The HP Business Consultant Pocket Companion

A GRAPEVINE PUBLICATION

The HP Business Consultant Pocket Companion

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Welcome!

This HP Business Consultant Pocket Companion is for you to keep in your calculator's case (or tucked inside your pocket, purse, glove compartment, or wherever you like to stash things) for convenient and quick reference...just in case you forget how to work certain kinds of problems, or you need to brush up on a seldom-used application. Think of it as just that–a companion–always there and ready to offer you assistance and advice at the flip of a page.

This book is not intended to be a replacement for your Business Consultant Owner's Handbook–just a supplement to it. The material in this Pocket Companion is mostly adapted from our full-length (full-size) book, *The HP Business Consultant Training Guide*, which is our complete course on using the HP Business Consultant (please see the outside back cover). Because this Pocket Companion has to fit into your pocket, we couldn't go into the explanation of things as fully as we would have liked, but that's why we published our full-length book as well. If you're interested in getting a copy of the Training Guide, please check with your nearest Hewlett-Packard dealer, or write or call us at the address and phone number listed on page 72.

Now, if you're ready, just check the Table of Contents in the front of the book (or the Alphabetical Index inside the back cover), find the topic you want to brush up on, and let your Pocket Companion quickly refresh your memory!

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The Basics

ARITHMETIC

You can perform arithmetic on the Business Consultant just about anytime. The only time you can't is when you see the symbol "α" appearing in the top line of the display, telling you that the calculator is expecting alphabetic input (i.e., characters instead of numbers). So if the "α" symbol appears in your display–and you want to get rid of it—press [ ] [MAIN]. (The symbol "[ ]" designates the gold key, and you must first press this gold key in order to use any of the functions printed in gold on the keyboard. It acts like the shift key on a typewriter.)

If you wish to clear the **calculator line** (the third line of the display where arithmetic is performed) before starting an arithmetic problem, press [ ] [CLEAR]. But you don't have to clear anything to start a new arithmetic problem, because every time you finish a problem with an [=], the machine is ready for a new problem!

The answers below are shown with two displayed decimal places. (You'll learn how to adjust the display setting on page 8).

Example: (459 + 262) ÷ 12

Solution: 459 [+] 262 [+] 12 [=]

Answer: 60.08

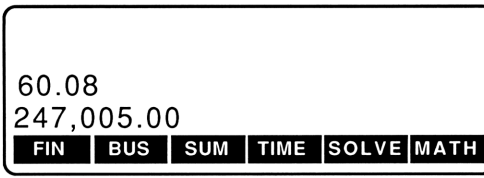
Notice that the calculator does arithmetic from left to right as you key in the numbers. You didn't have to key in any parentheses in the above solution. Now try this...

Example: 495 x (987 – 488)

Solution: 495 [x] [(] 987 [–] 488 [=]

Answer: 247,005.00

Any open parentheses are closed by the calculator when you press the [=] key. You didn't need to key in the right parenthesis in the above example.



Notice that the result from your previous calculation (60.08) is bumped up in the **history stack** (a record of your last four results shown in the display), and it now appears on the second line of the display. Use the [↓] and [↑] keys to bring values in the history stack to the calculator line, if you need them. Or, press [ ] [LAST] at anytime during a calculation to incorporate the previous result into your current calculation.

Most arithmetic problems on the Business Consultant are keyed in just as you would say them aloud, and [%] is no exception.

Example: Increase 35 by 6%.

Solution: 35 [+] 6 [%] [=]

Answer: 37.10

When you press the [%] key in the above solution, the calculator immediately computes 6% of 35, which is 2.10. Then, pressing [=] computes the final answer.

Example: What is 7% of 85,253?

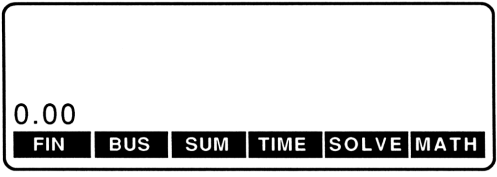
Solution: 85253 [x] 7 [%] [=]

Answer: 5,967.71

Again, when you press the [%] key, the number you just keyed in is modified. This time, the 7 that you keyed in is divided by 100. The word "percent" means "divide by 100," right?

USING A MENU

The HP-18C is full of menus (sorry, you can't order Chateaubriand and a bottle of champagne from these menus). You can choose an item on a menu by simply pressing the blank key directly beneath the displayed item. For example, here is the MAIN menu (sort of a "home position"):



Example: Starting from the MAIN menu, proceed to the TIME menu, then to the SET menu, then RETRACE your steps—back through the TIME menu to the MAIN menu once again.

Keystrokes	**Comments**
[ ] [MAIN]	Always sets the calculator to the MAIN menu
[TIME]	Selects the TIME menu
[SET]	Selects the SET menu
[EXIT]	Goes back to the TIME menu
[EXIT]	Goes back to the MAIN menu.

All you did in this example was move through menus. You didn't change the setting of the clock. You didn't change anything at all.

Notice how the [EXIT] key always lets you go back to the menu PREVIOUS to the one you're now viewing. And remember the keystrokes [ ] [MAIN]—so you can always jump back directly to the MAIN menu, in case you get lost or want to start over.

ADJUSTING THE DISPLAYED DECIMAL PLACES

Press the [DISP] key to adjust the number of displayed decimal places. The calculator will show you the following instructions:

TO SET #DECIMAL PLACES:
PRESS {FIX} OR {ALL}.
RADIX: {.} OR {,}.

The choice [ALL] tells the calculator to display every decimal place except for trailing zeros. Thus, the number 1.00000000000 will be displayed as 1, and the number 8.05446769000 will be displayed as 8.05446769 (the trailing zeros aren't shown).

The choice [FIX] allows you to set the number of decimal places to be displayed. To set the display to FIX 2 (i.e., for dollars and cents), press [DISP] [FIX] 2 [INPUT]. To display four decimal places, press [DISP] [FIX] 4 [INPUT].

The choices of [.] and [,] on the DISP menu allow you to choose a period or a comma as the radix in displayed numbers. To most of the people in this world, the number one-million should look like this: 1.000.000,00; while a few countries prefer that one-million look like this: 1,000,000.00. So choose the radix that you prefer.

CLEARING THE BUSINESS CONSULTANT

Usually, if you want to clear the calculator line to start a new problem, just press [ ] [CLEAR] or [←] (repeatedly). Three different keys are available for clearing information from the calculator: the [←] key, the [ ] [CLEAR] key, and the [ ] [CLEAR ALL] key. Exactly what these keys clear depends upon what you are doing on the calculator at the time you press them.

At the MAIN menu (press [ ] [MAIN] to get there), the clearing functions have the following meanings:

[←]: If you are in the middle of keying in a number or an arithmetic problem, this key means "backstep." It clears away one digit or operation each time you press it. But if a complete result is on the calculator line, that result is cleared to zero.

[ ] [CLEAR]: Clears (to zero) whatever is on the calculator line.

[ ] [CLEAR ALL]: Clears the history stack and the calculator line.

STORING AND RECALLING NUMBERS

You can store many numbers in your Business Consultant (over 130 under certain circumstances). They can be stored in number lists, or as variables under specific menus, or in data registers. Number lists and variable registers are covered in other sections here.

Your HP-18C has four numbered data registers for storing numbers that you want to have available to you at every menu. These numbered registers are called register 0, register 1, register 2, and register 3. A register in the Business Consultant is simply a hidden box that holds one number (and only one number).

Example: Store the number on the calculator line into register 0.

Solution: [STO] 0

As you can see, the **[STO]** key is used to store the most recent number to appear on the calculator line.

Example: Calculate 25.3 + 19.8, and meanwhile store 19.8 in register 1.

Solution: 25.3 [+] 19.8 [STO] 1 [=]

Answer: 45.10

The number 19.80 was the most recent entry to the calculator line when you pressed [STO]; so register 1 now contains the number 19.80.

The **[RCL]** key is used to recall a number from any register for use on the calculator line.

Example: Add the number in register 1 to the number on the calculator line (i.e., do this: 45.10 + 19.80).

Solution: [+] [RCL] 1 [=]

Answer: 64.90

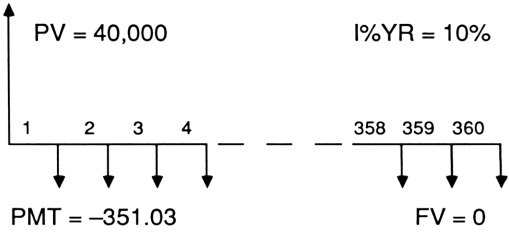
Numbers stored in the four numbered data registers will stay there until you change them by storing a new number. If you press [RCL] 1 repeatedly, the number 19.80 will repeatedly come into the display. To **clear a numbered register**, simply store a 0 in it. For example, to clear register 1, press 0 [STO] 1.

Financial Calculations

From the MAIN menu, press [FIN] to use the financial calculating capabilities of the Business Consultant. You will see the following menu:

Any loan, lease, or investment is characterized by a certain cash-flow scenario. You either receive money or pay money at certain points in time. For example, it may be that you are currently receiving monthly payments of $2000 against a $130,000 amount that you loaned out or invested ten months before. Cash is either flowing in or out (Ah, yes, the simple aspects of life!).

Tracking and analyzing different cash-flow scenarios is easy on the Business Consultant, but first, it's usually a good idea to draw a picture of the scenario. A cash-flow diagram is a good tool for visually representing different cash-flow scenarios. Here's a cash-flow diagram of a typical mortgage:



This diagram is drawn from the perspective of the borrower. The initial cash-flow is shown as *positive*, to represent the borrowed money *coming in* for the purchase of the house. The payments are shown as *negative*, to represent money *paid out* to whittle away at the borrowed money and interest over the years. A positive arrow means money coming in. A negative arrow means money paid out. You will use the **[+/–]** key to change numbers back and forth between positive and negative when you are describing a cash-flow diagram to your calculator.

Besides the above sign convention, you must keep a few other things in mind when drawing a cash-flow diagram. Just about any cash-flow scenario can be analyzed using the Business Consultant, but some scenarios require adjustment so that their cash-flow diagrams conform to the following rules:

1. The periods must be regular. A month is a common period, but the period can be quarterly, annual, or any defined length of time.

2. Only one cash-flow can occur per period. In addition, one initial cash-flow can occur at the beginning of the time-line, and one final cash-flow at the end. If more than one cash-flow occurs at any one point in time, they can be netted together. A cash-flow can be any amount, *including zero.*

3. The compounding period of the interest must be the same as the payment or cash-flow period

described in 1 above. If it is *not* the same, it is easily adjusted using the [ICONV] menus.

Any cash-flow situation that has regular periodic payments of the same amount each period (that amount can be zero) can be analyzed using the **[TVM]** (Time Value of Money) menu. Cash-flow situations where the payment amount per period varies are likely candidates for the **[CFLO]** menu. TVM problems using a period that is other than monthly usually require an interest conversion using the **[ICONV]** menu.

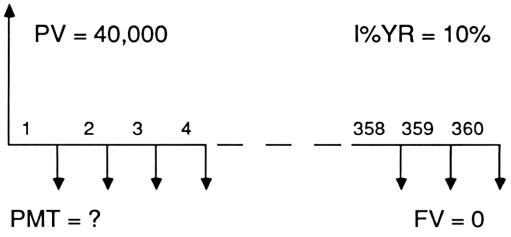
But all these rules and descriptions are meaningless if you don't understand them well enough to apply them to your situation. What follows are examples of common (and some uncommon) financial problems. There may well be one example that shows you exactly how to solve your situation. But if not, you will most likely be able to extract pieces of several examples to develop a cash-flow diagram for analyzing your specific cash-flow situation.

Remember: If a cash-flow scenario is complicated, the best way to assure that you are analyzing it correctly is to draw the correct picture first.

A TYPICAL MORTGAGE (PMT CALCULATION)

Example: A recently married couple, with stars in their eyes, have approached you for some friendly advice on buying their first house. They have about $10,000 that they plan on using for the down payment and they are looking for houses in the $50,000 dollar range. What kind of monthly payment are they going to be required to make? The interest rate is around 10% A.P.R. First, draw the picture...

Cash-Flow Diagram:



Explanation: This is a TVM problem. A typical mortgage is paid-off over a 30 year period, though 15-year mortgages have recently become more popular.

In the above diagram, N is the number of periods (30 years is 360 months). PV (Present Value) is $40,000, which is the amount the couple will need to borrow on a $50,000 house if they put $10,000 down. FV (Future Value) is zero because the loan will be completely paid off in 360 months. I%YR (annual Interest rate) is 10%, and, since it isn't stated otherwise, you can assume that interest is compounded monthly.

Keystrokes	**Comments**
[ ] [MAIN] [FIN] [TVM]	Move to the TVM menu.
[OTHER] 12 [#P/Y]	Set payments per year if not set to 12 already.
[END]	Set END MODE if not already set, because payments occur at the END of each month.
[EXIT]	Go back to TVM menu.
360 [N] 10 [I%YR] 40,000 [PV]	Store the known values.

0 [FV]	Make sure to store zero in FV, because a number may be there from a previous problem.
[PMT]	Calculate the payment.

Answer: PMT = -351.03

The sign convention dictates that this result is negative because the payment is money paid out each month, right? $351.03 is the amount they will be paying on their mortgage. Any property taxes and insurance will increase that monthly payment.

PV (PRESENT VALUE) CALCULATIONS

Example: Refer to the previous example. The couple decides that they can actually make $750.00 payments, plus they can cover taxes and insurance. What is the price range of the houses they can look at and afford to buy?

Explanation: You need to work the previous example before attempting this one. Much of the value behind the TVM menu is the ability to vary one value to see how it affects another value. Here, everything is the same except for the PMT, and you wish to see how this new payment affects the PV.

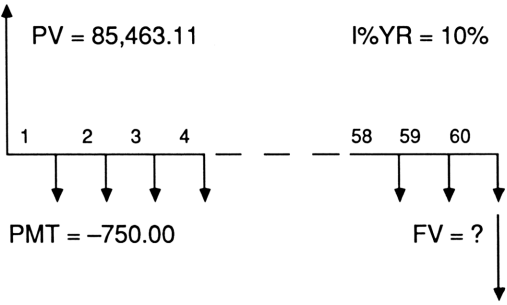
Keystrokes	**Comments**
750 [+/-] [PMT]	Store the new payment
[PV]	Calculate the maximum loan amount the couple can afford.

Answer: PV = 85,463.11

That's how much the couple can afford to finance. So, adding in the amount of the down payment they can make, they can actually look for a house in the $95,000.00 range.

FUTURE VALUE CALCULATIONS (FV)

Example: Again, refer to the previous example. If the couple decides to move after exactly 5 years of payments, what will be the balance left to pay on the mortgage?



Keystrokes	**Comments**
5 [x] 12 [N]	N = 60. They make 60 payments
[FV]	Calculate the balance.

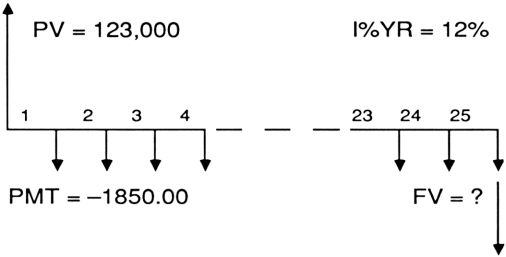
Answer: FV = –82,535.42

Notice on the cash-flow diagram that FV is the amount left to pay immediately after making the 60th payment. The calculator does not net the two cash-flows that occur at that one point in time. Remember, both *FV and PV are separate from any regular PMT that may occur at the same time!*

BALLOON PAYMENTS

Example: You have borrowed $123,000.00 at 12% A.P.R. At 12% A.P.R., the interest that accumulates by the end of the first month is 1% of the original balance, which comes to $1230.00, right? So, if $1230.00 was your monthly payment, you would always owe $123,000.00. (That is, you would be making "**interest-only payments.**")

After a lengthy discussion with the lender, you decide to make monthly payments of $1850.00 with the balance due at the end of the 25th month in the form of a "balloon payment." What will be the amount of that balloon payment?



Explanation: This example is very similar to the one immediately preceding. The FV will be the amount of principal left to pay on the loan after the 25th payment. By paying more than just interest only, you will have whittled the balance away just a bit by the time the whole note comes due.

Keystrokes	**Comments**
[ ] [MAIN] [FIN] [TVM]	Move to the TVM menu.
[OTHER] 12 [#P/Y]	Set payments per year if not set to 12 already.

[END]	Set END MODE if not already set, because payments occur at the END of each month.
[EXIT]	Go back to TVM menu.
	All the steps to this point are not necessary if you are at the TVM menu and the above parameters are already set.
25 [N] 12 [I%YR]	
123000 [PV]	
1850 [+/-] [PMT]	Store the known values.
[FV]	Calculate the balloon.

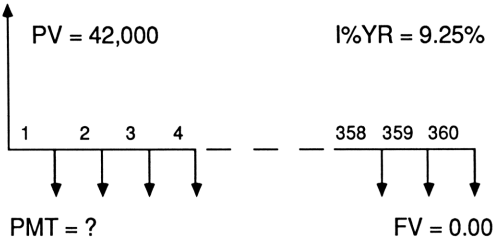
Answer: FV = -105,489.22

Remember: This answer is the Future Value, the amount you must pay *above and beyond* the final regular payment. (The entire payment made at that time will be 107,339.22, if you add in the regular payment.) The answer here is negative because it represents money that you will be paying out. Money paid out is negative; money coming in is positive.

Example: A loan of $42,000 is amortized over 30 years, with the balance due in 15 years. The interest rate is 9.25%. What is the monthly payment and what will be the amount of the final (balloon) payment?

Explanation: Since this loan is amortized over 30 years, the payment is calculated based on a term of 30 years. Then using that payment, the balloon amount is figured after 15 years of making payments.

Cash-Flow Diagram:



Solution: This is a straightforward TVM problem.

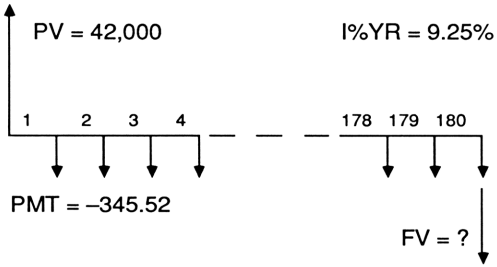
Keystrokes	**Comments**
[ ] [MAIN] [FIN] [TVM]	Move to the TVM menu.
[OTHER] 12 [#P/Y]	Set payments per year if not set to 12 already.
[END]	Set END MODE if not already set, because payments occur at the END of each month.
[EXIT]	Go back to TVM menu. All the steps to this point are not necessary if you are at the TVM menu and the above parameters are already set.
42,000 [PV]	Store the loan amount.
30 [x] 12 [N]	Store the term of the loan.
9.25 [I%YR]	Store the interest rate.
0 [FV]	The loan will amortize completely in 30 years.

[PMT]	Calculate the payment.

Answer: PMT = -345.52

Then it's a simple matter to calculate the balloon payment after a term of 15 years:

Cash-Flow Diagram:



Keystrokes	Comments
15 [x] 12 [N]	N = 180.
[FV]	Calculate the balance.

Answer: FV = -33,572.32

POINTS UP FRONT (PREPAID FINANCE CHARGES)

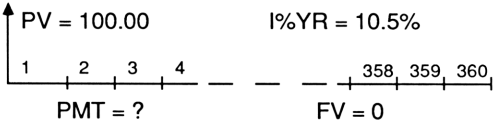
Example: In searching for potential financing for a house purchase, you explore F.H.A. financing and find that the interest rate on F.H.A. loans depends on the amount you are willing to pay up front (percentage points up front) as a finance charge. On the day you inquire, the terms on fixed rate, 30-year loans are 10.5% with 1/4 point (0.25% of the loan paid up front), 10.0% with 1/2 point, 9.5% with 2.5 points, and 9.0% with 4.25 points. Payments and

compounding are monthly. What is the F.H.A. really yielding on those loans?

Explanation: The points up front do not reduce the payment amount. They don't change anything about the loan except the net amount of money that you are borrowing. F.H.A. will loan you, say, $100.00, but at the same time, you will give them back a quarter (0.25%). Then they will figure your payment on a $100.00 loan at 10.5%, not on a $99.75 loan, right?

Here's how you figure the yield. First, choose a loan amount. Any amount will do because it's the interest rate that you are concerned with. $100.00 keeps things simple. Now, just calculate the payment as if there were no points up front. Then subtract the points from the loan amount (PV) and calculate the actual I%YR.

Cash-Flow Diagram:



Keystrokes	**Comments**
[ ] [MAIN] [FIN] [TVM]	Move to the TVM menu.
[OTHER] 12 [#P/Y]	Set payments per year if not set to 12 already.
[END]	Set END MODE if not already set, because payments occur at the END of each month.
[EXIT]	Go back to TVM menu.
	All the steps to this point are not necessary if you are at the TVM menu and the

	above parameters are already set.
0 [FV]	The loan will amortize completely in 30 years.
30 [x] 12 [N]	Store the term of the loan.
100 [PV]	Store the loan amount.
10.5 [I%YR]	Store the interest rate.
[PMT]	Calculate the payment.
[RCL] [PV] [–] 0.25 [%] [PV]	Subtract the points from the loan amount.
[I%YR]	Solve for the interest rate.

Answer: I%YR = 10.53

You can repeat the above steps three more times (starting at 100 [PV]) for each case of interest rate and points up front. (The answers are 10.06, 9.79 and 9.49, respectively.)

AMORTIZATION SCHEDULES

Amortization schedules (the schedule by which the balance of a loan is "killed") are frequently required in the banking and real estate industries. With the HP Business Consultant, you can easily display or print an amortization schedule for any TVM problem. From the MAIN menu, you can access the AMRT function by pressing [FIN] [TVM] [OTHER] [AMRT].

Example: Display or print the amortization schedule for the first five years of a $122,000.00, 30-year mortgage, at an interest rate of 0.8542% per month, with monthly payments. Show the interest paid, principal paid, and the balance of the loan at the end of each year.

Explanation: If you have a printer, just turn it on and position it so that it can "see" the calculator's infrared eye above the display. The amortization schedule will show the balance of the loan, the amount of interest paid to date, and the amount of principal paid to date at the end of each year for 5 years. (Assume the loan started in January.)

Keystrokes	**Comments**
[ ] [MAIN] [FIN] [TVM]	Move to the TVM menu.
[OTHER] 12 [#P/Y]	Set payments per year if not set to 12 already.
[END]	Set END MODE if not already set, because payments occur at the END of each month.
[EXIT]	Go back to TVM menu.
	All the steps to this point are not necessary if you are at the TVM menu and the above parameters are already set.
122,000 [PV]	Store the loan amount.
30 [x] 12 [N]	Store the term of the loan.
0.8542 [x] 12 [I%YR]	Store the annualized interest rate.
0 [FV]	The loan will amortize completely in 30 years.
[PMT]	Calculate the payment.

Answer: PMT = -1093.28

[OTHER] [AMRT]	Move to the AMRT menu.
12 [#P]	Amortize the first year.

12 [#P]	Amortize the first year.
Answer:	PAYMENTS: 1-12
	BALANCE = 121,356.45
	INTEREST = -12,475.81
[PRIN]	PRINCIPAL = - 643.55
[NEXT]	PAYMENTS: 13-24
	BALANCE = 120,643.75
	INTEREST = -12,406.66
[PRIN]	PRINCIPAL = -712.70

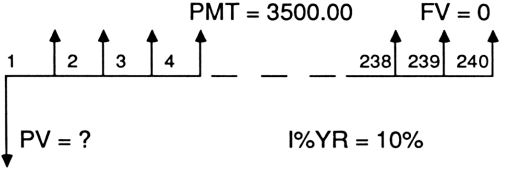
Continue pressing [NEXT] [PRIN] as above for the next three years (through the 60th payment).

ANNUITIES, IRA's, AND SAVINGS

Example: How much do you need to tuck away each month for the next 25 years at 10% A.P.R., so that at the end of those 25 years, you can draw $3,500.00 per month for the following 20 years? (Assume the interest rate is constant at 10%)

Explanation: This is a two-step problem. The first step in solving this problem is to calculate how much you need as a PV in order to draw $3,500 per year for 20 years at 10%.

Cash-Flow Diagram:



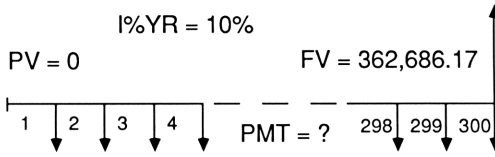
Keystrokes	**Comments**
[ ] [MAIN] [FIN] [TVM]	Move to the TVM menu.

[OTHER] 12 [#P/Y]	Set payments per year if not set to 12 already.
[END]	Set END MODE if not already set, because payments occur at the END of each month.
[EXIT]	Go back to TVM menu.
	All the steps to this point are not necessary if you are at the TVM menu and the above parameters are already set.
20 [x] 12 [N]	Store the term of the loan.
10 [I%YR]	Store the annualized interest rate.
0 [FV]	You will deplete your cash to zero in 20 years.
3500 [PMT]	Store the amount you're drawing each month.
[PV]	Calculate the amount you need to have saved in order to meet your cash demands for 20 years.

Answer: PV = -362,686.17

The second step is to make the above amount your Future Value (the amount you're shooting for) and figure what you need to save each month to meet that goal.

Cash-Flow Diagram:



Keystrokes	**Comments**
[+/–] [FV]	Store the new Future Value.
0 [PV]	Store the amount you're starting with.
25 [x] 12 [N]	You're going to be saving for 25 years.
[PMT]	Calculate the amount you need to tuck away each month.
Answer: PMT = –273.35	Can your budget handle that?

DIFFERING INTEREST AND PAYMENT PERIODS

When the compounding period of the interest differs from the payment period (for example, compounding daily with monthly payments), you need to convert to a new interest rate. This new interest rate will *compound* in accordance to the payment period, but it will *accumulate* the same amount of interest as the old rate.

When you press the [FIN] key from the main menu, one of the options that you can choose is [ICONV] (interest conversions). This is the option you will choose whenever the compounding period and the payment period differ.

ANNUAL PAYMENTS, MONTHLY COMPOUNDING

Example: As an Oregon grass seed farmer, you make annual, end-of-the-year payments on an equipment loan of $210,000.00 at an annual interest rate of 7.25% compounded monthly. The term of the loan is 7 years. What is your annual payment?

Explanation: The only burr in this problem is the fact that the payment period is different from the interest period. Well, the payment period always wins out. The period for this loan is one year. So all you need to do is figure an interest rate compounded annually that is equivalent to 7.25% compounded monthly:

Keystrokes	**Comments**
[ ] [MAIN] [FIN] [ICONV]	Move to the interest conversions menu.
[EFFCT]	Always choose this selection unless you're into CONTinuous compounding.
7.25 [NOM]	The nominal rate quoted was 7.25%...
12 [P]	...compounded monthly.
[EFF%]	Calculate the effective annual rate for monthly compounding.
Answer: 7.49582974213	(if you write down this number, every digit is important–use [DISP])
[EXIT] [EXIT]	Leave the ICONV menu.
[TVM] [STO] [I%YR]	Store the correct [I%YR]. You have to press [STO]. Otherwise the calculator will think you want to calculate.

[OTHER] 1 [#P/Y]	Set the number of payments per year.
[END]	Set END mode if it is not already set.
[EXIT] 7 [N]	A 7-year loan.
	Don't touch [I%YR].
210000 [PV]	Loan amount.
0 [FV]	It's completely paid off.
[PMT]	Calculate the payment.

Answer: PMT = -39,642.36

QUARTERLY PMT'S, MONTHLY COMPOUNDING

Example: You recently loaned $14 million to Universal Studios to begin production of what they feel will be the hit movie of the year (when it's completed). The contract is at 13.5% compounded monthly, with quarterly payments (annuity in advance) for the next 6 years. What is the payment amount?

Explanation: Annuity in advance means the payments happen at the BEGINning of the month. This calls for BEGIN mode. Other than that, you just need to do an interest conversion. Here's how it goes:

Keystrokes	**Comments**
[ ] [MAIN] [FIN] [TVM]	Move to the TVM menu.
6 [x] 4 [N]	Six years of quarterly payments.
14 [ ] [E] 6 [+/-] [PV]	Use [ ] [E] to enter the zeros on big numbers.

0 [FV]	No money left to pay at the end of the sixth year.
[OTHER] [BEG]	Set BEGIN mode.
4 [#P/Y]	Set the number of payments per year (quarterly payments.)
[EXIT] [EXIT] [ICONV]	Move to interest conversions menu.
[EFFCT]	Always choose this unless you want continuous compounding.
13.5 [NOM%]	Store the nominal interest rate.
12 [P]	Compounded monthly.
[EFF%]	Solve for the effective annual rate with monthly compounding (14.37%).
4 [P] [NOM%]	Calculate the equivalent quarterly compounded rate (13.65%).
[EXIT] [EXIT]	Leave the interest conversions menu.
[TVM] [STO] [I%YR]	Store the interest rate.
[PMT]	Calculate the payment.

Answer: PMT = 835,370.49

(A pretty hefty payment! But after all, you *are* dealing with Universal Studios, right?)

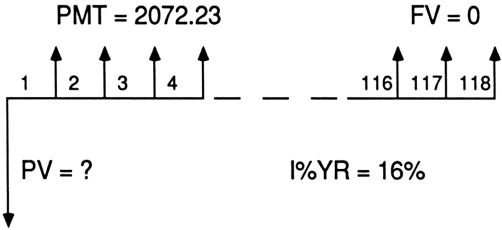
DISCOUNTED LOANS AND MORTGAGES

Example: The lending institution where you work is approached by another lender who wishes to discount (cash out) a contract she owns. She is currently receiving monthly payments of $2072.23 and the contract calls for those payments to continue for the next 118 months. The loan was originally for $175,000 and payments were figured on an annual interest rate of 11.75% amortized over 15 years of monthly payments **in arrears** (at the end of the month). Your lending institution agrees to buy the contract, provided they yield 16% on their investment. What does your lending institution pay for the contract?

Explanation: The first thing you need to do when approaching a problem like this is to figure out if there is any redundant information in the description. Screen out all the garbage and just get the facts down on a cash-flow diagram. The garbage, in this example, is the following: "The loan was originally for $175,000 and payments were figured on an annual interest rate of 11.75% amortized over 15 years of monthly payments." You don't need to know any of that.

What is the woman trying to sell? She's trying to sell a contract that entitles the buyer to receive 118 payments of $2073.23. That's it. Nothing more. C'est tout.

The buyer, naturally, will have to give the woman a considerable payment to gain the right to that payment stream. And the buyer is specifying that they want a 16% return on that initial investment. So the cash-flow diagram looks like this:



As you can see, this amounts to a simple PV calculation:

Keystrokes	**Comments**
[ ] [MAIN] [FIN] [TVM]	Go to the TVM menu.
[OTHER] 12 [#P/Y] [END]	Set the number of payments per year and END mode.
[EXIT]	Back to the TVM menu.
2072.23 [PMT]	Store the payment.
118 [N]	Store the term.
16 [I%YR]	Store the desired yield.
0 [FV]	Make sure FV is zero.
[PV]	Calculate the PV.

Answer: PV = -122,854.25

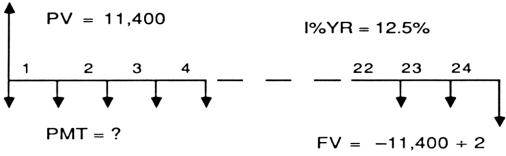
LEASES

There is very little difference between a lease and any other investment situation. Leases can still be drawn on a cash-flow diagram, and most can be analyzed using the TVM menu. A lease involves the lending of property that has a monetary value, rather than the lending of money itself.

The payments on leases usually are at the beginning of the month, which changes the looks of the cash-flow diagram a bit and requires the calculator to be set to **BEGIN** mode. If the payment schedule is something other than a uniform series of periodic payments, the lease may have to be analyzed using the CFLO menu.

Example: Employees of your company buy their own cars to use as company cars. Your company then leases the cars from the employees, in effect making the car payments for two years and agreeing to pay down the loan halfway during that time. After that time, the employee owns the car and can sell it or keep it as he or she so chooses. What will the company's payments be on an $11,400.00 car loan at 12.5% interest?

Explanation: This example is simple once you draw the picture. The loan amount (PV) is $11,400 and the company agrees to pay that amount down 50% over two years. The cash-flow diagram looks like this:



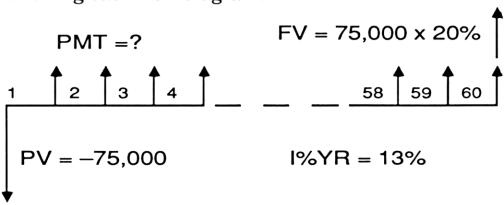
Keystrokes	Comments
[ ] [MAIN] [FIN] [TVM]	Move to the TVM menu.
[OTHER] [BEG] 12 [#P/Y]	Set BEGIN mode and 12 payments per year.

[EXIT]	Return to the TVM menu.
11400 [PV]	Store the amount of the loan.
[+] 2 [+/-] [FV]	Store the amount that the company agrees to pay the loan down to.
12.5 [I%YR]	Store the interest rate.
24 [N]	A two-year term.
[PMT]	Calculate the company's payment.

Answer: PMT = -325.63

Example: You are leasing out a piece of equipment that carries a price of $75,000.00. The term of the lease is 60 months (with the payment at the end of the month) and the **residual** value is 20% of the price. You figure the payment based on a 13% annual yield, but then you request 2 payments in advance. What is the payment and what is the actual yield if you take the advance payments into consideration?

Explanation: The first step of this lease is very similar to any loan with a balloon payment. In order to calculate the payment, just amortize it out using the following cash-flow diagram:

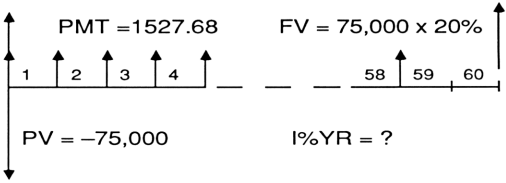


Keystrokes	Comments
[ ] [MAIN] [FIN] [TVM]	Move to the TVM menu.

[OTHER] [END] 12 [#P\Y]	Set END mode and 12 payments per year.
[EXIT]	Return to the TVM menu.
75000 [+/-] [PV]	Store the price of the equipment.
[x] 20 [%] [+/-] [FV]	Store the residual.
13 [I%YR]	Store the interest rate.
5 [x] 12 [N]	A five year lease.
[PMT]	Calculate the lease payment.

Answer: PMT = 1527.68

Now, if you request two payments up front, how does that affect your yield? Look at this cash-flow diagram:



This diagram adequately describes the situation. Two of the regular payments, the ones from the 59th and 60th periods, are shown at the beginning or the first period, right? But because the final two periods now have no regular monthly payment, you cannot use the TVM menu directly to solve for yield. You have to use the CFLO menu.

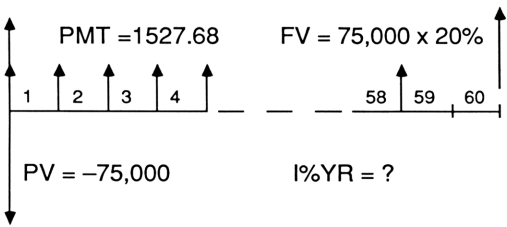
Press [ ] [MAIN] [FIN] and you'll see that one of your choices is [CFLO]. Whenever the payments in your cash-flow situation are uneven, the CFLO menu is where you'll turn.

UNEVEN CASH-FLOWS [CFLO]
(General Investment Analysis)

The picture of any cash-flow scenario can be painted using the CFLO menu and analyzed using the CALC menu. The Business Consultant is unique in the way it stores a series of cash-flow groups as a list of numbers in memory. Every cash-flow is easily reviewed or changed, making general investment analysis more accessible to the common human being than ever before.

IRR% [YIELD]

This is the cash-flow diagram from the previous example:



You can't find the I%YR on this problem directly using the TVM menu because the payments don't run all the way to the end of the timeline. The easiest way to deal with this problem is to use the cash-flow analysis capabilities of the Business Consultant.

The IRR% key under the [CALC] selection from the CFLO menu is used to calculate interest rates or yields for situations where the payment stream is uneven or interrupted. Here's how it's done:

Keystrokes	Comments
[ ] [MAIN] [FIN] [CFLO]	Move to the CFLO menu.
[ ] [CLEAR ALL] [YES]	Clear any numbers that you've already stored in this list. If you don't want to clear the list, you can name it and store it away. Then press [GET] [NEW].
1527.68 [x] 2 [–] 75000	Calculate the net initial cash-flow.
[INPUT]	Store the initial cash-flow in the cash-flow list.
1527.68 [INPUT]	Store the amount of the first cash-flow group.
58 [INPUT]	There are 58 cash-flows in group 1.
0 [INPUT]	You must account for every period on the cash-flow line, even if the amount of cash-flowing in a period is zero.
1 [INPUT]	There is one period with a zero cash-flow.
75000 [x] 20 [%] [INPUT]	This is the amount of the final cash-flow group.
1 [INPUT]	It occurs only once.
[CALC] [IRR%]	Calculate the internal rate of return for this cash-flow scenario.
[x] 12 [=]	Annualize the return.

Answer: 13.81

[IRR%] returns a periodic rate that needs to be annualized. In this case, the period was monthly so you had to multiply by 12 in order to annualize.

The result shows that, in the lease problem that starts on page 33, you are raising your yield from 13.5% to 13.81% by requesting the two payments up front.

SLIDING CASH FLOWS: A VALUABLE SKILL

When you are analyzing a complicated cash-flow scenario, it is often useful to slide cash-flows forward or backward along the cash-flow diagram to arrive at an equivalent cash-flow diagram that is easier to work with on the Business Consultant.

If you know the prevailing interest rate that applies to a cash-flow diagram, any single cash-flow can be moved one or more periods in either direction, provided you adjust the amount of the cash-flow according to that prevailing interest rate. Also, a group of cash-flows can be combined into a single cash-flow by sliding all the cash-flows in the group to one period and summing them.

Sliding cash-flows works for analysis purposes. It won't necessarily apply in the real world. For example, if your bank is looking for regular monthly payments on a loan, they probably won't be enthused if you move payments around to come up with an equivalent irregular payment schedule.

The next few pages take a look at the tools used for sliding cash-flows. The concepts are developed during this discussion, then they are followed by some hardcore examples to solidify your knowledge of this type of analysis.

NPV AND NFV
(Net Present Value, Net Future Value)

The NPV (Net Present Value) and NFV (Net Future Value) keys under the CFLO menu are excellent examples of functions that make use of sliding cash-flows.

The Net Present Value [NPV] key calculates the amount that all the cash-flows on the current list are worth if they are all slid to the left end of the time-line and adjusted according to the periodic interest rate that is stored in [I%].

Example: The payment schedule on an 11.25% A.P.R. loan calls for six $500.00 monthly payments followed by six $1000.00 monthly payments (end of the month). What was the original amount of the loan?

Keystrokes	**Comments**
[ ] [MAIN] [FIN] [CFLO]	Move to the CFLO menu.
[ ] [CLEAR ALL] [YES]	Clear any numbers that you've already stored in this list. If you don't want to clear the list, you can name it and store it away. Then press [GET] [NEW].
0 [INPUT]	Initial cash-flow in this scenario is zero.
500 [INPUT]	Store the amount of the first cash-flow group.
6 [INPUT]	There are 6 cash-flows in group 1.
1000 [INPUT]	The second cash-flow group consists of $1000 cash-flows...

6 [INPUT]	...for six months
[CALC] 11.25 [+] 12 [I%]	With NPV, you must supply the interest rate, right? I% is a **periodic** interest rate.
[NPV]	Calculate the Net Present Value for this scenario.
Answer: NPV = 8,395.68	All the cash-flows in the list are positive, and NPV is also positive. This is different from PV in the TVM menu. NPV only slides cash-flows, whereas PV is always assuming an investment/return situation. Had you done this sliding using PV (see page 40), you would have had to make some sign changes to keep it positive.

The Net Future Value NFV is the same as NPV except that the cash-flows are all slid to the right end of the time-line.

NUS

The Net Uniform Series (NUS) key does two things. First it calculates the NPV of a cash-flow scenario by sliding all the cash-flows to the left end of the time-line (adusting them according to the periodic interest rate) and summing them together. Then it amortizes this NPV out to the end of the time-line and returns the regular periodic payment scenario that would be equivalent to the uneven cash-flow scenario described in the current list.

Example: What would be the regular payment that would give equivalent results in the previous problem?

Solution: Simply press [NUS] to see that a payment of $743.00 per month at the periodic interest rate of 0.9375 is equivalent to six $500 payments, followed by six $1000 payments.

TOTAL

TOTAL simply adds up all the cash-flow amounts and returns this total amount of cash flow over time. TOTAL doesn't know that I% exists. It makes no adjustments for the interest rate. It does pay attention to the sign of the cash-flow. A negative cash-flow will reduce a positive overall TOTAL.

Example: What is the total of the cash-flows in the current list (keyed in on page 38)?

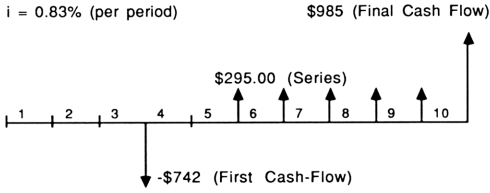
Solution: Press [TOTAL] to see $9000. (Six times 1000 plus six times 500).

USING THE TVM MENU TO SLIDE CASH-FLOWS

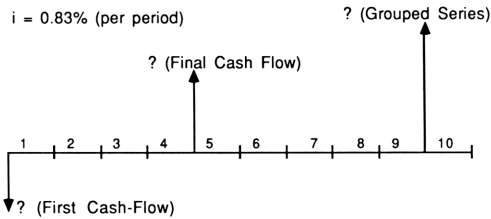
The TVM menu can be used for sliding single cash-flows or for netting a group of even cash-flows. The examples that follow demonstrate the process of sliding cash-flows on a cash-flow diagram. If you can develop a pictorial understanding of this process, you never have to brush shoulders with the mathematics involved.

Exercise: On the following cash-flow diagram, move the first cash-flow back (to the left) three periods, group the series of $295 cash-flows into one cash-flow at the end of the ninth period, and slide the final cash-flow back in time (to the left) six periods.

In other words, take this:



And turn it into this:



Keystrokes	**Comments**
[ ] [MAIN] [FIN] [TVM]	This sliding can all be done at the TVM menu.
0.83 [x] 12 [I%YR]	Store the interest rate making the periods monthly by multiplying by 12.
[OTHER] 12 [#P/Y] [END]	Set 12 payments per year and END mode.
[EXIT]	Go back to the TVM menu.
742 [+/-] [FV]	Store the amount of the first cash-flow to slide.

3 [N]	Set the number of periods that it's going to slide.
0 [PMT]	You're just sliding one cash-flow.
[PV]	Calculate the Present Value.
[+/–]	When you use the TVM keys for sliding cash-flows, you frequently have to change signs on the answers.

Answer: –723.83

0 [PV] 5 [N]	Ready to slide the group of cash-flows.
295 [PMT]	There are five payments, each $295.
[FV]	Slide four payments to the right, and add to fifth payment.
[+/–]	TVM changes the sign.

Answer: 1499.69

0 [PMT]	One more cash-flow to slide. It is going to slide to the left.
985 [FV]	The amount of the final cash-flow.
6 [N]	Slide it to the left six periods.
[PV] [+/–]	Calculate the amount after sliding. Change the sign.

Answer: 937.34

If you understand the material that has been reviewed in the last few pages, then you have a good grasp of the cash-flow diagram as a dynamic tool for analyzing problems in finance. The examples that follow will give you practice in using this broad grasp of cash-flow analysis. And they may apply directly to the solution that you are looking for within the pages of this, your faithful Pocket Companion.

WRAPAROUND MORTGAGES

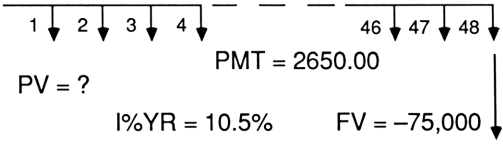
Example: As a prospective lender, you are approached by a property owner who wishes to refinance. The property that he owns has a single mortgage at 10.5% A.P.R for which he owes $2,650 per month for 48 months, plus a balloon payment of $75,000 at the end of the 48th month.

He wishes to borrow an additional $35,000 against the value of the property and have you assume the payment schedule of the initial mortgage. He would like this debt to you amortized over 20 years with a $40,000 balloon payment.

You agree to wrap his mortgage and to refinance everything at 13.5% plus a finance charge of 2% of the new money loaned. What is the property owner's monthly payment to you and what are you yielding by wrapping his mortgage?

Explanation: This example has to be approached in three steps. The first two steps involve some fairly simple calculations using the TVM menu. Then, the third step requires that the results of the first two steps be combined onto one cash-flow diagram to calculate the yield using [IRR%] under the CFLO menu.

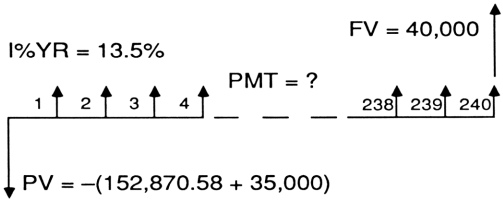
The first step is to calculate the balance that the property owner has yet to pay on his mortgage. The following cash-flow diagram illustrates the described payment schedule. These cash flows need to be slid to the left end of the time-line:



Keystrokes	**Comments**
[ ] [MAIN] [FIN] [TVM]	Go to the TVM menu.
[OTHER] 12 [#P/Y] [END]	Set the number of payments per year and END mode.
[EXIT]	Back to the TVM menu.
2650 [+/–] [PMT]	Store the payment.
48 [N]	Store the term.
10.5 [I%YR]	Store the original rate.
75000 [+/–] [FV]	Store the balloon.
[PV]	Calculate the PV.

Answer: PV = 152,870.58

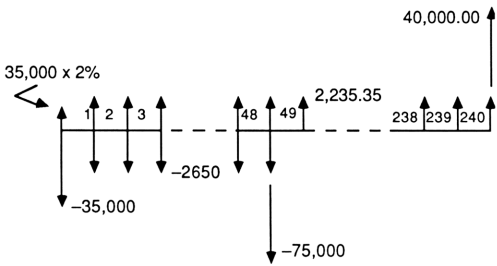
Next, figure his new payment based on the above present value plus $35,000.00 at 13.5% A.P.R.



Keystrokes	Comments
[+] 35000 [=] [+/–] [PV]	Store the new present value.
13.5 [I%YR]	The new interest rate.
40,000 [FV]	The balloon.
20 [x] 12 [N]	20 years of monthly payments.
[PMT] [STO] [0]	Calculate his payment to you; store it in register 0.

Answer: PMT = 2,235.35

And finally, put the whole shebang on one cash-flow diagram and figure the IRR%:



Keystrokes	Comments
[EXIT] [CFLO]	Move to the CFLO menu.
[ ] [CLEAR ALL] [YES]	Clear the current list. You may have to press [YES] twice if the list has a name.

35000 [+/–] [–] 2 [%]	Calculate the initial cash-flow.
[INPUT]	Store the initial cash-flow.
2650 [+/–] [+]	Calculate amount of cash-flow group one.
[RCL] 0	Fetch the last payment you calculated.
[INPUT]	Store the amount of cash-flow group one.
47 [INPUT]	That group lasts for 47 periods.
[↑] [↑]	Move to the previous cash-flow.
[RCL] [INPUT]	Bring that cash-flow to the calculator line.
[–] 75000	Calculate the net 48th cash-flow.
[↓] [↓] [INPUT]	Store the 48th cash-flow.
[INPUT]	That cash-flow occurs just once.
[RCL] 0	Fetch the payment.
[INPUT]	Store the amount of the next cash-flow group.
239 – 48 [INPUT]	That flow happens 191 times.
[↑] [↑]	Move to the previous cash-flow.
[RCL] [INPUT]	Bring that cash-flow to the calculator line.

[+] 40000 [ ] [↓]	Add the balloon.
[INPUT]	Store the final cash-flow.
[CALC] [IRR%]	Calculate the yield.
[x] 12 [=]	Annualize it.
Answer: 15.15	Not bad.

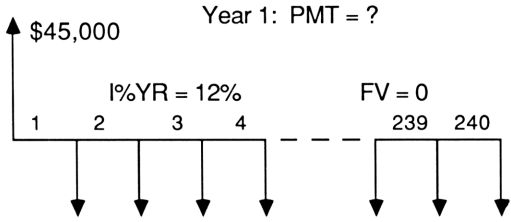
VARIABLE RATE LOANS

Variable interest rates need to be handled as a series of separate problems on any financial calculator because any single function has to assume that the interest rate is constant throughout the cash-flow line.

Interest rates on variable rate loans are generally tied to some other uncontrollable lending source (like Treasury Bills, or the Prime Rate). Many have ceilings set to control both the maximum rate and the maximum annual change in rates. If you are responsible for quoting payments on a variable rate loan, the only approach is to quote the worst case scenario. That is, assume interest rates will increase at the maximum rate per year up to the ceiling. A person who agrees to a variable rate loan should be able to handle the payments if the worse case scenario becomes reality.

Example: You are signing a contract to borrow $45,000 to be paid back with monthly payments for the next 20 years. The interest rate is currently 12% A.P.R., but on this variable rate loan, it can increase at 0.5 points per year to a maximum of 17%. What is the worse case scenario for your payments during the first 3 years? What is your maximum payment?

Explanation: In a variable rate loan, where the rate is adjusted annually like this one, you must treat each year separately and assume the interest rate is going to increase at the maximum allowed rate. You need to calculate the balance owed at the end of each year, and then recalculate the payment due on that balance using the new interest rate:



Keystrokes	**Comments**
[ ] [MAIN] [FIN] [TVM]	Move to the TVM menu. (Set 12 payments per year and END mode, if necessary.)
240 [N] 12 [I%YR] 45000 [PV] 0 [FV]	Store the knowns.
[PMT]	Calculate the payment amount for the first year.
Answer: PMT = –495.49	
12 [N] [FV]	Calculate the balance due at the end of 12 months.
[+/–] [PV]	Store this as PV.
240 [–] 12 [N]	Store the new term.
12.5 [I%YR]	Store the new interest rate.
0 [FV]	Re-amortize the loan.

[PMT]	Calculate the payment amount for the second year.

Answer: PMT = -510.84

12 [N] [FV]	Calculate the new balance due at the end of 12 months.
[+/-] [PV]	Store this as PV.
240 [-] 24 [N]	Store the new term.
13.0 [I%YR]	Store the new interest rate.
0 [FV]	Re-amortize the loan.
[PMT]	Calculate the payment amount for the third year.

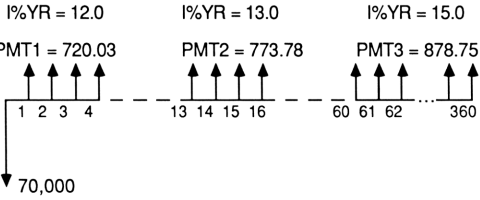
Answer: PMT = -525.93

Now, to calculate the maximum payment, repeat the steps above for each year until you reach an interest rate of 17%. Other than a computer program on a more powerful computer, there are no shortcuts... sorry. After many keystrokes (and some sore fingers), you'll find the maximum payment turns out to be -632.36.

BLENDED RATE MORTGAGES

Once a variable rate mortgage is drawn out, it is sometimes nice to calculate the interest rate that prevails over the entire scenario. This is done by going to the CFLO menu. The payment established for each change in the interest rate is keyed in as one cash-flow group.

Example: What is the overall rate earned on the following variable rate mortgage?

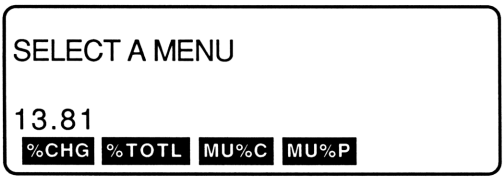


All you need to do is paint the correct picture and the Business Consultant takes over from there:

Keystrokes	**Comments**
[ ] [MAIN] [FIN] [CFLO]	Move to the CFLO menu.
[ ] [CLEAR ALL] [YES]	Clear the current list.
70000 [+/–] [INPUT]	Store the initial cash-flow.
720.03 [INPUT]	Store the amount of cash-flow group 1.
12 [INPUT]	There are 12 cash-flows in group 1.
773.78 [INPUT]	Store the amount of cash-flow group 2.
60 [–] 12 [INPUT]	There are 48 cash-flows in group 2.
878.75 [INPUT]	Store the amount of cash-flow group 3.
360 [–] 60 [INPUT]	There are 300 cash-flows in group 3.
[CALC] [IRR%]	Find the periodic return.
[x] 12 [=]	Annualize it.
Answer: 13.81	Voilá!

BUSiness Calculations: Percentage and Markup Problems

When you select the BUS option from the MAIN menu, here's what you'll see (the 13.81 is left over from the example on page 50):



Do that now: From the MAIN menu, press [BUS]. Then you can do any of the following examples:

%CHG

Example: In 1984, your gross income was $24,000. In 1985, it was $25,000. By what percentage did your income change?

Keystrokes	**Comments**
[%CHG]	Go from the BUS menu to the %CHG menu.
24,000 [OLD]	Key in your old gross.
25,000 [NEW]	Key in your new gross.
[%CH]	Solve for the percentage it changed.

Answer: %CHANGE = 4.17

Example: If you had received a 7% increase (instead of the 4.17%), what would have been your 1985 gross income?

Keystrokes	Comments
7 [%CH]	Continue from the previous example; assume your OLD gross is still in that register. So just specify the %CH you want.
[NEW]	And solve for the NEW gross this %CH would imply.

Answer: NEW = 25,680.00

(Now [EXIT] to the BUS menu.)

%TOTL

Example: Last year, out of your gross income of $25,000, you paid $5,602.50 in Social Security, State and Federal income taxes. What is your effective tax bracket; that is, what percent of your total gross did you pay in these taxes?

Keystrokes	Comments
[%TOTL]	Go from the BUS menu to the %TOTL menu.
25,000 [TOTAL]	Key in the TOTAL.
5602.50 [PART]	Key in the PART.
[%T]	Ask the question: "What percentage is the PART of the TOTAL?"

Answer: %TOTAL = 22.41

Example: In order to get down to an 18% effective tax bracket, to what level would you have to reduce your total tax bill?

Keystrokes	Comments
18 [%T]	Continuing from the previous example, just change the %T, since your TOTAL is still the same.
[PART]	Then solve for the PART this specified %T would produce.

Answer: PART=4,500.00

(Now [EXIT] to the BUS menu.)

MU%C

Example: A bookstore buys a certain title from a publisher for $10.80 per copy; that's the COST of the item to the bookstore. The store then marks it up to $18.00 for a retail price. What is the markup as a percentage of the cost?

Keystrokes	Comments
[MU%C]	Go from the BUS menu to the MU%C menu.
10.80 [COST]	Key in the COST.
18.00 [PRICE]	Key in the PRICE.
[M%C]	Solve for the Markup as a Percentage of Cost.

Answer: MARKUP%C = 66.67

Example: What should the bookstore sell this title for to achieve a 75% markup–as a percentage of cost?

Keystrokes	**Comments**
75 [M%C]	Continuing from the previous problem, just specify your desired M%C, preserving your COST as is.
[PRICE]	Then solve for PRICE.

Answer: PRICE = 18.90

(Now [EXIT] to the BUS menu.)

MU%P

Example: A bookstore buys a title from a publisher at $10.80 per copy, then marks it up to $18.00. What is the markup as a percentage of the PRICE (not the cost)? Another way to say this is: What percentage DISCOUNT off of the retail price did the publisher give to the bookstore? (You can think of MU%P as a discount.)

Keystrokes	**Comments**
[MU%P]	Go from the BUS menu to the MU%P menu.
10.80 [COST]	Key in the COST.
18.00 [PRICE]	Key in the PRICE.
[M%P]	Solve for the Discount–the Markup as a Percentage of Price.

Answer: MARKUP%P = 40.00

Example: What would be the bookstore's cost from the publisher to achieve a 45% discount (i.e. a 45% markup as a percentage of price)?

Keystrokes	**Comments**
45 [M%P]	Continuing from the previous problem, just key in your desired discount (M%P), leaving your PRICE as is.
[COST]	Then solve for the COST this discount would imply.

Answer: COST = 9.90

Using Lists And Statistics

Besides the storage registers 0, 1, 2, and 3, there is another way to store numbers–in the form of a list. To do this, you need to use the SUM option from the MAIN menu. Try that now: press [SUM]. Your display should now look something like this:

Example: For the past five years, your annual gross income has increased as follows:

1981	$14,400
1982	$19,200
1983	$22,200
1984	$24,000
1985	$25,000

Create a list from these five numbers.

Keystrokes	**Comments**
[GET] [•NEW]	This begins a new list. (If you already have a list started, then before "GETting" a new list for you, the calculator may ask you to name that previous list or get rid of it.) Now just

	key in the five values, pressing [INPUT] after each entry:

14,400 [INPUT]
19,200 [INPUT]
22,200 [INPUT]
24,000 [INPUT]
25,000 [INPUT]

Notice how the calculator always gives you a running total of all the numbers in your list.

Example: Now give your list of incomes a name so you can store it for later use. Use the name INCOM. After doing this, return to the MAIN menu.

Keystrokes	**Comments**
[NAME]	Now you're told to type in the name and press [INPUT]. So type:
I N C O M [INPUT]	Then:
[ ] [MAIN]	Return to MAIN menu.

Example: Upon rechecking your records, you discover that your 1984 income was $24,200–not $24,000. Go back and edit your INCOM list.

Keystrokes	**Comments**
[SUM]	Going to the SUM menu.
[GET] [INCO]	Open the INCOM list for editing.
[↓] [↓] [↓]	Moves the pointer down the list.
24,200 [INPUT]	Key in the correct amount and press [INPUT] to replace the old value. Notice

how the [↓] and [↑] keys move the pointer down and up the list.

Example: Use your INCOM list to calculate your average annual income for the past five years.

Keystrokes	**Comments**
[GET] [INCOM]	Open your INCOM list, if you're not there already.
[CALC]	Go to the CALC menu.
[MEAN]	Solve for the average (mean) income.

Answer: MEAN = 21,000.00

Example: Now create a new list of the years that correspond to your list of gross incomes. Name this list YEAR.

Keystrokes	**Comments**
[EXIT]	to the SUM menu. Then,
[GET] [*NEW]	Create a new list:
1 [INPUT] 2 [INPUT] 3 [INPUT] 4 [INPUT] 5 [INPUT] [NAME] Y E A R [INPUT]	

Example: Now find the kind of curve that best describes the trend of your INCOM list, as it is "graphed" against your YEAR list. Choose from Linear, Logarithmic, Exponential or Power curves.

Keystrokes	**Comments**
[GET] [INCO]	If you're going to analyze this curve, it has to be the

	one you're looking at when you go to the CALC menu.
[CALC] [MORE]	Now you go to the CALCulations menu and select the [MORE] option.
[FRCST]	Now choose the Forecasting calculation. This is the one with the curve-fitting capabilities.
[YEAR]	Choose your YEAR list as the X-variable--the one you're going to "graph" your INCOM against.
[LIN]	Now select a curve model.
[CORR]	Calculate the Correlation coefficient. The closer this is to 1.00, the better the curve fits. You want to find which of the four models has the highest correlation coefficient. (You may want to adjust the display to show you at least 3 decimal places.)
Answer: 0.960	(for LINear fit)
[EXIT]	Go back to choose another model.
[LOG]	Choose logarithmic model.
[CORR]	
Answer: 0.998	(for LOGarithmic fit)
[EXIT]	Go back to choose another model.

[EXP]	Choose exponential model.
[CORR]	
Answer: 0.939	(for EXPonential fit)
[EXIT]	Go back to choose another model.
[PWR]	Choose power model.
[CORR]	
Answer: 0.993	(for PoWeR fit)
Final answer:	The LOGarithmic curve is the best description of the trend of your annual income, because it had a Correlation Coefficient nearest to 1.00.

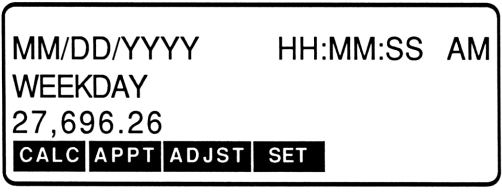
Example: Continuing the previous example, use a LOGarithmic curve to forecast your incomes levels for the next two years.

Keystrokes	**Comments**
[EXIT] [LOG]	Exits to choose the LOG model.
6 [XLIST]	You want to analyze year 6 (i.e. extrapolate the curve).
[YLIST]	
Answer:	
YLIST=26,651.93	Your predicted '86 income.
7 [XLIST]	Now predict year 7.
[YLIST]	

Answer: YLIST= 27,696.26

Setting the Time, the Date, or an Appointment

From the MAIN menu, if you press the TIME key, the display will then appear like this:



The following examples all begin from this menu.

Example: Set the date to be September 1, 1990.

Keystrokes	**Comments**
[SET]	Go from the TIME menu to the SET menu. Then, if the date now appearing on the upper left has slashes (/ /) in it, you need to use a date format of MM.DDYYYY.
	That is, you would key in...
9.011990	...for the date, and press...
[DATE]	OR, if the date on the upper left has periods (. .) in it, you would key in the date as DD.MMYYYY, or...

1.091990 [DATE]	You can alternate between the two different notations by pressing the [M/D] key on the SET menu.

Notice how the day of the week is automatically computed for the new date.

Example: Set the time to be 3:30 p.m.

Keystrokes	**Comments**
[SET]	Go from the TIME menu to the SET menu. If you see an AM or PM at the upper right, this means the clock is in a 12-hour mode; if not, it's in 24-hour mode (where you would refer to 3:30 p.m. as 15:30).
[12/24]	Set the clock to 12-hour mode (if it's not already there).
[A/PM]	Set the clock to PM (if it's not already there).
3.3000	Key in the time in HH.MMSS format (exactly 3:30 would be 3.3000. Finally, press
[TIME]	to set the clock to this new time.

(Now [EXIT] to the TIME menu)

Example: You have a nice smile, and you'd like to avoid becoming a proud denture owner in the future. Thinking ahead, you schedule your dental appointments well in advance. Set an appointment for 1:00 p.m. on September 2, 1990, with this message: "Prepare for dentist."

Keystrokes	Comments
[APPT]	Go from the TIME menu to the APPT menu.
[APPT1]	Select this appointment to be appointment number 1.
9.021990	(or 2.091990, depending on the date format).
[DATE]	This sets the date.
1.0000 [TIME] [A/PM]	Sets the time (use the [A/PM] key as necessary).
[MSG]	This prepares the machine to accept the message you type in. Type:
PREPARE FOR DENTIST	Then press
[INPUT]	to finish the message, then
[EXIT] [EXIT]	to get back to the TIME menu.

Note: To acknowledge any appointment alarm when it beeps, just press any key. To clear an appointment, just press [ ] [CLEAR ALL] while you're viewing that appointment.

TIME **CALC**ULATIONS

Example: Your brother and sister-in-law come to visit, bringing the good news that they are now expectant parents (Which means, of course, you will soon be an Uncle, or Aunt). The doctor has told them that the pregnancy has just completed its sixth week (42nd day). If full-term is 280 days, and today is September 1, 1990, when is the baby due?

Keystrokes	**Comments**
[CALC]	Go from the TIME menu to the CALC menu.
280 [-] 42 [=]	Figure the number of days remaining in the pregnancy.
[DAYS]	Store this as the actual days' count.
9.011990 [DATE1]	Key in today's date as DATE1.
[DATE2]	Solve for DATE2–the due date.

Answer:

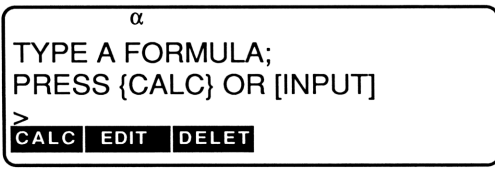
DATE2=04/27/1991.	The baby is due on Saturday, April 27, 1991.

Note: The two keys [360D] and [365D] will allow you to choose two alternate types of calendars (besides the actual one):

The 365D option chooses a calendar that ignores leap years, but has 365 days in a year. The 360D calendar is one which assumes only 30 days in each month. Only the DAYS key will calculate the ACTUAL number of days (including leap years) between DATE1 and DATE2.

Creating and Using Your Own Formulas

The HP Business Consultant lets you create your own formulas–and use them in menu form, just like you use the built-in ones. To create and store these formulas, you have to build a LIST of formulas. First, from the MAIN menu, press [SOLVE]. The display should now look like this:



Example: You are a professional carpetlayer, and you frequently give estimates for carpeting rooms and hallways. The formula you use to do this estimating is Cost = 1.1 x (Length x Width x Price)÷9, where Length and Width are measured in feet, and the price is per square yard.

Try putting this formula into your Business Consultant.

Solution: Once you've reached the SOLVE menu, type: CARP=1.1xLENGTHxWIDTHxPRICE÷9.

This is the formula.

Example: Now you are asked to provide a quote for carpeting a room that is 12 by 15 feet. The carpet selected is priced at $18 per square yard. What is your estimate for the job?

Keystrokes	Comments
	From the last example, you now have your carpet formula stored in the machine. Now press...
[CALC]	to use it to do a quote:
15 [LENG]	Key in the length.
12 [WIDT]	Key in the width.
18 [PRICE]	Key in the price.
[CARP]	Solve for the carpeting cost.

Answer: CARP = 396.00

Example: Another material you install is wall molding. Your standard bidding formula for this is:

Molding cost = 2.1xPricex(Length+Width)

Add this formula to your calculator's stored list of formulas.

Solution: Continuing from the previous example, press [EXIT] to get back to the SOLVE menu. Then:

MOLDING=2.1xPRCx(LENGTH+WIDTH)

Example: Continuing from the previous example, use that molding formula to give a bid on a 12 x 15 foot room, with molding priced at $1.00 per foot.

Keystrokes	Comments
[CALC]	The calculator will verify the molding formula, and then present a menu of its variables.
1.00 [PRC]	Key in the per-foot price.

15 [LENG]	Key in the room length.
12 [WIDT]	Key in the room width.
[MOLD]	Solve for the molding bid.

Answer: MOLDING=56.70

Example: Change your CARP formula to 1.05 x LENGTH x WIDTH x PRICE +9, instead of 1.1 x LENGTH x ... etc.

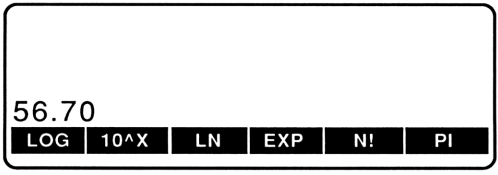
Keystrokes	**Comments**
	From the SOLVE menu,
use the [↓] and [↑] keys	until the list pointer is pointing to the CARP formula. Press
[EDIT]	to prepare to edit that formula. Then:
[→] [→] [→] [→] [→] [→] [→]	This moves the cursor to the proper place in the formula to edit.
[DEL]	This deletes the second "1" in 1.1
[INS] [INS] 05	Make room for and key in the replacement digits "05"
[CALC]	Now let the machine verify its validity.

Math Functions

Four math functions appear in gold on the keyboard:

[1/x]; [^]; [$\sqrt{x}$]; and [x^2].

Also, the [MATH] key on the main menu will bring up the following six additional functions:



The math functions operate on the most recent number to appear on the calculator line.

Example: Calculate the square root of 94.25.

Solution: 94.25 [ ] [$\sqrt{x}$]

Answer: 9.71

The square root function is a gold function on the keyboard, so you must press the gold key [ ] first. The **gold key** acts like a shift key on a typewriter. The function $\sqrt{x}$ is the "shifted" version of the [–] key.

Example: Calculate 2000 + 7! (seven factorial, which means 1 x 2 x 3 x 4 x 5 x 6 x 7).

Solution: 2000 [+] 7 [N!] [=] (N! is one of the functions on the [MATH] menu.)

Answer: 7040.00

The following example demonstrates computing a root that is not the square root of a number.

Examples: Compute the cube root of 157. Then compute the fifth root of 32.

Solutions: 157 [ ] [^] 3 [ ] [1/x] [=]. Then 32 [ ] [^] 5 [ ] [1/x] [=].

Answers: 5.39 and 2.00

(The key to the above example is that the nth root of a number is defined as that number raised to the 1/n power. However, don't let that last sentence scare you. If you don't want to deal with this kind of math, just ignore it.)

The MATH functions are there if you ever need them (chances are, you'll use them very seldom, depending on your occupation and whether or not you despise math), and they all work as demonstrated in the above three examples.

More About Clearing Things

The HP Business Consultant has a fairly healthy supply of memory, but it is finite (i.e., it can fill up). If you are using the powers of the Business Consultant to their fullest, you may occasionally bump up against the ominous error message "**INSUFFICIENT MEMORY**." If that happens, you need to start paying attention to managing your memory (well, not really *your* memory, but your calculator's).

The first thing to check is if there is anything stored under the SOLVE, SUM, or FIN menus that you won't ever use. Unwanted number lists, CFLO lists, and formulas should be cleared.

Press [ ] [MAIN] [SUM]. Do you need the list that is currently showing in the display? If not, press [ ] [CLEAR ALL] and answer [YES] to the questions that appear in the display. If you wish to keep this list and you haven't named it yet, press [NAME], type in a name, and press [INPUT].

Press [GET]. Are there any of these named lists that you can clear (besides [*NEW], of course)? To clear an unwanted list, press the key naming that list, then press [ ] [CLEAR ALL] [YES] [YES]. When you're done clearing unwanted lists under [SUM, press [ ] [MAIN] [FIN] [CFLO] and follow the procedure starting at the second sentence of the previous paragraph to clear any unwanted CFLO lists.

Finally, press [ ] [MAIN] [SOLVE]. Use the [↑] and [↓] keys to move through your list of formulas. Write down any formula that you don't anticipate using, then press [DELET] and answer the question "DELETE VARS ONLY, OR BOTH FORMULA AND VARS?" with the answer [BOTH]. To keep a formula in

memory, while recovering memory that is reserved for the variables in that formula, answer the question with [VARS] instead of [BOTH]. Whenever you calculate with that formula in the future, the calculator will reserve new space for the variables in that formula.

After you have worked through the above paragraphs, you have emptied all the memory that you are willing to empty and you should be able to proceed with what you were doing. If you still keep bumping into the message INSUFFICIENT MEMORY, you may be attempting to input a formula or list that is too long for your Business Consultant, or you may need to be more discrete in deciding what to retain under each menu.

A FINAL WORD...

This is where your Pocket Companion ends. We hope you continue to enjoy it, seeking out its help whenever you are at all bewildered or baffled by your Business Consultant.

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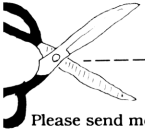

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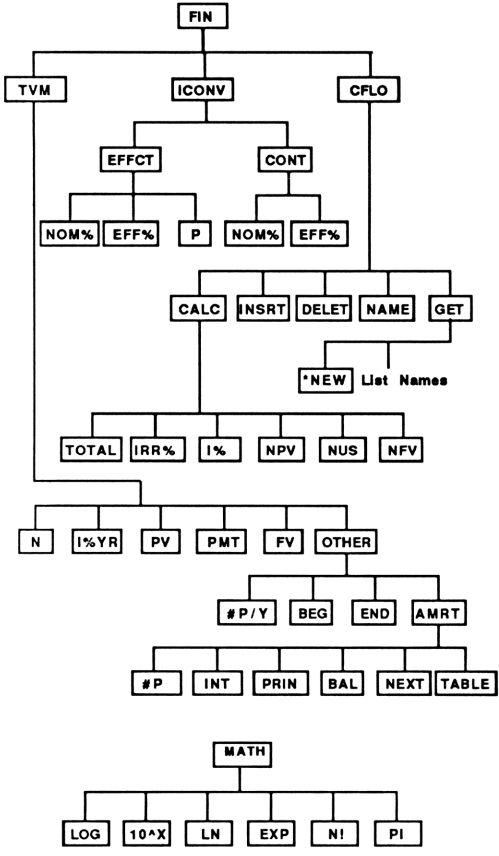
Menu Maps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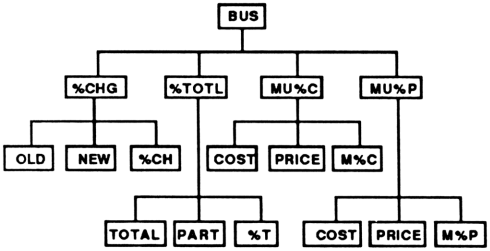
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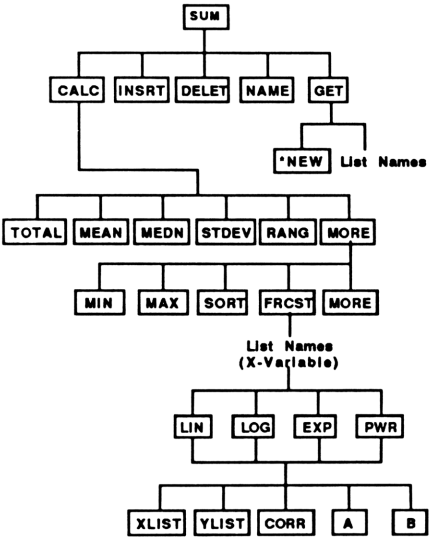
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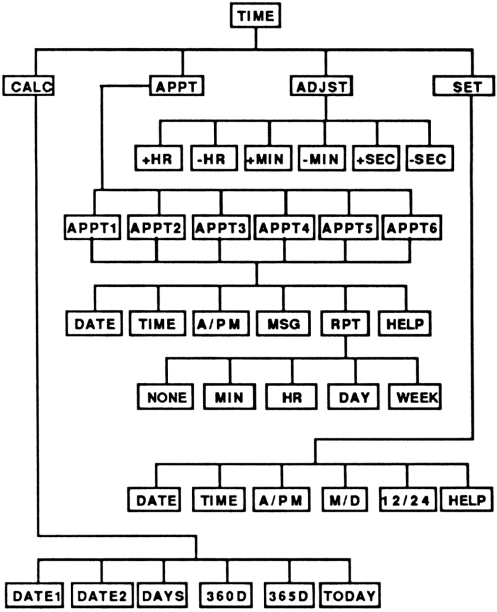

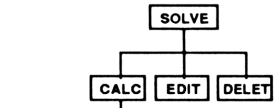

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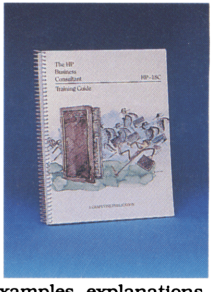

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