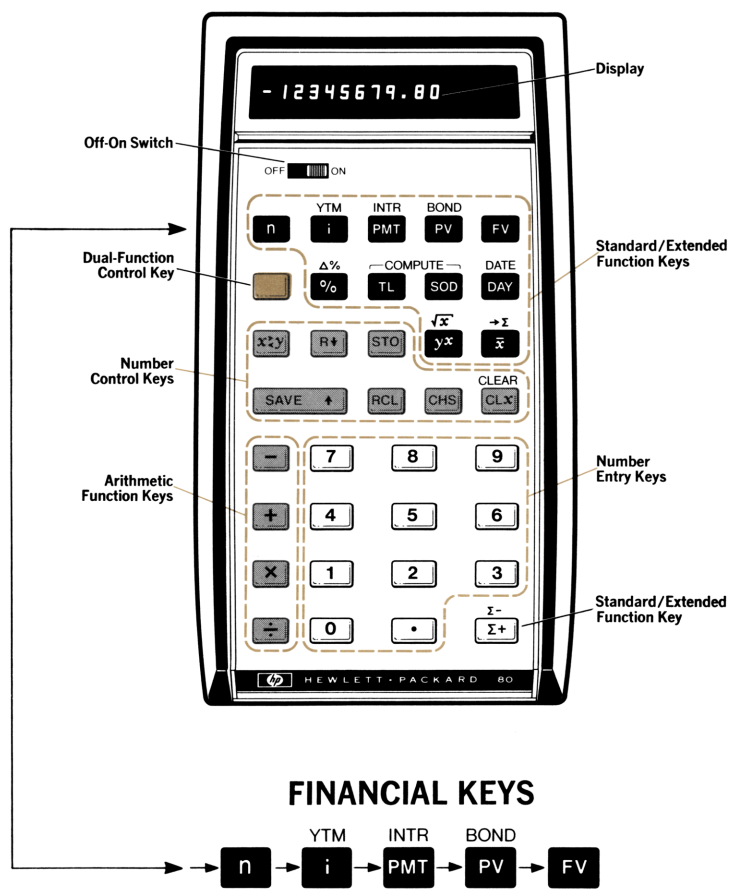


The Hewlett-Packard Company Advanced Products Division

The HP-80 is a highly sophisticated computer calculator that performs a broad spectrum of preprogrammed business calculations—from the ordinary to the exotic—and does all this with just a few simple keystrokes. The following pages show a few representative problems selected from the HP-80's extensive repertoire. Try them.





These five keys represent a myriad of preprogrammed functions. They replace all tables commonly used for figuring compound interest, discounts, bonds, and annuities. A special rule simplifies entry; enter the known values and press the associated keys in left-to-right order. Then press the key triggering the solution. See, for example, the COMPOUND INTEREST calculations, page 4.








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DISPLAY

Displayed numbers may be rounded to a maximum of 6 decimal places by pressing the gold key  before pressing the appropriate number key 0–6. Numbers requiring more than 6 decimals may be displayed in power of ten's notation by pressing  7–9. The gold key works like a shift key on a typewriter; it gives two functions to one key.




What does the number 123.456 look like with different decimal settings?

Step	Key Strokes	Display	Description
1	Turn on	0.00	HP-80 turns on with rounding to two places
2	123.456  SAVE 	123.46	rounds up if next place was 5 or larger
3	 0	123.	no decimal places
4	 3	123.456	rounding to three places
5	 6	123.456000	rounding to six places
6	 9	1.23456 02	power of ten's notation; actually means 1.23456×10^2
7	 2	123.46	puts rounding back to a dollars and cents setting

FLASHING DISPLAY





A BLURRED flashing display indicates the HP-80 is busy calculating.

For example, find the square of 7 with the  key.

Step	Key Strokes	Display	Description
1	7  SAVE 	7.00	enter the base 7
2	2 	49.00	7 raised to power 2

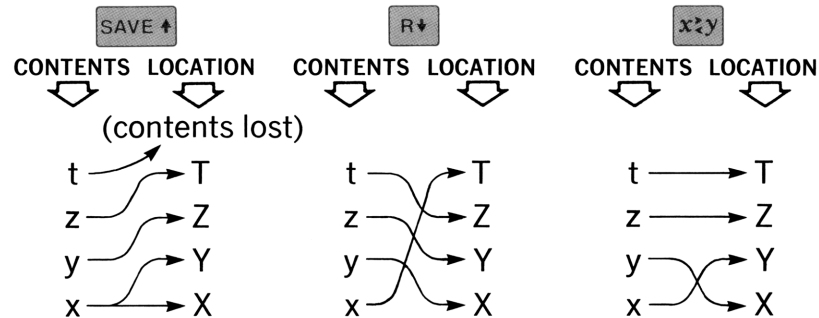
A BLINKING display with legible numbers indicates a user error, and you must start over.

For example divide 7 by 0:

Step	Key Strokes	Display	Description
1	7  SAVE 	7.00	enter value 7
2	0 	Blinking	an error
3		0.00	clears error

MOVING DATA

The HP-80 has a constant storage register plus 4 working registers (locations) that hold the number you have entered and the results of calculations. The contents of these registers can be moved to and fro to permit greater operating flexibility. 3 keys are provided for manipulating (or moving) the contents as follows:



CLEARING AND STORING DATA

Use the key **CLX** to clear the display to zeros when an incorrect number has been entered, and the keys **CLX** **CLEAR** to clear all working registers.

A number may be stored in the constant storage location with the key **STO** and recalled later with the key **RCL**.

Step	Key Strokes	Display	Description
1	1234 STO	1234.00	stores the entered value into constant storage
2	CLX	0.00	clears display to zeros
3	RCL	1234.00	recalls the stored value from constant storage location into the display
4	CLX CLEAR	0.00	clears the 4 working registers

Pressing **CLX** **CLEAR** does not affect the contents of the constant storage register.

ARITHMETIC OPERATIONS

In the HP-80, arithmetic answers appear immediately after pressing one of the arithmetic keys **+**, **-**, **×**, **÷**. This means the operation follows the number entry.

A number is changed from positive to negative or vice versa with the change sign key **CHS**.

How much is 6 plus 2? Next, subtract 5 from the result, then multiply by 4, divide by 6, and change the sign of the final answer.

Step	Key Strokes	Display	Description
1	6 SAVE ↑ 2 +	8.00	addition
2	5 -	3.00	subtraction
3	4 ×	12.00	multiplication
4	6 ÷	2.00	division
5	CHS	-2.00	changes positive number to a negative number

CALENDAR FUNCTIONS

FORMAT: MM.DDYYYY

May 12, 1977 5.121977

November 9, 2009 11.092009

RANGE: 1900-2099.

Find Number of Days

How many days are there between January 1, 1973 and December 31, 1977?

Step	Key Strokes	Display	Description
1	6	0.000000	sets rounding to six places
2	1.011973	1.011973	January 1, 1973 entered
3	12.311977	1825.000000	total number of days
4		1824.000000	number of days minus leap day(s)

Find Future or Past Dates

If you issue a note on May 4, 1973 that is due in 120 days, what is the maturity date?

Step	Key Strokes	Display	Description
1	5.041973	5.041973	May 4, 1973 entered
2	120	9.011973	September 1, 1973 (maturity date)

Dates in the past are found by entering the number of days as a negative number by using key.

Press 2 to return to a dollars and cents setting.

PERCENTAGE OF BASE

If Joe is making \$221.58 per week and he gets a 12% raise, what is the amount of increase, and what will his new weekly salary be?

Step	Key Strokes	Display	Description
1	221.58	221.58	base salary
2	12	26.59	amount of increase
3		248.17	new weekly salary

PERCENT DIFFERENCE

Last week, 334 building permits were issued in your town. Only 297 were issued this week. What is the percent of increase or decrease?

Step	Key Strokes	Display	Description
1	334	334.00	base amount
2	297	-11.08	percent of decrease

FUTURE VALUE OF A COMPOUNDED AMOUNT

What is the future value of \$500 invested at 6% for 7 years, if interest is compounded annually?

Step	Key Strokes	Display	Description
1	7 n	7.00	number of years
2	6 i	6.00	annual interest rate
3	500 PV	500.00	principal invested (present value)
4	FV	751.82	value in 7 years (future value)

PRESENT VALUE OF A COMPOUNDED AMOUNT

If it would take \$2,000 to finance a European ski vacation which you plan to take in 18 months, how much money would you have to deposit now in a savings account paying 6% compounded monthly?

Step	Key Strokes	Display	Description
1	18 n	18.00	number of months
2	6 SAVE ↑	6.00	interest rate
3	12 ÷ i	0.50	monthly interest rate
4	2000 FV	2000.00	amount needed (future value)
5	PV	1828.27	amount to be deposited (present value)

RATE OF INTEREST FOR A COMPOUNDED AMOUNT

Your brother-in-law wants to borrow \$800 for two years. In order to get \$1000 back, what interest rate will you charge him?

Step	Key Strokes	Display	Description
1	2 n	2.00	number of years
2	800 PV	800.00	loan amount
3	1000 FV	1000.00	amount you want
4	i	11.80	interest rate you charge

TIME PERIOD FOR A COMPOUNDED AMOUNT

If you have \$889 in a savings account earning 5.45% interest compounded monthly, how long will it take to reach \$1000?

Step	Key Strokes	Display	Description
1	5.45 SAVE ↑	5.45	annual interest rate
2	12 ÷ i	0.45	monthly interest rate
3	889 PV	889.00	principal (present value)
4	1000 FV	1000.00	future value
5	n	25.97	number of months (or 26 months)

TRUE INTEREST RATE ON A LOAN (ANNUITY)

What is the true interest rate on a 36 month loan for \$3000 having monthly payments of \$100?

Step	Key Strokes	Display	Description
1	36 n	36.00	number of months
2	100 PMT	100.00	payment amount
3	3000 PV	3000.00	principal (present value)
4	i	1.02	monthly interest rate
5	12 x	12.25	annual percentage rate

NUMBER OF INSTALLMENTS TO REPAY A LOAN (ANNUITY)

How many months will it take to pay off a \$530 loan that cost 16%, when you can afford to pay \$25 per month?

Step	Key Strokes	Display	Description
1	16 SAVE ↑	16.00	annual interest rate
2	12 ÷ i	1.33	monthly interest rate
3	25 PMT	25.00	amount you can afford per month
4	530 PV	530.00	amount you want to borrow
5	n	25.08	number of months (or 25 months)

AMOUNT OF LOAN FINANCED (ANNUITY)

How much money can you borrow for 36 months at 9% interest, if you can afford to repay the loan at \$80 per month?

Step	Key Strokes	Display	Description
1	36 n	36.00	number of months
2	9 SAVE ↑	9.00	interest rate
3	12 ÷ i	0.75	monthly interest rate
4	80 PMT	80.00	monthly payment amount
5	PV	2515.74	principal (present value)

MONTHLY PAYMENT AMOUNT (ANNUITY)

If you borrow \$1500 from the credit union, to be repaid over 18 months at 9% annual interest, what is the monthly payment?

Step	Key Strokes	Display	Description
1	18 n	18.00	number of months
2	9 SAVE ↑	9.00	annual interest rate
3	12 ÷ i	0.75	monthly interest rate
4	1500 PV	1500.00	principal (present value)
5	PMT	89.40	monthly payment

RATE OF INTEREST FOR SAVINGS (ANNUITY)

What rate of interest must be obtained to amass a total of \$23,550 in 12 years on an annual investment of \$1300?

Step	Key Strokes	Display	Description
1	12 n	12.00	number of years
2	1300 PMT	1300.00	annual investment
3	23550 FV	23550.00	future value
4	i	7.21	required rate of interest

FUTURE VALUE OF A SAVINGS (ANNUITY)

How much money will you have in one year if you deposit \$140 per month in a savings account paying interest at 5.25% compounded monthly?

Step	Key Strokes	Display	Description
1	12 n	12.00	number of monthly deposits
2	5.25 SAVE ↑	5.25	annual interest rate
3	12 ÷ i	0.44	monthly interest rate
4	140 PMT	140.00	monthly deposit
5	FV	1721.02	total future amount

YEARLY DEPOSIT FOR A SINKING FUND (ANNUITY)

If you want to establish a sinking fund to retire \$150,000 worth of bonds maturing in 25 years, how much must be deposited annually if money earns 5% per year?

Step	Key Strokes	Display	Description
1	25 n	25.00	number of years
2	5 i	5.00	annual interest rate
3	150000 FV	150000.00	amount needed to retire bonds (future value)
4	PMT	3142.87	annual deposit

NUMBER OF DEPOSITS FOR A SAVINGS (ANNUITY)

How many months does it take to save \$2300 when you can set aside \$88 a month in a savings account paying 5% annual interest compounded monthly?

Step	Key Strokes	Display	Description
1	5 SAVE ↑	5.00	interest rate
2	12 ÷ i	0.42	monthly interest rate
3	88 PMT	88.00	deposit amount
4	2300 FV	2300.00	amount to be amassed (future value)
5	n	24.86	number of months (or 25 months)

CONVERTING ADD-ON INTEREST TO APR

If you borrow \$770 for 18 months at a 5% add-on rate, what is the true rate of interest (APR) and the amount of the monthly payment?

Step	Key Strokes	Display	Description
1	18 n	18.00	number of months
2	5 i	5.00	add-on interest rate
3	i	9.27	true rate of interest (APR)
4	x↔y	0.06	monthly payment factor
5	770 x	45.99	amount of monthly payment

NOMINAL INTEREST CONVERTED TO TRUE INTEREST

What is the effective annual rate of interest if your bank quotes a nominal (stated) rate of 9% compounded monthly?

Step	Key Strokes	Display	Description
1	12 n	12.00	number of months per year
2	9 SAVE ↑	9.00	nominal interest rate
3	12 ÷ i	0.75	monthly interest rate
4	100 PV	100.00	principal (present value)
5	FV	109.38	principal plus interest (future value)
6	100 -	9.38	effective annual rate

ACCUMULATED INTEREST ON MORTGAGE PAYMENTS AND REMAINING PRINCIPAL

You have a 10 year (120 month), 9.5% mortgage on your mountain property. You are making monthly payments of \$120.40. The 1st payment was made October, 1970; therefore, the December payment was the 3rd and last one of 1970.

- (a) What was the total accumulated interest paid in 1971?
- (b) What is the remaining principal due on December 31, 1971?

Step	Key Strokes	Display	Description
1	3	3.00	3rd and last payment in 1970
2	15	15.00	15th and last payment in 1971
3	120	120.00	total number of payments
4	9.5	9.50	interest rate
5	12	0.79	monthly interest rate
6	120.40	120.40	amount of each payment
7		844.84	total amount of interest paid in 1971
8		8563.37	unpaid principal

REBATES ON CONSUMER LOANS (RULE OF 78's)

You have a 36-month, \$3300 loan having a finance charge of \$1421.54 which you are repaying at \$131.15 per month. If you pay off the loan when the 17th payment is due,

- (a) what is the amount of the interest portion in payment 17 and
- (b) what is the amount of interest rebated?

Step	Key Strokes	Display	Description
1	17	17.00	payment number
2	36	36.00	length of the loan in months
3	1421.54	1421.54	finance charges (present value)
4		42.69	interest portion in payment 17
5		405.54	amount of interest charge to be rebated

SUM-OF-THE-YEARS' DIGITS DEPRECIATION

If your office machines have a depreciable value of \$5310 and a life expectancy of 5 years, what is the amount of depreciation and remaining value for the first 2 years?

Step	Key Strokes	Display	Description
1	1	1.00	first year number
2	5	5.00	last year number
3	BOND 5310	5310.00	depreciable value
4	COMPUTE 	1770.00	year 1 depreciation
5		3540.00	remaining value, year 1
6		1416.00	year 2 depreciation
7		2124.00	remaining value, year 2
8	Can repeat steps 6 and 7 through 5 years		










DECLINING BALANCE DEPRECIATION (Constant Percentage)

What is the depreciation schedule for the first 2 years of an asset valued at \$4,500 that has a life expectancy of 6 years if the declining factor is 1.5 (or 150%)?

Step	Key Strokes	Display	Description
1	150	150.00	declining factor
2	6	25.00	yearly depreciation factor
3	4500	4500.00	value of the asset
4		1125.00	year 1 depreciation
5		3375.00	remaining book value
6		843.75	year 2 depreciation
7		2531.25	remaining book value
8	Repeat steps 6 and 7 for full schedule		








DISCOUNTED NOTE

On a \$1000 note maturing in 45 days, what is the discount amount and effective annual yield, on both a 360- and 365-day basis, if the discount rate is 6%?

Step	Key Strokes	Display	Description
1	45 	45.00	number of days
2	6 	6.00	interest rate
3	1000 	1000.00	face value (future value) of note
4	  	7.50	discount amount (360-day basis)
5		6.05	effective annual yield (360-day basis)
6		7.40	discount amount (365-day basis)
7		6.04	effective annual yield (365-day basis)










ACCRUED INTEREST

What is the interest amount accrued on a \$640 note for 60 days at 8%, figured on both a 360- and 365-day basis?

Step	Key Strokes	Display	Description
1	60 	60.00	number of days
2	8 	8.00	interest rate
3	640 	640.00	amount of the note
4	  	8.53	accrued interest (360-day basis)
5		8.42	accrued interest (365-day basis)









BOND YIELD

What is the yield-to-maturity of a bond settled January 23, 1973 at a price of 106, if it matures on March 15, 1978 and has a coupon rate of 4.75%?

Step	Key Strokes	Display	Description
1	1.231973 	1.23	settlement date
2	3.151978 	1877.00	maturity date
3	4.75  	4.75	coupon rate
4	106  	106.00	bond price
5	  	3.46	yield-to-maturity














BOND PRICE

What is the price of a bond having a settlement date of January 23, 1973, a maturity date of March 6, 1978, a coupon rate of 4½%, and a yield-to-maturity of 3.22%?

Step	Key Strokes	Display	Description
1	1.231973 	1.23	settlement date
2	3.061978 	1868.00	maturity date
3	3.22  	3.22	yield-to-maturity
4	4.5  	4.50	coupon rate
5	 	105.99	bond price

TREND LINE










During January, company sales were 22 units; for February, 18 units; for March, 25 units; April, 26 units; May, 32 units. Using the “least squares” technique of fitting a line to these points, project the sales for June and August (6th and 8th months).

Step	Key Strokes	Display	Description
1	 	0.00	clears all working registers
2	22 	1.00	1st value is entered; counter is displayed
3	18 	2.00	2nd value is entered; counter is displayed
4	25 	3.00	3rd value is entered; counter is displayed
5	26 	4.00	4th value is entered; counter is displayed
6	32 	5.00	5th value is entered; counter is displayed
7	 	16.20	extrapolated sales at month 0 (year's start)
Projections			
8	6  	33.00	forecasted sales for June (6th month)
9	8  	38.60	forecasted sales for August (8th month)

STATISTICS

A sample of delivered parts reveals the following sizes. What is the mean and standard deviation of the sample?

1.95" 2.00" 2.02" 2.05" 1.98"



















Step	Key Strokes	Display	Description
1	 	0.00	working registers are cleared
2	1.95 	1.95	1st value is entered
3	2.00 	3.95	2nd value is entered and added to total
4	2.02 	5.97	3rd value is entered and added to total
5	2.05 	8.02	4th value is entered and added to total
6	1.98 	10.00	5th value is entered and added to total
Answers			
7		2.00	mean (average)
8		0.04	standard deviation

DISCOUNTED CASH FLOW ANALYSIS

If you want a minimum rate of return of 14% on an investment of \$50,000, would the investment be profitable based on the following cash flows?

	1st year	2nd year	3rd year
Cash Flow	-\$10,000	\$15,000	\$20,000





	4th year	5th year	6th year
Cash Flow	\$20,000	\$25,000	\$22,000

Step	Key Strokes	Display	Description
1	 	0.00	clears working registers
2	14 	14.00	minimum desired rate of return
3	50000  	-50000.00	original investment
4	10000   	-58771.93	net present value after year 1
5	15000  	-47229.92	net present value after year 2
6	20000  	-33730.49	net present value after year 3
7	20000  	-21888.88	net present value after year 4
8	25000  	-8904.66	net present value after year 5
9	22000  	1118.24	net present value after year 6

Investment is profitable (to the extent of the minimum desired rate of return) because the final result is positive.

DISCOUNTED RATE OF RETURN

What is the rate of return on an initial investment of \$10,000 that pays \$2000 per year for 7 years?

Step	Key Strokes	Display	Description
1	7 	7.00	number of years
2	2000 	2000.00	cash flow per year
3	10000 	10000.00	original investment
4		9.20	discounted rate of return

Why not accept our short term, interest free loan of the new HP-80? Ask an HP representative for details on our no obligation trial offer.

