

F-8016
HEWLETT  PACKARD

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HEWLETT-PACKARD

HP-80

**Quick
Reference
Guide**

Basic Instructions

Clearing

To clear display only, press $\boxed{\text{CLx}}$

To clear everything (except constant storage),

press $\boxed{\text{CLEAR}} \boxed{\text{CLx}}$

Constant Storage

To store a constant, press $\boxed{\text{STO}}$

To recall a constant, press $\boxed{\text{RCL}}$

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

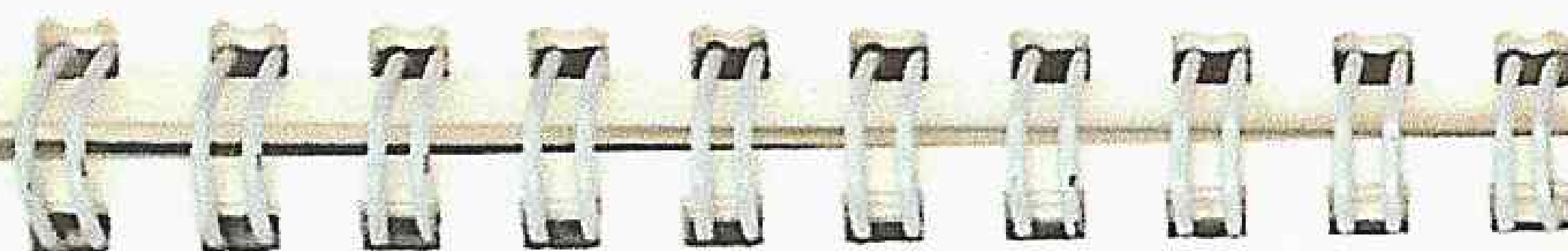
- Add-on to annual percentage rate conversion
- Effective yield of an annuity (loan repayment and sinking fund)
- Accrued interest and discounted note problems
- Trend lines (least squares linear regression)
- Sum-of-the-digits calculations
- Bond calculations (price and yield)
- Accumulated interest 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 $\boxed{\text{RND}}$, then any desired numeral key between $\boxed{0}$ and $\boxed{6}$.

1



2

A numeral key greater than $\boxed{6}$ 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 $\boxed{\text{SAVE } \uparrow}$

② Key in the second number, press desired operation, $\boxed{+}$, $\boxed{-}$, $\boxed{\times}$ or $\boxed{\div}$

To perform chain calculations, only the first number has to be loaded through a $\boxed{\text{SAVE } \uparrow}$ 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 $\boxed{\text{RCL}}$ and the desired function.

Changing Sign

To change the sign of a displayed number,

press $\boxed{\text{CHS}}$

To enter a negative number, key in number,

press $\boxed{\text{CHS}}$

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 **√** **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 two numbers:

- 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 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: Simple arithmetic operations may be performed prior to entering any value. Also, a mistaken last entry may be corrected by pressing **CLX**, then keying in the correct value and pressing the appropriate key.

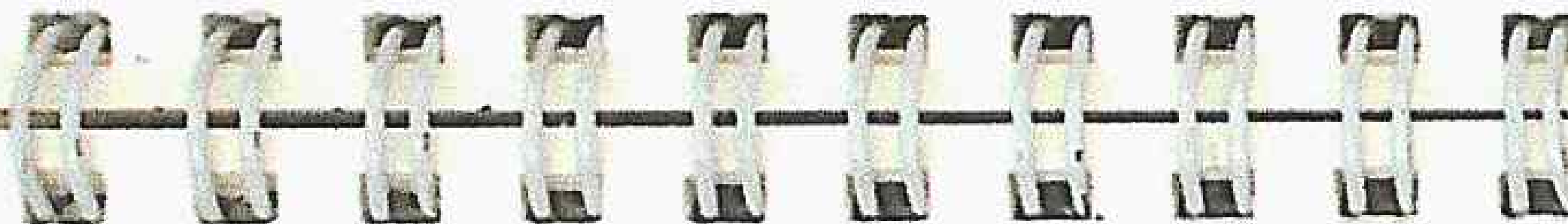
Present Value

- 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**

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- 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** **X**

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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

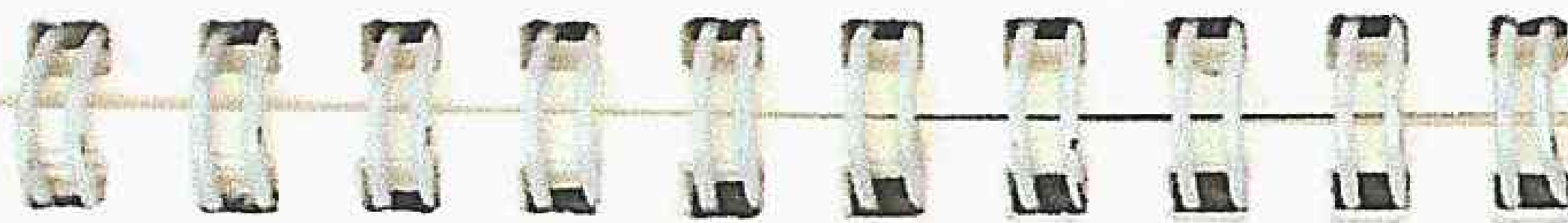
- ① Key in number of time periods, press **n**
- ② Key in interest rate per period (as a %), press **i**
- ③ Key in future value, press **FV**
- ④ To obtain payment amount, press **PMT**

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 (Simple) Interest Payment Due

- 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 **INTP** **PMT**
- ⑤ To obtain interest payment due on a 365 day basis, press **x₂y**

Discounted Note and Effective Annual Yields

- 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.—the interest portion) of the note on a 360 day basis, press **INTP** **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) ②

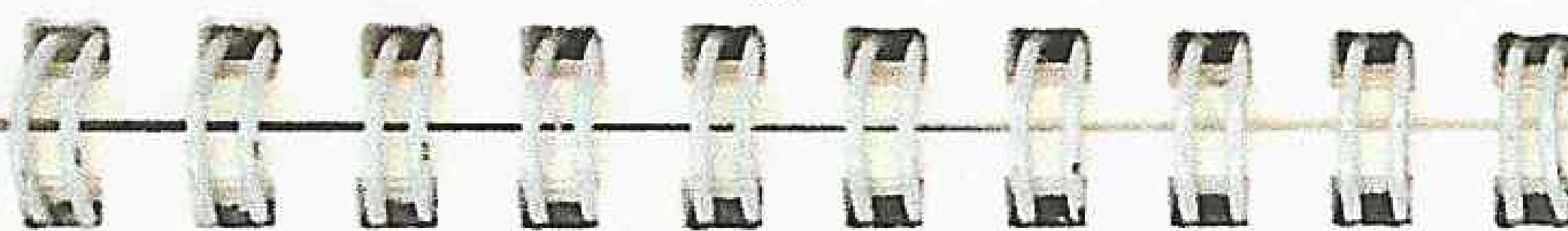
- ① Key in the number of time periods (*months, years, etc.*), press **n**
- ② Key in interest rate **per** period (*in %*), press **i**
- ③ Key in the amount of the payment **per** period, press **PMT**
- ④ To obtain present value (*principal*), press **PV** *sub.*

Loan Repayment Amount

- ① Key in number of time periods, press **n**
- ② Key in interest rate **per** period (*in %*), press **i** *Loan*
- ③ Key in present value (*principal*), press **PV** *Repay*
- ④ To obtain payment amount **per** period, press **PMT** *and Loan*

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 **x**.

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 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 **xzy**

"Add-on" Interest Converted to a True 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 true annual percentage rate, press **i**
- ④ To obtain the monthly payment amount, press **xzy**
- ⑤ Then key in the principal amount to be loaned, press **x**

Interest Rebate (Rule of 78's)

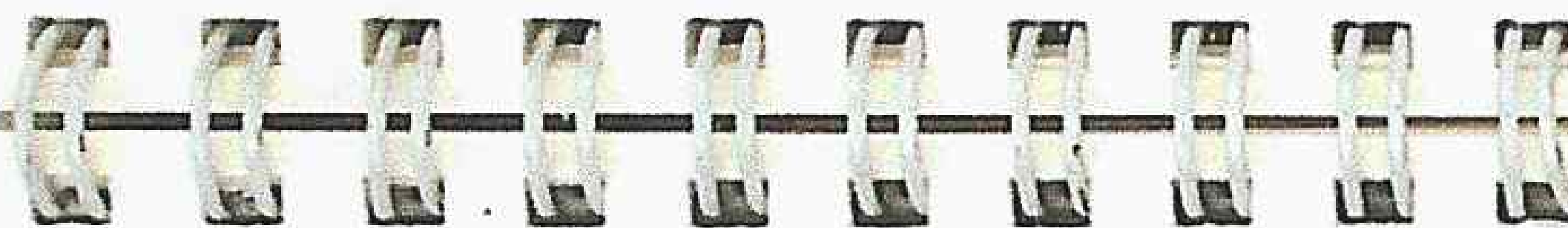
- ① Key in last payment number, press **n**
- ② Key in total number of payments for the loan, press **n**
- ③ Key in the total finance charge, press **PV**
- ④ To obtain the unearned interest (*rebate*), press **orange** **SOD** **xzy**
To obtain the remaining principal due,
- ⑤ Key in the amount of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

Depreciation Amortization

Sum-of-the-years' Digits Depreciation

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

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- 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 book value after each year's depreciation press **xzy**. The **xzy** key must be pressed **again** before the next **SOD** calculation (*step 5*).

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 book value after each year's depreciation, first press **STO** **-** for book value after first year then **RCL** **-** for each subsequent year.

Variable Rate, Declining-Balance Depreciation

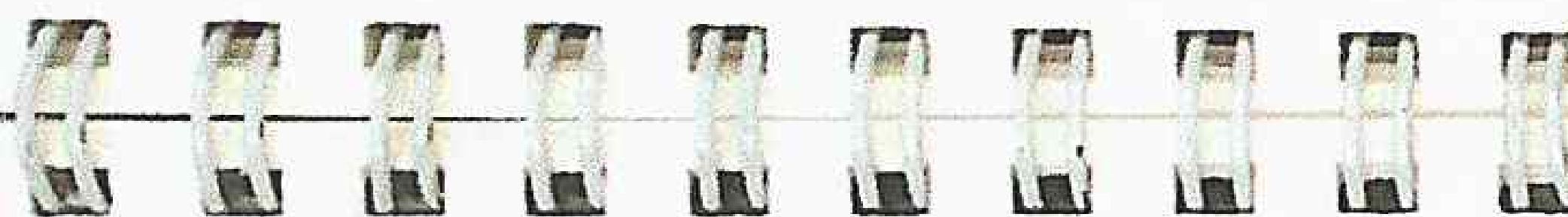
- ① Key in 1 0 0 and, press **SAVE** \uparrow
- ② Key in life of asset (*number of years*) press **\div**
- ③ Key in declining factor or rate (*i.e.*—1.5, 2 etc), press **\times** **STO**
- ④ Key in depreciable amount (*purchase less salvage value*)
- ⑤ To obtain year's depreciation, press **RCL** **%**
- 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 either maturity or purchase date, press **SAVE** \uparrow
- ② Key in remaining 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 bond price, press **BOND** **PV**

Yield-to-Maturity of a Bond

- ① Key in either maturity or purchase date, press **SAVE** \uparrow
- ② Key in remaining date, press **DAY**
- ③ Key in annual coupon rate (*as a %*), press **PMT**
- ④ Key in the bond price, press **PV** **YTM**
- ⑤ To obtain bond yield, press **BOND** **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** \uparrow
 - c) Key in **3** **0** (*days/month*), press **\div**
 - d) Key in number of months, press **+**
 - e) Key in **1** **2** (*months/year*), press **\div**
 - f) Key in number of years, press **+**
 - g) Key in **3** **6** **5** (*days/year*), press **\times** **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)

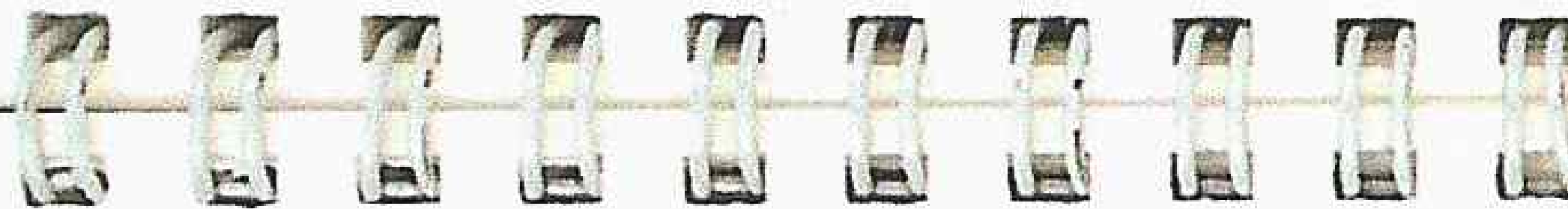
- ① Key in number of time periods, press **n**
- ② Key in amount of cash flow per period, press **PMT**
- ③ Key in original investment, press **PV**
- ④ To obtain discounted rate of return (*in %*) per period, press **i**

Discounted Cash Flow Analysis

(for uneven cash flows)

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

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- 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** **$\Sigma+$**
- 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 **CLEAR** **CLx**
- ② Key in data item, press **$\Sigma+$**
- ③ Continue step ② until all data are entered.
- ④ To obtain mean (*arithmetic average*), press **\bar{x}**

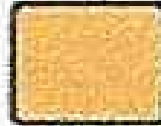

NOTE: To obtain the standard deviation after each mean calculation press **$\sqrt{x^2y}$** . The **$\sqrt{x^2y}$** key must be pressed **again** before resuming.

- ⑤ To return to the summation mode, press **\bar{x}**
- ⑥ Continue with step ② if desired.

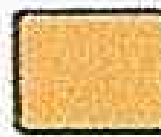
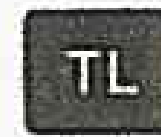


NOTE: To correct a data item key in its value and press **$\sqrt{x^2y}$** .

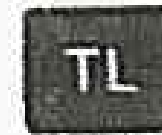


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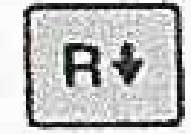

Trend Lines (Least Squares Linear Regression) CLEAR

- ① Clear the entire machine by pressing  CLX
- ② Sequentially, key in data item, press 

NOTE: Each time  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  
- ⑤ To obtain a specific value on the trend line, key in the appropriate time period number, press  
- ⑥ Repeat step ⑤ as often as desired.

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

- ⑦ To obtain the amount of change of the trend line per period (*commonly called "slope"*), press  
- ⑧ To resume operation, press  

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