HEWLETT-PACKARD

HP-80

Quick Reference Guide

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Basic Instructions

Clearing

To clear display only, **press** CLx .

To clear everything (except constant storage), **press** CLEAR CLx .

Constant Storage

To store a constant, **press** STO .

To recall a constant, **press** RCL .

NOTE: Certain important pre-programmed calculations overwrite previous contents of the constant storage. These are:

- Add-on to annual percentage rate conversion
- Effective yield of an annuity (loan repayment and sinking fund)
- Accrued interest and discounted note problems
- Trend lines (least squares linear regression)
- Sum-of-the-digits calculations
- Bond calculations (price and yield)
- Accumulated interest paid on a loan
- Discounted cash flow analysis

Except where noted above, a constant remains in the machine until overwritten by another constant or machine is turned off.

Rounding

To round-off *(the display only)*, **press** , then any desired numeral key between 0 and 6.

A numeral key greater than 6 will put display in so-called *"scientific notation."* Normal turn-on mode is automatic rounding to two decimal places.

> **NOTE:** Rounding affects the display *only.* The full internal accuracy of the machine is maintained.

Arithmetic Operations

To perform simple arithmetic operations between two numbers:

① **Key** in the first number, **press** SAVE ↑

② **Key** in the second number, **press** desired operation, +, −, × or ÷

To perform chain calculations, only the first number has to be loaded through a SAVE ↑ operation; all subsequent numbers need only be keyed in and the desired function key pressed after each one.

Automatic computation between a displayed number and a stored constant is achieved by pressing RCL and the desired function.

Changing Sign

To change the sign of a displayed number, **press** CHS .

To enter a negative number, key in number, **press** CHS .

Raising a Number to a Power

① **Key** in positive base number *(to be raised to a power)*, **press** SAVE

② **Key** in power *(exponent)*, **press** y^x

Square Root of a Positive Number

Key in number, **press** $\sqrt{x}$ y^x.

Percentage Operations

To obtain the **percentage amount** of a number:

① **Key** in the base number, **press** SAVE

② **Key** in the percent *(as a %)*, **press** %

To add or subtract the percentage amount to the base number simply **press** + or −, respectively.

To obtain the **percent difference** between a base and another number:

① **Key** in the base *(or reference)* number, **press** SAVE

② **Key** in the second number, **press** Δ% %

(answer is displayed in percent)

Calendar Functions

Date entry sequence is: month, decimal point, two-numeral day and four-numeral year. **Example:** May 8, 1972 = 5.081972. Calendar range is from January 1, 1900 to December 31, 2099.

To obtain **difference between two dates:**

① **Key** in first date, **press** SAVE ↑

② **Key** in second date, **press** DAY

To obtain a **date** from a base date:

① Set rounding to six decimal places, **press** [ ] 6

② **Key** in the base date, **press** SAVE ↑

③ **Key** in the number of days *(can be positive or negative),* **press** [ ] DATE DAY

To obtain the **day of the week** *of a date:*

① **Key** in today's date, **press** SAVE ↑

② **Key** in desired date, **press** DAY SAVE ↑

③ **Key** in 7, **press** ÷

④ **Key** in that portion of the display **left** of the decimal point, **press** −

⑤ **Key** in 7 again, **press** ×

If the date in question is **beyond** today, its day of the week will be today's day **plus** the number shown in the display.

If the date in question is **before** today, its day of the week will be today's day **minus** the number shown in the display.

Error Indication

An improper or illegal operation *(such as dividing by zero)* will result in a steady blinking display.

Battery Condition (low charge indication)

All decimal points lighting in the display indicates low battery condition. Plug into recharger.

Compound Interest

NOTE: To use the compound interest keys *(top row)* simply remember to enter your known values in left-to-right sequence and then press the key which corresponds to the unknown value.

Future Value

① **Key** in number of time periods, **press** n

② **Key** in interest rate **per** time period *(in %)*, **press** i

③ **Key** in present value *(principal)*, **press** PV

④ To obtain future value, **press** FV

NOTE: STO and arithmetic operations must be performed prior to entering any value. A mistaken last entry may be corrected by pressing CLx, then keying in the correct value and pressing the appropriate key.

Present Value

① **Key** in number of time periods, **press** n

② **Key** in interest rate **per** time period *(in %)*, **press** i

③ **Key** in future value amount, **press** FV

④ To obtain present value, **press** PV

Rate of Return (growth rate)

① **Key** in number of periods, **press** n

② **Key** in present *(beginning)* value, **press** PV

③ **Key** in future *(ending)* value, **press** FV

④ To obtain effective rate **per** period *(in %)*, **press** i

Number of Time Periods

(for a compounded amount)

① **Key** in interest rate **per** period *(in %)*, **press** i

② **Key** in present *(beginning)* value, **press** PV

③ **Key** in future *(ending)* value, **press** FV

④ To obtain number of time periods, **press** n

Nominal Rate Converted to Effective Annual Rate

① **Key** in number of time periods **per** year, **press** STO n

② **Key** in nominal rate *(as a %)*, **press** RCL ÷ i

③ **Key** in 1 0 0, **press** STO PV FV

④ To obtain effective annual rate *(in %)*, **press** RCL −

Effective Annual Rate Converted to Nominal Rate

① **Key** in number of time periods **per** year, **press** STO n

② **Key** in 1 0 0, **press** SAVE ↑ PV

③ **Key** in effective annual rate *(in %)*, **press** + FV i

④ To obtain nominal rate *(in %)*, **press** RCL ×

Sinking Fund

Future Value of an Annuity (sinking fund)

① **Key** in number of time periods, **press** n

② **Key** in interest rate **per** period *(as a %)*, **press** i

③ **Key** in payment *(installment)* amount, **press** PMT

④ To obtain future value, **press** FV

Sinking Fund Payment Amount

① **Key** in number of time periods, **press** n

② **Key** in interest rate **per** period *(as a %)*, **press** i

③ **Key** in future value, **press** FV

④ To obtain payment amount, **press** PMT

Effective Yield of a Sinking Fund

① **Key** in number of time periods, **press** n

② **Key** in payment *(installment)* amount, **press** PMT

③ **Key** in future value, **press** FV

④ To obtain interest rate **per** period *(as a %)*, **press** i

Number of Periods Required for a Sinking Fund

① **Key** in interest rate **per** period *(as a %)*, **press** i

② **Key** in payment *(installment)* amount, **press** PMT

③ **Key** in future value, **press** FV

④ To obtain number of time periods, **press** n

Loan Repayment

Accrued Interest Payment Due (Simple)

① **Key** in number of days, **press** n

② **Key** in **annual** interest rate *(in %)*, **press** i

③ **Key** in the principal *(present value)*, **press** PV

④ To obtain interest payment due on a 360-day basis, **press** INTR PMT

⑤ To obtain interest payment due on a 365-day basis, **press** x≷y

Discounted Note and Effective Annual Yield

① **Key** in number of days, **press** n

② **Key** in **annual** interest *(discount)* rate *(in %)*, **press** i

③ **Key** in the face *(future)* value of note, **press** FV

④ To obtain the discount amount *(i.e., interest portion)* of the note on a 360-day basis, **press** INTR PMT

⑤ To obtain the effective annual yield on a 360-day basis, **press** R↓

⑥ To obtain the discount amount of the note on a 365-day basis, **press** R↓

⑦ To obtain the effective annual yield on a 365-day basis, **press** R↓

True Equivalent Annual Yield

① **Key** in number of days, **press** SAVE↑

② **Key** in 3 6 5, **press** ÷ n

③ **Key** in the principal *(present value)* of note, **press** PV

④ **Key** in the face value *(future value)* of note, **press** FV

⑤ To obtain true equivalent annual yield, **press** i

Present Value of an Annuity

(Principal Amount of a Loan)

① **Key** in the number of time periods *(months, years, etc.)*, **press** n

② **Key** in interest rate **per** period *(in %)*, **press** i

③ **Key** in the amount of the payment **per** period, **press** PMT

④ To obtain present value *(principal)*, **press** PV

Loan Repayment Amount

① **Key** in number of time periods, **press** n

② **Key** in interest rate **per** period *(in %)*, **press** i

③ **Key** in present value *(principal)*, **press** PV

④ To obtain payment amount **per** period, **press** PMT

True Interest Rate of a Loan

① **Key** in number of time periods, **press** n

② **Key** in payment amount **per** period, **press** PMT

③ **Key** in present value *(principal)*, **press** PV

④ To obtain interest rate **per** period *(in %)*, **press** i

NOTE: To obtain an **annual** rate, simply **key** in the number of time periods per year and **press** [×].

Number of Time Periods Required for a Loan

① **Key** in the interest rate **per** time period, **press** [i]
② **Key** in the payment amount **per** time period, **press** [PMT]
③ **Key** in the present value *(principal)*, **press** [PV]
④ To obtain the number of time periods, **press** [n]

Accumulated Interest Paid on a Loan

(between two points in time)

① **Key** in the payment number (less 1) corresponding to the first point of the time span in question, **press** [STO]
② **Key** in the payment number corresponding to the last point of the time span in question, **press** [n]
③ **Key** in the **total** number of payments of the loan, **press** [n]
④ **Key** in the interest rate **per** payment *(or period)*, **press** [i]
⑤ **Key** in the payment amount **per** period, **press** [PMT]
⑥ To obtain the accumulated interest, **press** [Σ+]
⑦ To obtain the remaining balance *(principal)*, **press** [x≷y]

"Add-on" Interest Converted to Annual Percentage Rate

① **Key** in the number of **months** of the loan,
press n
② **Key** in the "add-on" rate *(per annum)*,
press i
③ To obtain annual percentage rate,
press i
④ To obtain the monthly payment amount,
press x≷y
⑤ Then **key** in the principal amount to be loaned, **press** ×

Interest Rebate (Rule of 78's)

① **Key** in last payment number, **press** n
② **Key** in **total** number of payments for the loan,
press n
③ **Key** in the total finance charge, **press** PV
④ To obtain the unearned interest *(rebate)*,
press [orange] SOD x≷y
To obtain the remaining principal due:
⑤ **Key** in the amount of each payment,
press SAVE ↑
⑥ **Key** in the number of payments remaining,
press × x≷y −

Depreciation Amortization

Sum-of-the-years' Digits Depreciation

① **Key** in given year number *(or beginning year number)*, **press** n

② **Key** in life of asset *(number of years)*, **press** n

③ **Key** in depreciable amount *(purchase less salvage value)*, **press** PV

④ To obtain given year's depreciation, **press** [orange] SOD

⑤ To obtain subsequent year's depreciation, **press** SOD

⑥ Continue step ⑤ as desired

⑦ To obtain the depreciation for a particular year **not** in sequence, simply key in the year number desired and **press** n SOD

⑧ Continue step ⑦ as desired.

NOTE: To obtain the remaining depreciable value after each year's depreciation **press** x⇄y .

Straight Line Depreciation

① **Key** in depreciable amount *(purchase less salvage value)*, **press** SAVE ↑ SAVE ↑

② To obtain each year's depreciation, **key** in life of asset *(number of years)*, **press** ÷

NOTE: To obtain the remaining depreciable value after each year's depreciation, first **press** STO − for depreciable value after first year then RCL − for each subsequent year.

Variable Rate, Declining-Balance Depreciation

① **Key** in 1 0 0, **press** SAVE ↑

② **Key** in life of asset *(number of years)*, **press** ÷

③ **Key** in declining factor or rate *(i.e., 1.5, 2, etc)*, **press** × STO

④ **Key** in original cost

⑤ To obtain year's depreciation, **press** RCL %

⑥ To obtain remaining book value, **press** −

⑦ Continue steps ⑤ and ⑥ for subsequent years

Diminishing Balance Depreciation

① **Key** in life of asset *(number of years)*, **press** n

② **Key** in beginning value of asset, **press** PV

③ **Key** in ending *(salvage)* value of asset, **press** FV

> **NOTE:** Salvage value must be greater than zero.

④ To obtain and store rate of depreciation, **press** i CHS STO

⑤ **Key** in beginning value of asset

⑥ To obtain year's depreciation, **press** RCL %

⑦ To obtain remaining book value, **press** −

⑧ Continue steps ⑥ and ⑦ for subsequent years

Bonds

Price of a Bond

① **Key** in settlement date,
press SAVE ↑
② **Key** in maturity date, **press** DAY
③ **Key** in yield-to-maturity *(as a %)*, **press** i
④ **Key** in annual coupon rate *(as a %)*,
press PMT
⑤ To obtain price (percentage), **press** BOND PV

Yield-to-Maturity of a Bond

① **Key** in settlement date,
press SAVE ↑
② **Key** in maturity date, **press** DAY
③ **Key** in annual coupon rate *(as a %)*,
press PMT
④ **Key** in the bond price (percentage), **press** PV
⑤ To obtain bond yield, **press** YTM i

NOTE: The mathematical approach used for bond problems as calculated above is more precise than the traditional one established in the 1800's. The reason is that where the intra-coupon period is applicable to the problem, the **actual** number of days per month is used instead of an arbitrary 30 days for all months. The traditional method is quite close to the actual method, and generally, the two differ only beyond the second decimal place. In deference to long standing custom, however, the following option is provided for calculating bond problems in accordance with traditional trade custom.

Conventional Bond Calculations

a) Determine the number of days, months and years to maturity *(in accordance with trade custom)*

b) **Key** in number of days, **press** SAVE ↑

c) **Key** in 3 0 *(days/month)*, **press** ÷

d) **Key** in number of months, **press** +

e) **Key in** 1 2 *(months/year)*, **press** ÷

f) **Key** in number of years, **press** +

g) **Key** in 3 6 5 *(days/year)*, **press** × n

Continue with step ③ of either price or yield calculation above.

NOTE: For maturities of less than 6 months, load the number of days to maturity directly into n.

Investment Analysis

Discounted Rate of Return

(for even cash flows)

① **Key** in number of time periods, **press** n

② **Key** in amount of cash flow **per** period, **press** PMT

③ **Key** in original investment, **press** PV

④ To obtain discounted rate of return *(in %)* **per** period, **press** i

Discounted Cash Flow Analysis

(for uneven cash flows)

① Clear the entire machine by **pressing** CLEAR CLx

② **Key** in discount rate *(in %)* **per** period, **press** [i]

③ **Key** in original investment, **press** [CHS] [PV]

④ **Key** in cash flow **per** period, **press** [PV] [Σ+]

⑤ Continue step ④ for subsequent flows.

NOTE: Investment is profitable (to the extent of the discount rate) if the result is positive. Furthermore, the user can determine the "break-even" period by noting the period in which step ④ first yielded a positive result.

Statistics

Mean and Standard Deviation

① **Clear** the entire machine by **pressing** [f] [CLx] (CLEAR)

② **Key** in data item, **press** [Σ+]

③ Continue step ② until all data are entered.

④ To obtain mean *(arithmetic average)*, **press** [$\bar{x}$]

NOTE: To obtain the standard deviation after each mean calculation, **press** [$x \gtrless y$]. The [$x \gtrless y$] key must be pressed **again** before resuming.

⑤ To return to the summation mode, **press** [f] [$\bar{x}$] ($\rightarrow\Sigma$)

⑥ Continue with step ② if desired

NOTE: To correct a data item, **key** in its value and **press** [f] [Σ+] ($\Sigma-$).

Trend Lines (Least Squares Linear Regression) CLEAR

① **Clear** the entire machine by **pressing** [ ] [CLx]

② Sequentially **key** in data item, **press** [TL]

> **NOTE:** Each time [TL] is pressed, the sequence number for that item is displayed.

③ Continue step ② until all data are entered.

④ To terminate the data entry sequence,
press [ ] [TL]

⑤ To obtain a specific value on the trend line **key** in the appropriate time period number,
press [n] [TL]

⑥ Repeat step ⑤ as often as desired

> **NOTE:** The user may also "step-along" the trend line by simply pressing [TL] as many times as desired. Further, the current time period number may be obtained by pressing [x≷y]. The [x≷y] key must be pressed **again** before resuming.

⑦ To obtain the amount of change of the trend line **per** period *(commonly called "slope")*,
press [R↓] [R↓]

⑧ To resume operation, **press** [R↓] [R↓]

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