deep (29.3 cm)

5.5 inches high (14 cm)

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