THE HP-12C CALCULATOR
FOR THE RESIDENTIAL AGENT

THE EASY WAY TO LEARN THE LISTING & SELLING FUNCTIONS OF THE HP-12C CALCULATOR!

CONTENTS INCLUDE:

* ALL HP-12C LISTING & SELLING FUNCTIONS
* EASY-TO-FOLLOW, STEP-BY-STEP INSTRUCTIONS
* 119 PRACTICE PROBLEMS
* HOW TO PROGRAM YOUR 12C

SPECIAL BONUS!
6 Ready-to-Use Programs for Your 12C:

* **Conventional Qualifying**
* **V.A./F.H.A. Qualifying**
* **Maximum A.R.M. Payment**
* **After-Tax Payment**
* **Loan Amortization**
* **Annual Percentage Rate**

By Allen F. Hainge, G.R.I.
Real Estate's Most Dynamic
Calculator and Financing Trainer

A WORD (OR TWO) ABOUT THIS MANUAL

WHO IS THE MANUAL FOR?

"The HP-12C For The Residential Agent" is written exclusively for the residential sales associate. It does not attempt to present information the residential salesperson doesn't need in his or her daily real estate activity.

It is designed to increase your ability to give better, more professional service to your customers and clients, thereby enabling you to close more sales and take more listings.

SOME SUGGESTIONS FOR USING THIS MANUAL

1. The material is presented in an easy to follow, step-by-step format. Therefore, start at the beginning and take it "one step at a time." Do the practice problems included in each chapter, then do the additional practice problems for that chapter (beginning on page 75) before going on to the next chapter.

2. Take your time. Work though the manual in short sessions. Then, when you come back to it the next time, take a moment to review the chapter you last worked on so that it will be reinforced before you move on to new material.

3. Use your HP-12C "Owner's Handbook and Problem-Solving Guide" as a supplement to this material. This manual refers you back to it several times for further study on certain points, such as the "stack registers." In addition, there is valuable information on such items as battery replacement and error messages which will supplement your study of this manual.

4. Tell yourself, "I can do it!" Perhaps the biggest barrier to learning the HP-12C is "calculator phobia." The 12C looks complicated, yet it is far easier to use than most other calculators, once you have it explained in a clear, step-by-step manner. Anyone can learn to use the 12C: all you need is this manual and a belief that you can do it. Remember, "Whether you think you can or can't, you're right!"

A FINAL WORD

Your comments and suggestions are both welcome and appreciated. If you'd like to write, here's the address: Allen F. Hainge, G.R.I., Allen F. Hainge Seminars, 8813 Side Saddle Road, Springfield, Va. 22152.

WHAT WILL THIS BOOK DO FOR YOU?

"The HP-12C Calculator for the Residential Agent" will explain the HP-12C financial calculator in plain English: no frustrating examples which don't pertain to your day-to-day activities, no hard to follow explanations. Just a step-by-step process which is tailor-made for you, the residential sales associate.

In short, it will unlock a powerful tool for you. In doing so, it will help you give better service to buyers and sellers, and it will help you take more listings and make more sales.

ABOUT THE AUTHOR

Allen F. Hainge, G.R.I., is a former Million Dollar Sales Club member who has been a professional real estate sales trainer since 1977. He has previously served as Director of Training for both Merrill Lynch Realty, Virginia, and for Century 21 of the Mid-Atlantic States, as well as Director of Sales and Management Development for Century 21 of the Southeast.

Currently, he teaches a total of 12 courses for the REALTOR® Institute programs in 6 states (Virginia, Maryland, West Virginia, Tennessee, Wisconsin and Pennsylvania), he is the financing and calculator instructor for the Northern Virginia Association of REALTORS®, the nation's largest real estate board, and he conducts seminars for real estate boards, franchises and companies throughout the United States as President of his own training firm, Allen F. Hainge Seminars.

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CHAPTER I: THE HP-12C KEYBOARD

KEY ARRANGEMENT

The HP-12C has 39 keys: 38 regular sized keys and one large, ENTER key, arranged in four rows of 10 keys each. The last 4 keys in each row are, with the exception of one key, similar to the number, decimal and "operation" keys (add, subtract, multiply and divide) found on any hand-held calculator.

There is a significant difference, however, between this keyboard and the keyboards of other financial calculators in that most keys have two or even three functions: the function printed on the key itself, the function printed above the key and the function printed below the key.

Learning to use the HP-12C begins with learning to identify the location of each key through the use of a key numbering system, then learning what each key does.

KEY NUMBERING

For purposes of key identification (and for use later when learning how to program the 12C), each key can be given a number. The 3rd key from the left in the 2nd row (%T), for example, is key #23. This shorthand tells us which row the key is in and where on that row, starting from the left, the key is located.

The %T key is designated "key 23" because it is in the 2nd row (hence, the "2") and is the 3rd key from the left in that row (hence, the "3"). Key #43 would be the g key: 4th row, third from the left.

The 10th key in each row is always the "0" key. The - key would be key #30: 3rd row, 10th key. Key #40 would be the + key.

One key, the ENTER key, could be numbered either 36 or 46, since it is the sixth key from the left in both the 3rd and 4th rows. Its correct label, however, is key #36.

Locate the following keys before proceeding to the next section:

#14 **PMT**
#35 **CLx**
#36 **ENTER**
#40 **+**
#45 **RCL**

KEY FUNCTIONS

As mentioned, most keys perform 2 or even 3 operations. Take, for example, **key #11:**

- The function indicated on the face of the key is **n**, which stands for "number of payments."
- The function indicated above the key in gold is **AMORT**, which stands for "amortize." This function is activated by first pressing the gold **f** key (key #42), releasing it, and then pressing the **n** key.
- The function indicated below the key in blue is **12x**. Activating this function causes a number in the display to be multiplied by 12 and entered as the total number of payments for a loan ; it is accessed by first pressing the blue **g** key (key #43), releasing it, and then pressing the **n** key.

Key #13, for example, can perform the following operations:

PV Computes or enters "present value"
f NPV Computes "net present value" (NPV)
g CFo Computes or enters a "cash flow" (CFo)

CHAPTER II: SOME BASIC KEYS

The following keys are basic to operating the 12C:

ON Key #41. Turns calculator on & off. When the calculator is turned off, anything in the display or in any of the memories will be there when the calculator is turned on again.

f Key #42. When pressed before another key, this key activates the upper (gold) function of the key. If, for example, key #15 were pressed by itself, the FV (future value) function would be activated; if f were pressed before pressing FV, the IRR (internal rate of return) function would be activated.

g Key #43. When pressed before another key, this key activates the lower (blue) function of the key. If key #15 were pressed after pressing g, the Nj function (used to store multiple cash flows) would be activated.

ENTER Key #36. Enters whatever number is in the window into the "stack registers" so that an operation (+, -, ÷, etc.) can be performed on it. The stack registers will be covered in detail in Chapter V and in Appendix A.

CLx Key #35. Clears the display. As will be explained later, this key is the least powerful of several clearing functions, since it does not clear any other data stored in the "stacks," the loan registers or any other storage registers.

CHAPTER III: TURNING ON THE 12C

The 12C is turned on by pressing **ON** (key 41) located in the lower left hand corner of the keyboard. The same key also turns the calculator off when pressed again. There is also an automatic "off" function. If the calculator is left on with no operations being performed for 8-17 minutes, if will shut itself off as a battery-saving measure.

One nice feature of the 12C is the fact that whatever was in the display (window) when the calculator was turned off will re-appear when the calculator is turned on again. More importantly, everything that was stored in the 12C's memory is also retained. This will be covered in detail later.

INDICATORS IN THE DISPLAY

If you have not already done so, turn your calculator on. You might see various "indicators," or symbols in the display, in addition to numbers. Review the following list of indicators and perform the operation designed to eliminate them if they are now showing in the display.

IF YOU SEE	PRESS	EXPLANATION
BEGIN	**g END** (#43 & #18)	Calculator was set to calculate interest from the beginning of the period; real estate interest is calculated from the end of the period.
D.MY	**g M.DY** (#43 & #28)	Calculator was in the "day-month-year" mode; it is now set to the "month-day-year" mode.
c	**STO EEX** (#44 & #26)	Calculator was set on compound interest; real estate interest is simple interest.
PRGM	**f P/R** (#42 & #31)	Sets calculator in "run" mode, ready to do problems.

SETTING THE NUMBER OF DECIMAL PLACES

Internally, the 12C uses non-rounded numbers. You will not usually want to see the entire, non-rounded number. Therefore, the number of decimal places can be set to the number you want to see. This is accomplished by pressing **f**, followed by the number of decimal places you want.

Turning on the 12C

Do the following exercises. Disregard whatever you might see in the display when you first turn the calculator on.

	PROCEDURE	PRESS	DISPLAY
1.	Turn the calculator on	ON	
2.	Key in the number "25"	25	25.
3.	Set to 2 decimal places	f 2	25.00
4.	Set to 5 decimal places	f 5	25.00000
5.	Return to 2 decimal places	f 2	25.00
6.	Turn the calculator off	ON	

	PROCEDURE	PRESS	DISPLAY
1.	Turn the calculator on	ON	25.00
2.	Enter the number 1.78	1.78 ENTER	1.78
3.	Multiply by 36.2	36.2 X	64.44
4.	Set to 5 decimal places	f 5	64.43600
5.	Return to 2 decimal places	f 2	64.44

RETAINING DATA IN THE DISPLAY

Any number in the display when you turn the calculator off will reappear when the calculator is turned on again. If, for example, the result of the above problem, 64.44, was in the display when you turned the 12C off, it will be there when you turn it on again.

CHAPTER IV: BASIC MATH OPERATIONS

The HP-12C uses a mathematical system unlike most other calculators. Normally, 2 + 3 is calculated by entering "2 + 3 =" and getting an answer. The 12C's system is different, and, while awkward at first, it is actually a simpler, faster system for more complicated problems. The basic procedure is as follows:

- Key in the first number ("2" in the above example).
- Press the ENTER key. The number "2" is now entered and is ready to be worked on.
- Key in the next number ("3").
- Enter the operation you want performed ("+" in the above example).

The steps for adding "2 + 3" would be:

	PRESS	DISPLAY
1.	2	2.
2.	ENTER	2.00 (Assumes you are showing 2 decimal places)
3.	3	3.
4.	+	5.00

Once an answer is in the display, it can be worked on if you want to go directly to another problem. If you now wanted to add 45 to the answer showing in the display, for example, you would simply enter 45 +. The answer, "50," would appear in the display. There is no need to clear the display or to "enter" the previous result.

CLEARING MISTAKES

Mistakes made when entering data are cleared by pressing CLx, key #35. If you wanted to add 2 + 3 but pressed "4" instead of "3," for example, you would remove the 4 by pressing CLx. The first part of the problem (2 ENTER) would still be in the calculator, ready to be worked on.

PRACTICE PROBLEMS: BASIC MATH OPERATIONS

PROBLEM #1: Divide 167 by 35

	PRESS	DISPLAY
1.	167 ENTER	167.00
2.	35 ÷	**4.77**

To see the answer to 5 decimal places, do the following:

3.	f 5	**4.77143**
4.	f 2	4.77

PROBLEM #2: Subtract 7 from 21

	PRESS	DISPLAY
1.	21 ENTER	21.00
2.	7 -	**14.00**

Notice that the display did not have to be cleared to begin this problem. If you did clear it, by pressing **CLx**, that's fine, but it is an unnecessary step. Once you finish a calculation, you can go right on to the next one without clearing the display.

PROBLEM #3: Multiply 68.5 by 12

	PRESS	DISPLAY
1.	68.5 ENTER	68.50
2.	12 x	**822.00**

PROBLEM #4: 2 + 6 + 8 - 5

	PRESS	DISPLAY
1.	CLx	0.00
2.	2 ENTER	2.00
3.	6 +	8.00
4.	8 +	16.00
5.	5 -	**11.00**

PROBLEM #5: $\frac{(3x4) + (5x6)}{7}$

When doing problems involving multiple operations, work the problems **inside the** parentheses first. The steps to this problem would be as follows:

- Multiply 3 x 4
- Multiply 5 x 6
- Add the results of the first 2 steps
- Divide the answer by 7

	PRESS	DISPLAY
1.	3 ENTER 4 x	12.00
2.	5 ENTER 6 x	30.00
3.	+	42.00
4.	7 ÷	**6.00**

A feature called the "stack registers" is allowing you to do the 4 steps of this problem without storing any of your answers or having to re-enter any data. The stack registers are explained fully in Chapter V and in Appendix A.

EXERCISE

Complete the practice problems for "Basic Calculator Operations" found on page 75.

CHAPTER V: USING MEMORY FUNCTIONS

One of the main advantages the HP-12C has over other calculators is its increased memory capacity. Because of this, you rarely need to use pencil and paper when working as you do with most other calculators.

There are four storage areas in the HP-12C. Each is explained fully in the following sections.

DATA STORAGE REGISTERS

Up to 20 numbers can be stored simultaneously using the data storage registers. These 20 "storage boxes" are activated by pressing the **STO** key (key #44), followed by the number of the register where you want to store the particular number (0-9 or .0-.9). Recalling a particular number is accomplished by pressing **RCL** (key #45) and the number of the register you want to recall.

PROBLEM #6: USING DATA STORAGE REGISTERS

Store and recall the following numbers: 2, 28 and 145. Be sure to enter the decimal point (.) in steps 4, 6, 8 and 9.

	PROCEDURE	ENTER	DISPLAY
1.	Key in the 1st number	2	2.
2.	Store in register "0"	STO 0	2.00
3.	Key in the 2nd number	28	28.
4.	Store in register ".0"	STO . 0	28.00
5.	Key in the 3rd number	145	145.
6.	Store in register ".6"	STO . 6	145.00
7.	Recall 1st number	RCL 0	2.00
8.	Recall 2nd number	RCL . 0	28.00
9.	Recall 3rd number	RCL . 6	145.00

Using Memory Functions

PROBLEM #7: USING DATA STORAGE REGISTERS

You want to store monthly taxes, insurance and p.m.i. for future use in a qualifying program. Taxes are $60.00, insurance is $20 and p.m.i. is $32.

	PROCEDURE	PRESS	DISPLAY
1.	Key in & store taxes	60 STO .0	60.00
2.	Key in & store insurance	20 STO .1	20.00
3.	Key in & store p.m.i.	32 STO .2	32.00
4.	Recall taxes	RCL .0	60.00
5.	Recall insurance	RCL .1	20.00
6.	Recall p.m.i.	RCL .2	32.00

PROBLEM #8: USING DATA STORAGE REGISTERS

You are driving to your office and see a f.s.b.o. sign. The number on the sign is 644-4374. A while later, you see another one: 644-8537. Store both numbers in your calculator so that you can call the owners later.

	PROCEDURE	PRESS	DISPLAY
1.	Key in & store the 1st number	6444374 STO 1	6,444,374.00
2.	Key in & store the 2nd number	6448537 STO 2	6,448,537.00
3.	Recall the 1st f.s.b.o. number	RCL 1	6,444,374.00
4.	Recall the 2nd f.s.b.o. number	RCL 2	6,448,537.00

CLEARING THE DATA STORAGE REGISTERS

There are three ways to clear a number from a particular data storage register:

- Place a "0" in the display and store it in the register you want to clear. Pressing **0** followed by **STO 1** would place a "0" in storage register 1, thus replacing the "6,444,374.00" stored there in problem #8 above.
- Store a new number in the register; the old number will be overridden
- Use the "Clear Register" function. This method will be explained in chapter VI.

FINANCIAL REGISTERS

The financial registers are used to store the elements of a loan: number of payments, interest rate, loan amount and p.i. payment. Loan elements are automatically stored as you enter them. The use of these registers will be covered in detail in Chapter IX.

THE "LAST X" REGISTER

The "last X" storage register also works automatically. The last number you entered before adding, subtracting, multiplying or dividing is kept there and can be recalled at any time by entering g LSTx (#43 & #36). Recalling this number is useful when you have to do repeated calculations using the same number, as in the following example.

PROBLEM #9: USING LSTx

Your company earns an 8% commission on sales of $80,000, $90,000 and $115,000. What is the total of the 3 commissions? (The number you will enter last before an operation will be ".08"; this will be recalled instead of having to enter it each time you calculate a commission)

	PROCEDURE	PRESS	DISPLAY
1.	Calculate the $80,000 commission	80000 ENTER .08 x	6,400.00
2.	Calculate the $90,000 commission	90000 g LSTx x	7,200.00
3.	Calculate the $115,000 commission	115000 g LSTx x	9,200.00
4.	Total the 3 commissions	+ +	22,800.00

NOTES:

1. When using LSTx, you do not have to press ENTER when entering each succeeding number (90,000 and 115,000 in the above problem).

2. Step #4 above, adding together the 3 commissions, was possible because the answers to steps #1 & 2 were automatically stored in the stack registers, a procedure which is covered in the next section and in Appendix A. For now, remember that the answers to your last 3 operations (add, subtract, multiply, divide, getting a loan payment, etc.) are automatically stored, ready for you to use again.

STACK REGISTERS

The final memory area, the stack registers, is automatically activated each time you do a calculation. The stack registers allowed you to automatically total the three commissions in the above problem when you did step #4 and are extremely valuable when doing long, complicated problems.

The stack registers are extremely useful and can help with everyday problems and with programming. For a complete explanation of the stack registers, and of what they can do for you once you understand them, see Appendix A, beginning on page 69. It will also be helpful to review pgs. 188-199 in your HP-12C Owner's Handbook.

EXERCISE

Before going on to the next chapter, complete the problems for "Storage Registers" beginning on page 75.

CHAPTER VI: CLEARING REGISTERS

Just as there are several types of storage registers (stacks, last x, data storage, financial and, as will be covered later, program storage), there are several ways to clear memories.

f PREFIX Key #36, preceded by f. Clears a prefix (an f or g key) you might have inadvertently entered. No other memories are cleared.

CLx Key #35. This clears only the display and the "X" register. Any data stored in other memories is not lost. This is the least powerful of the clearing functions.

f FIN Key #34, preceded by f. Clears only the financial (loan) registers. Any data stored in other memories is not erased, and the window is not cleared.

f REG Key #35, preceded by f. This is the most powerful clearing key, since it clears all registers except what you have stored in program memory. The financial, data storage and stack registers are all erased, as are LSTx and the display.

f PRGM Key #33, preceded by f. This clears all programs from memory. As a safeguard against erasing programs accidentally, you must be in "program mode" (covered later) in order for it to work.

Do the following before proceeding to the next chapter:

1. Clear your financial registers by pressing f FIN. Notice that whatever was in the display is not cleared.
2. Clear all registers by pressing f REG. The display is cleared, as are all data storage registers, loan elements and the stack registers.

CHAPTER VII: THE CALENDAR FUNCTION

The HP-12C has a built-in calendar which allows you to determine future or past dates. The calendar will handle dates from October 15, 1582 through November 25, 4046 -- a long enough span to cover most real estate careers!

2 METHODS FOR CALCULATING DATES

DAY-MONTH-YEAR

When dates are entered or displayed using this method, first the day, then the month, then the year will be shown. If you wish to display day-month-year, you begin a date problem by entering **g D.MY** (key #27) and following these steps when entering a date:

1. Key in the day; you can use either 1 or 2 digits. The second of the month would be entered as "2"; the tenth would be entered as "10".

2. Press the decimal point key (.).

3. Key in the month. You must use 2 digits. January, for example, would be entered as "01"; October would be entered as "10".

4. Key in the year. You must use 4 digits ("1989").

MONTH-DAY-YEAR

Using this method, the month, then the day, then the year will be shown. If you want month-day-year, press **g M.DY** (key #28) and follow these steps to enter dates:

1. Key in the month; you can use either 1 or 2 digits. October, for example, would be "10"; January would be "1"

2. Press the decimal point key (.).

3. Key in the day. You must use 2 digits. The first of a month, for example, would be "01"; the tenth would be "10".

4. Key in the year. You must use 4 digits ("1989").

OTHER KEYS USED IN THE CALENDAR FUNCTION

DATE Key #16. When pressed after **g**, **DATE** calculates a past or future **date**, once you enter a starting date and a given number of days. The **day** of the week will also be shown in your answer.

▲DYS Key #26. When pressed after **g**, **▲DYS** calculates the number of days between 2 given dates. Again, you must first enter a starting date before using this key.

DETERMINING FUTURE DATES

You can determine a future settlement date (or any other future date) quickly and easily using the 12C. The following problem uses the **M.DY** format.

PROBLEM #10: DETERMINING A FUTURE DATE

A buyer is signing a contract on February 5, 1989 and wants to go to settlement within 45 days. What is the projected settlement date?

	PROCEDURE	PRESS	DISPLAY
1.	Set the month-day-year format	g M.DY	
2.	Enter contract date	2.051989 ENTER	2.05
3.	Calculate settlement date	45 g DATE	3,22,1989 3

NOTES:

1. The settlement date would be March 22, 1987.

2. The "3" in the right hand corner indicates the day of the week; in this case, a Wednesday. (Monday = 1, Tuesday = 2, etc.).

3. The contract date shown in step 2 is rounded to 2 decimal places when the number is displayed, assuming your calculator was set to 2 places.

DETERMINING PAST DATES

The only step you do differently when calculating dates in the past is to press **CHS** (key #16, "change sign") after entering the number of days you are looking for, as in the following problem.

PROBLEM #11: DETERMINING A PAST DATE

Determine a date 140 days prior to January 30, 1989, using the **D.MY** function.

	PROCEDURE	PRESS	DISPLAY
1.	Set the day-month-year format	**g D.MY**	
2.	Enter the known date	30.011989 ENTER	30.01
3.	Key in the number of days prior	140 CHS	-140.
4.	Calculate the prior date	g DATE	12,09,1988 1

NOTES:

1. 140 days prior was Monday, September 12, 1989.
2. Remember: to calculate days past, press **CHS** after entering the number of days, as you did in step 3.

DETERMINING DAYS BETWEEN DATES

Follow this procedure when calculating the number of days between 2 dates:

- Key in the earlier date and press **ENTER**.
- Key in the later date.
- Press **g ▲DYS** (key #26, after pressing **g**) to see the number of days between the 2 dates.

PROBLEM #12: DAYS BETWEEN DATES

It is January 30, 1989, and your youngest child asks you how many days remain until Christmas. What is your answer?

	PROCEDURE	PRESS	DISPLAY
1.	Use the month-day-year function	g M.DY	
2.	Enter today's date	1.301989 ENTER	1.30
3.	Key in Christmas day	12.251989	12.251989
4.	Calculate days between 2 dates	g ▲DYS	329

PRORATIONS USING THE DATE FUNCTION

Prorations are used for such items on the closing statement as taxes, insurance, fuel oil left in the tank and others. The 12C will enable you to do these calculations without having to spend time doing a lot of division. The procedure for doing so is as follows:

- Calculate and store the per diem cost of the item.
- Key in the earlier date and press ENTER.
- Key in the later date and press g ▲DYS.
- Recall the per diem cost; press x to multiply the per diem cost by the number of days.

PROBLEM #13: PRORATION AT SETTLEMENT

The sellers have paid $345 for a 1 year homeowner's insurance policy which the buyer will "assume" at closing. The policy was paid for on January 1, 1989 and closing occurs on February 11, 1989. How much will the purchaser owe the sellers for the portion of the policy the sellers have used?

	PROCEDURE	PRESS	DISPLAY
1.	Enter the policy amount	345 ENTER	345.00
2.	Find and store the daily cost of the policy	365 ÷ STO 1	0.95
3.	Key in the date policy was purchased	1.011989 ENTER	1.01
4.	Key in the closing date and determine how many days have passed	2.111989 g ▲DYS	41.00
5.	Recall the per diem cost	RCL 1	0.95
6.	Multiply the per diem cost by the number of days	x	38.75

NOTE: Step 6 allowed you to use the number of days (calculated in Step 4) which were automatically stored in the stack registers after being calculated. When you pressed x, the number previously calculated (41 days) was multiplied by the number in the display (0.95).

EXERCISE

Before going on to the next chapter, do the practice problems for "Dates" beginning on page 75.

CHAPTER VIII: USING THE PERCENTAGE KEYS

The HP-12C has three keys using the % symbol, all located on the second row: **%T, Δ% and %.** Each has a different function, and each can be useful to a residential sales associate.

USING THE % KEY

The **%** key, key #25, works like the % key in most calculators, as in the following problem.

PROBLEM #14: USING THE % KEY

Your prospects are interested in a $128,000 home and want to put 20% down in order to avoid p.m.i.. Calculate their down payment and their loan amount.

	PROCEDURE	PRESS	DISPLAY
1.	Enter sales price	128000 ENTER	128,000.00
2.	Determine 20% down payment	20 %	25,600.00
3.	Subtract down payment; result is loan amount	-	102,400.00

USING %T

The **%T** (percent of total) key, key #23, determines what percentage one number is of another number.

PROBLEM #15: USING THE %T KEY

Your firm sells an $89,000 home. Your commission on the sale is $1,234.00. What percentage of the total sales price did you receive?

	PROCEDURE	PRESS	DISPLAY
1.	Enter sales price	89000 ENTER	89,000.00
2.	Key in your commission	1234	1,234.
3.	Determine percentage of commission	%T	1.39

USING ▲%

The ▲% key (key #24) calculates the percentage of difference between 2 numbers. It is useful in calculating appreciation.

PROBLEM #16: APPRECIATION USING THE ▲% KEY

A home which sold for $112,000 6 years ago is now worth $185,000. What percentage of appreciation has taken place?

	PROCEDURE	PRESS	DISPLAY
1.	Enter the original value	112000 ENTER	112,000.00
2.	Key in today's value	185000	185,000.00
3.	Determine appreciation over 6 years	▲%	**65.18**
4.	Determine average yearly appreciation	6 ÷	10.86

NOTE: Most of the examples in the text begin without clearing the display. Remember that you can clear the display if you prefer but that it is not a necessary step.

HELPFUL HINT!

See pages 28-32 of your "Owner's Handbook" for other problems using the three % keys.

EXERCISE

Complete the practice problems for "Percentages" found on page 87.

CHAPTER IX: THE COMPOUND INTEREST (LOAN) KEYS

The first five keys along the top row control the loan functions of the HP-12C. Using these keys, you will be able to:

- Determine the monthly, semi-annual, quarterly or any other periodic payment (principal and interest, or "p.i.") for a loan, given the amount borrowed, the interest rate and the term of the loan

- Determine the amount of loan your prospects can qualify for, given the monthly payment (p.i.) they can carry, the interest rate and the term of the loan

- Determine the yield of an investment, given the payment, the term and the amount borrowed.

- Determine the time needed to pay off a loan, given the amount borrowed, the interest rate charged and the payment amount.

Knowing how to use the financial keys also opens up the entire area of investment real estate: cash flows, discounting, internal rate of return, net present value and other investment functions. While not covered in this book, since it is designed for the residential sales associate, they are covered thoroughly in your "Owner's Handbook."

NOTE!

Payments can be made either at the beginning or the end of a compounding period. Payments for real estate loans are usually made at the end of the period, so make sure your calculator is set accordingly. To do so, press g END (key #18) now.

WHAT THE LOAN KEYS DO

Understanding what each loan key does is the key to solving financial problems. This brief summary explains what each key does or what it wants from you as you enter loan data. The primary key (**n, i, PV, PMT,** and **FV**) is explained, and explanations for the upper (gold) and lower (blue) functions are given.

n Number of payments over the life of the loan (or compounding periods)

AMORT Amortizing function: used for accumulated interest and interest portion of a payment.

12x Automatically multiplies the number in the display by 12 and stores the result in **n**

Loan Keys

i Interest rate per payment (or per compounding period)

INT Computes simple interest. Not used for real estate loans.

12÷ Automatically divides the number in the display by 12 and enters a monthly interest rate in **i**.

PV Loan amount (or present value of a series of cash flows)

NPV Calculates "net present value" of an uneven future cash flow. Used in investment calculations.

CFo Cash flow at the beginning of an investment period. Used in investment calculations.

PMT Amount of periodic principal and interest (p.i.) payment; can be monthly, quarterly, annual, etc.

RND Rounds off the internal number so that it matches the number in the display.

CFj Identifies periodic cash flows. Used in investment calculations.

FV Future value (what your money or an investment will be worth in the future)

IRR Used to calculate "internal rate of return" for investment calculations.

Nj Used for the number of equal cash flows in investment problems.

In order to calculate the monthly payment for an $85,000 loan written at 10% for 30 years, monthly payments, the loan keys would require the following data:

KEY	INPUT
n	360 (30 years x 12 payments per year)
i	.83 (10% annual rate ÷ 12 payments per year)
PV	85000 (the amount of the loan)
PMT	No data entered, since this is what will be calculated
FV	No data entered, since FV does not enter into the problem

Loan Keys

The first 4 keys are used for nearly all real estate financing problems. The 5th key, FV, is used to determine appreciation and is also an important key for commercial/investment real estate problems.

LOADING THE KEYS

If any 3 elements of a loan are known, the 4th element can be determined. If you want to do a payment (PMT), for example, you must know the amount being borrowed (PV), the interest rate being charged (i) and the term of the loan (n).

To determine a loan payment, then, do the following:

- Enter what you know by putting the correct number into the display and then pressing n, i, or PV. Although most of our examples will be entered from left to right, starting with n, the information can be entered in any order.

- Ask the 12C to tell you what you don't know. This is done by pressing the key representing what you are looking for (PMT) after you have loaded the other 3 keys.

These are the steps needed to calculate the monthly payment for an $85,000 loan written for 30 years at 10.5% interest, monthly payments:

1. **Enter "360" as n**

   There are 360 payments over the life of the loan (30 years x 12 payments per year). It doesn't matter how "360" gets in the display before n is pressed. As a matter of fact, there are 3 ways to get to "360":

   A. Put 360 in the display and press n

   B. Do the math and load the result: 30 ENTER 12 X n. "360" would appear in the display and would be entered as the total number of payments when you pressed n.

C. Have the 12C do the math for you and load the result: **30 g n.** This method may be used only if you are working with monthly payments, since **g n** multiplies what is in the display by 12. If you were working a 30 year loan with quarterly payments, you would need to use method "a" or "b" with "120" as the total number of payments loaded.

Method "A" is obviously fastest if you instinctively know how many payments are in the loan, but, again, it does not matter which method you use as long as you enter the total number of payments over the life of the loan for **n.**

2. **Enter the interest rate per payment as i**

The same three methods can be used to enter the monthly interest rate:

A. Put it into the display and enter it as the monthly rate: **.875 i**

B. Do the math yourself: **10.5 ENTER 12 ÷ i.** If you are in 2 decimal places, the rate will be shown as the rounded off "0.88".

C. Let the 12C do the math and enter the result for you by pressing **10.5 g i.** The result will be shown as a rounded number if you are in 2 decimal places.

In nearly all cases, method "C" will be the easiest and fastest way to load the interest rate per payment. Note that this method, like using method "C" for calculating the total number of payments, works only with monthly payments. If you had to determine a quarterly rate, you would press **10.5 ENTER 4 ÷ i,** since there are only 4 payments per year.

3. **Enter "85000" as the loan amount.** To do so, press **85000 PV.**

Remember: **n** needs to know the total number of payments over the life of the loan and **i** needs to know the interest rate per payment. Remember, too, that data can be stored in any order.

EXERCISE

Complete the practice problems for "Entering Rate and Periods" found on page 77.

CLEARING THE FINANCIAL REGISTERS

Before beginning a loan problem, it is best to clear the financial registers by pressing **f FIN** (key #34) before you begin loading data. Failure to do so can cause data left over from a previous problem to be used in the new problem. Remember: the display will not clear when you press **f FIN**.

PAYMENTS AS A NEGATIVE

In the loan problems which follow, notice that a payment always shows as a negative number. This is because the HP-12C is "cash flow sensitive": it makes a distinction between cash in and cash out.

This becomes clearer if you look at residential loan problems from the borrower's standpoint. The loan amount (**PV**) is entered as a positive, since the borrower receives the money at closing. The payment (**PMT**), on the other hand, is money paid out by the borrower. It will always be shown as a negative if you are solving for **PMT**.

When you enter a payment (as you would if you knew a payment, a term and an interest rate and wanted to find the loan amount the payment would carry), you must enter the payment as a negative. This is done by placing the payment in the display and then pressing **CHS** (key #16) before pressing **PMT** to enter the payment. **CHS** stands for "change sign."

CHAPTER X: CALCULATING MONTHLY PAYMENTS

PROBLEM #17: MONTHLY PAYMENT (AMORTIZED LOAN)
Compute the monthly payment for a $60,000 loan amortized for 30 years at 10%.

	PROCEDURE	PRESS	DISPLAY
1.	Establish that payments will be made at the end of the month	g END	.00
2.	Clear financial registers	f FIN	0.00
3.	Enter total # of payments	30 g n	360.00
4.	Enter the interest rate per pmt.	10 g i	0.83
5.	Enter loan amount	60000 PV	60,000.00
6.	Compute monthly payment	PMT	-526.54

NOTES:

1. Step #1 makes sure that interest is calculated from the end of the month. It need not be done every time you do a loan problem. Once in the "end" mode, the 12C stays there unless g BEG is pressed.

2. Step #2, clearing the financial registers, is usually not necessary, but it is not a bad habit to get into since data in FV, should there be any, can cause incorrect answers in the current problem. Most of the examples which follow, as well as the practice problems at the end of the text, call for clearing the financial registers.

3. Notice that the monthly payment is expressed as a negative since it is a cash outflow from the borrower.

PROBLEM #18: MONTHLY PAYMENT (AMORTIZED LOAN)
Calculate the monthly payment for a $70,000 loan at 9½%, 30 years

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	-526.54
2.	Enter total # of payments	360 n	360.00
3.	Enter monthly interest rate	9.5 g i	0.79
4.	Enter loan amount	70000 PV	70,000.00
5.	Calculate monthly payment	PMT	-588.60

Calculating Monthly Payments

PROBLEM #19: MONTHLY PAYMENT (AMORTIZED LOAN)

Calculate the monthly payment for an $80,000 loan, 25 years, 9½%.

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	-588.60
2.	Enter total # of payments	25 g n	300.00
3.	Enter monthly interest rate	9.5 g i	0.79
4.	Enter loan amount	80000 PV	80,000.00
5.	Calculate monthly payment	PMT	-698.96

PROBLEM #20: DETERMINE MONTHLY PAYMENT, A.R.M.

What is the monthly payment for a $67,500 A.R.M., 30 years, with an initial interest rate of 9.876%? (Determining the monthly payment for an a.r.m. is the same as determining the payment for a fixed rate loan.)

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	-698.96
2.	Enter total # of payments	360 n	360.00
3.	Enter monthly interest rate	9.876 g i	0.82
4.	Enter loan amount	67500 PV	67,500.00
5.	Calculate monthly payment	PMT	-586.19

RECALLING DATA STORED IN THE FINANCIAL REGISTERS

Once you have completed a loan (loaded what you know and calculated the missing data), you can recall any of the loan elements. To do so, press **RCL**, then press the key for the loan element you want to recall (**n**, **i**, **PV** or **PMT**).

The ability to recall a loan element is useful if, for example, you get a wrong answer due to entering an incorrect loan element. Instead of clearing all loan elements and starting over, simply recall and check each element until you find your mistake. Correct it, then solve for the answer.

EXERCISE

Complete the problems for "Calculating Monthly Payment" beginning on page 77.

CHAPTER XI: DETERMINING OTHER PERIODIC PAYMENTS

The only difference in calculating payments other than monthly payments is that the years of the loan are not multiplied by 12 and the annual interest rate is not divided by 12. Instead, they are multiplied and divided by the appropriate number of periodic payments.

PROBLEM #21: DETERMINE SEMI-ANNUAL PAYMENT (AMORTIZED LOAN)
Compute the semi-annual payment for a $95,000 loan written for 30 years at 13%.

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers and display	f FIN CLx	0.00
2.	Enter total # of payments	60 n	60.00
3.	Enter periodic interest rate	13 ENTER 2 ÷ i	6.50
4.	Enter loan amount	95000 PV	95,000.00
5.	Compute the semi-annual payment	PMT	-6,319.44

NOTES:
1. Clearing the display by pressing **CLx** was not necessary, but it can be done if you prefer to do so.
2. The **g n** or **g i** function could not be used since the payments are not monthly.

PROBLEM #22: DETERMINING QUARTERLY PAYMENTS
A buyer wants a $15,000 2nd written for 20 years at 10½%, due and payable at the end of the 5th year with quarterly payments. What is the quarterly payment?

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN CLx	-6,319.44
2.	Enter total # of payments	80 n	80.00
3.	Enter periodic interest rate	10.5 ENTER 4 ÷ i	2.63
4.	Enter loan amount	15000 PV	15,000.00
5.	Compute the quarterly payment	PMT	-450.42

NOTE: The fact that the loan "balloons" in 5 years has nothing to do with calculating the payment. It is a regular, amortized loan, and the balance remaining after 5 years will be paid in one large payment.

EXERCISE
Complete the problems for "Calculating Periodic Payment" beginning on page 80.

CHAPTER XII: CALCULATING MAXIMUM LOAN AMOUNT

One way to maximize you success in real estate is to determine the maximum loan amount prospects can carry before showing them property. It is a relatively simple procedure:

- Find out the prospect's income and debts during the qualifying interview.
- Using both conventional and government qualifying sheets (or the programs included in this book), determine the prospect's maximum affordable p.i. payment for both types of financing.
- Enter each number as PMT, preceded by CHS, and then enter the rates and terms of loans offered by local lenders.

  Remember: when entering a payment, CHS must be pressed before entering the payment. The 12C needs payments entered to be negative numbers.

PROBLEM #23: DETERMINING MAXIMUM LOAN, GIVEN MAXIMUM P.I.
You have qualified a buying couple and have found that they can carry a maximum $685 per month as their p.i. payment. How large a loan can they qualify for under each of the following two loan plans?

A) Conventional, 10%, 30 year fixed, monthly payments
B) Conventional a.r.m., 8.23% initial rate, 30 years, monthly payments

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	-450.42
2.	Enter total # of loan payments (same for both loans)	30 g n	360.00
3.	Enter monthly interest rate for loan A	10 g i	0.83
4.	Enter maximum payment (same for both loans)	685 CHS PMT	-685.00
5.	Determine maximum loan amount (A)	PV	78,056.31
6.	Enter monthly interest rate for loan B	8.23 g i	0.69
7.	Determine maximum loan amount (B)	PV	91,350.26

NOTES:
1. Note that the payment was entered as a negative (cash paid out) by pressing CHS before PMT in step #4.

2. In order to calculate loan B (steps 6 & 7), the total number of payments did not have to be re-entered; it was retained from step #2. When working with multiple loans, change only what you have to change.

EXERCISE

Complete the problems for "Calculating Maximum Loan Amount" beginning on page 82.

CHAPTER XIII: DETERMINING INTEREST RATE OR YIELD

As mentioned, if any 3 elements of a loan are known you can solve for the 4th. In the following example, the term of the loan (N), the payment (PMT) and the amount being borrowed (PV) are given. Using these, you will be looking for the interest rate the noteholder will realize.

When solving for the interest rate below, notice that calculating an interest rate is one of the few functions which takes the 12C a rather long time to perform.

PROBLEM #24: CALCULATING INTEREST RATE, GIVEN DESIRED PAYMENT & TERM

You want to borrow $20,000 for 20 years and want to have monthly payments of $300. What yield will the noteholder realize?

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	91,350.26
2.	Enter total # of payments	20 g n	240.00
3.	Enter loan amount	20000 PV	20,000.00
4.	Enter monthly payment	300 CHS PMT	-300.00
5.	Calculate monthly interest rate	i	1.45
6.	Determine annual yield	12 X	17.44
7.	Round to 4 decimals	f 4	17.4354
8.	Return to 2 decimals	f 2	17.44

NOTE: The answer given in step #5 is a monthly interest rate. Step #6 converts it to an annual rate. You do not have to press ENTER before performing this step since answers given to you by the 12C are already entered, ready to be worked on.

CHAPTER XIV: SOLVING FOR REMAINING BALANCE

Structuring alternative financing (seller-held seconds, for example) often calls for a "balloon payment." A note may be written for a 20 year amortization schedule but with a 6 year payoff, for example. This means that the normal payment for a 20 year loan is calculated, and that payment is due each month. After the 72nd payment (6 years x 12 payments per year), the entire principal balance owed is due in one large payment. Any contract calling for such a payment should include the approximate amount of the payoff. This can easily be calculated using the 12C.

Do the following to calculate the remaining balance due after a certain number of payments have been made:

- Calculate the payment in the usual manner.
- Enter the number of payments the loan will run as **n**. For example, if the loan was a 30 year loan, monthly payments, due at the end of the 6th year, "72" would be entered as **n** after the payment was determined.
- Press **FV**. The balance due after the last payment made will be shown.

PROBLEM #25: REMAINING BALANCE PAYMENT FOR AN EARLY PAYOFF LOAN

Your seller agrees to hold a $15,000 2nd trust, amortized for 20 years, @ 11% interest with monthly payments. The entire balance is due and payable at the end of the 5th year. What is the remaining balance owed at the end of the scheduled payment period?

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	214,901.72
2.	Enter total number of payments	240 n	240.00
3.	Enter monthly interest rate	11 g i	0.92
4.	Enter loan amount	15000 PV	15,000.00
5.	Calculate monthly payment	PMT	-154.83
6.	Calculate remaining balance pmt.	60 n FV	-13,622.09

Remaining Balance

PROBLEM #26: CALCULATING REMAINING BALANCE

A $100,000 loan is amortized, monthly payments, for 30 years. The interest rate is 12¾%. What is the remaining balance after 3 years?

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	-13,622.09
2.	Enter total number of payments	30 g n	360.00
3.	Enter monthly interest rate	12.75 g i	1.06
4.	Enter loan amount	100000 PV	100,000.00
5.	Calculate monthly payment	PMT	-1,086.69
6.	Calculate remaining balance after 36 payments (3 years)	36 n FV	-98,945.77

NOTE: This is an instance where not clearing the financial registers before beginning a problem would cause an incorrect answer. If you did not do step 1 (f FIN), the payment would be shown as -1,083.40; the remaining balance would be -99,089.38. Both answers would be incorrect. The error occurs because of the value stored in FV from the previous problem.

EXERCISE

Complete the practice problems for "Calculating Remaining Balance" beginning on page 82.

CHAPTER XV:
ACCUMULATED INTEREST AND REMAINING BALANCE

Calculating both remaining balance and accumulated interest at the same time is even more helpful than is calculating only remaining balance. Your sellers, for example, might be asked to hold a $15,000 2nd, written at 11¼% for 20 years with the remaining balance due at the end of the 6th year. The key to properly presenting the offer to the sellers is the ability to tell them how much interest they will earn over the 6 years and how large a check they will receive at the end of the 6th year.

With the HP-12C, finding both amounts is easy. Use the following procedure:

- Enter the loan information and determine **PMT**
- Place the number of payments through which you want to determine accumulated interest and remaining balance in the display.
- Press **f AMORT** (key #11) to get the accumulated interest through the payment you entered. The longer it takes the loan to be paid off, the longer it will take for the answer to appear.
- Press **RCL PV** to get the remaining balance.

PROBLEM #27: REMAINING BALANCE & ACCUMULATED INTEREST

Your seller is asked to hold a $10,000 2nd, monthly payments, amortized for 30 years at 10% with the balance due and payable at the end of the 5th year. How much interest will your seller receive over 5 years? How much will be the final, payoff check be?

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	
2.	Enter total # of payments	360 n	360.00
3.	Enter monthly interest rate	10 g i	0.83
4.	Enter loan amount	10000 PV	10,000.00
5.	Calculate monthly payment	PMT	-87.76
6.	Calculate accumulated interest	60 f AMORT	-4,922.82
7.	Calculate remaining balance	RCL PV	9,657.22

Accumulated Interest/Remaining Balance

PROBLEM #28: REMAINING BALANCE & ACCUMULATED INTEREST

Your seller holds a $20,000 2nd amortized for 30 years at 11% interest, monthly payments, due and payable at the end of the 3rd year. What will the remaining balance be at the end of the 3rd year and how much interest will the seller have received?

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	
2.	Enter total # of payments	360 n	360.00
3.	Enter monthly interest rate	11 g i	0.92
4.	Enter loan amount	20000 PV	20,000.00
5.	Calculate monthly payment	PMT	-190.46
6.	Calculate accumulated interest	36 f AMORT	**-6,554.22**
7.	Calculate remaining balance	RCL PV	**19,697.66**

If you now wanted to determine both remaining balance and accumulated interest at the end of the 5th year, you would need to:

- Reset "n" to 0
- Re-enter the original loan amount ($20,000 in the above example)
- Repeat steps 6 & 7 above, using 60 payments in step 6

	PROCEDURE	PRESS	DISPLAY
8.	Reset n	0 n	0.00
9.	Re-enter loan amount	20000 PV	20,000.00
10.	Calculate accumulated interest through end of 5th year	60 f AMORT	**-10,860.90**
11.	Calculate remaining balance	RCL PV	**19,433.30**

If you were only interested in the remaining balance at the end of the 5th year, you would not need to reset "n" or "PV." After step #7 above, you would:

- Add 2 more years worth of payments and compute 2 more years' interest (**24 f AMORT**)
- Recall the balance remaining after the additional 2 years (**RCL PV**)

EXERCISE

Complete the practice problems for "Calculating Accumulated Interest and Remaining Balance" beginning on page 83.

CHAPTER XVI: PAYMENTS TO INTEREST & PRINCIPAL

The procedure for determining how much you have paid in interest and how much to principal at any time during the loan is as follows:

- Compute the payment.
- Compute the accumulated interest by putting the number of payments in question in the display, then pressing f AMORT.
- Press x≈y (key #34) to display the amount paid to principal during the period.

PROBLEM #29: AMOUNT PAID TO PRINCIPAL AND INTEREST

You get a $50,000 loan @ 10½% interest, 30 years, monthly payments. How much would be applied to interest your first year? How much to principal?

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	
2.	Enter total # of payments	30 g n	360.00
3.	Enter monthly interest rate	10.5 g i	0.88
4.	Enter loan amount	50000 PV	50,000.00
5.	Calculate monthly payment	PMT	-457.37
6.	Calculate 1st 12 months' interest	12 f AMORT	-5,238.19
7.	Calculate 1st 12 month's payment to principal	x≈y	-250.25

PROBLEM #30: AMOUNT PAID TO PRINCIPAL AND INTEREST

How much interest would you pay during the 2nd year of the above loan? How much principal?

	PROCEDURE	PRESS	DISPLAY
1.	Calculate next 12 month's interest	12 f AMORT	-5,210.61
2.	Calculate next 12 month's principal paid	x≈y	-277.83

Payments to Interest & Principal

Once you have determined how much has been paid to interest and to principal, you can also get the remaining balance for the loan. To do so, press RCL PV after you have solved for principal paid, as in the following problem.

PROBLEM #31: PRINCIPAL, INTEREST AND REMAINING BALANCE

You take out a $32,000 loan at 10%, monthly payments, for 20 years. How much interest and principal will you have paid the first year? How much will you still owe on the loan after the first year?

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	-277.83
2.	Enter total # of payments	20 g n	240.00
3.	Enter monthly interest rate	10 g i	0.83
4.	Enter loan amount	32000 PV	32,000.00
5.	Calculate monthly payment	PMT	-308.81
6.	Calculate 1st years' interest	12 f AMORT	-3,176.17
7.	Calculate 1st years' payment to principal	x≈y	-529.55
8.	Calculate balance remaining after the 1st year	RCL PV	31,470.45

EXERCISE

Complete the practice problems for "Payments to Interest and Principal" beginning on page 84.

CHAPTER XVII: WORKING WITH NON-AMORTIZED LOANS

So far, you have been working with "amortized" loans, the usual type offered by lenders. There are actually three ways of handling interest:

AMORTIZED LOANS have a series of equal payments, each of which contains the exact amount of principal and interest needed to reduce the loan balance to $0 over its term.

NON-AMORTIZED LOANS have payments which contain at least the correct amount of interest due, but which are short some, or all, of the principal needed to pay off the loan over its term. Therefore, a large payment remains at the end of the loan's term. The most common example of a non-amortized loan is an "interest only" loan.

NEGATIVELY-AMORTIZED LOANS have a payment which is not enough to cover the interest due. The unpaid interest is added on to what you owe. Thus, the loan balance grows with each payment. Most graduated payment loans contain negative amortization: at some point of the loan, the borrowers will owe more than they borrowed.

The 12C can calculate amortized and non-amortized payments, but trying to solve for a negatively amortized payment will result in an "ERROR" message since the loan would never be paid off. Try solving for n, given the following loan: $10,000 at 13%, monthly payments of $100 per month. You should get "ERROR 5" in the display, since $100 a month would never pay off the loan.

CALCULATING INTEREST ONLY PAYMENTS

Interest only loans are the most common example of non-amortized loans. The financial registers are not needed for calculating payments on this type of loans. Simply multiply the loan amount by the interest rate, then divide by the number of payments per year. The result will be an interest only payment.

PROBLEM #32: INTEREST ONLY PAYMENT

Calculate the interest only monthly payment for a $12,000 loan written at 12% for 10 years.

	PROCEDURE	PRESS	DISPLAY
1.	Enter the loan amount	12000 ENTER	12,000.00
2.	Calculate 1 year's interest	.12 x (or 12 %)	1,440.00
3.	Divide by 12 monthly payments	12 ÷	120.00

INTEREST & BALANCE: NON-AMORTIZED LOANS

The 12C works with this type of loan just as it works with amortized loans when it comes to calculating accumulated interest and remaining balance. The procedure for calculating accumulated interest and remaining balance for a non-amortized loan is as follows:

- Enter all 4 loan elements: interest rate per payment, loan amount, payment and term.
- Calculate accumulated interest and remaining balance as you did for an amortized loan (# payments, f AMORT RCL PV).

PROBLEM #33: ACCUMULATED INTEREST/REMAINING BALANCE: NON-AMORTIZED LOAN

A buyer wants your seller to hold a $10,000 2nd @ 13%, 5 years. The payment requested is a non-amortizing $150 per month. How much interest will your seller earn over the life of the loan and what is the amount of the final payment?

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	49,471.92
2.	Enter total # of payments	5 g n	60.00
3.	Enter monthly interest rate	13 g i	1.08
4.	Enter loan amount	10000 PV	10,000.00
5.	Enter payment amount	150 CHS PMT	-150.00
6.	Compute 60 month's interest	60 f AMORT	-5,504.39
7.	Recall remaining balance	RCL PV	6,504.39

NOTE: For this problem, you must enter CHS in step 5 so that the payment is entered as a negative number. If you failed to do so, your answer would be wrong.

CHAPTER XVIII: CALCULATING DISCOUNT & YIELD

DISCOUNT is the deduction (or amount subtracted) from the face value of a note by the purchaser of the note in order to increase the yield.

YIELD is the total dollars earned on a note, usually expressed in terms of an annual percentage rate.

As an example of why notes are often discounted when sold, consider the following example:

> A seller is asked to hold a $10,000 2nd, monthly payments, written at 11% for 10 years. The total interest paid on the note if it goes full term will be $6,530. This represents an 11% annual return on the seller's initial investment of $10,000. If an investor buys the note for $9,000 (a $1,000 discount), he or she will earn both the $6,530 interest plus an additional $1,000 of principal ($10,000 principal will be repaid; the investor only paid $9,000 for the note). This represents a yield to the investor of 13.63%.

The ability to calculate discount and yield is useful for several reasons:

- You will be able to help your sellers take back mortgages, yet sell them for cash at closing.
- You will be able to help investors purchase this lucrative form of investment, one which offers both cash flow and a higher yield than is found with most other types of investments.
- You can buy and sell seller-held notes for your own account.

HOW TO CALCULATE DISCOUNT AND YIELD

Investors usually have a specific yield in mind when they buy seller-held 2nds. They often look to you to calculate the price they should pay in order to achieve that yield. The following steps will accomplish this:

- If you are not given the note's payment, calculate it in the regular fashion.
- Substitute the investor's desired yield as i after you have calculated the payment.
- Press PV. The answer will be the price the investor should pay to achieve the desired yield.

Calculating Discount & Yield

When working with discount and yield, look at the problem from the investor's point of view rather than from the borrower's, as has been the case up until this point. The amount paid for the note will be an investment, or cash out of pocket; the payment will be monthly income, or cash inflow. When calculating discount needed to achieve a desired yield, therefore, enter the loan amount as a cash outflow by pressing CHS before entering it. The payment will appear as a positive.

PROBLEM #34: BUYING A NOTE WHEN NO PAYMENTS HAVE BEEN MADE

An investor will buy your seller's $10,000 2nd (written at 10%, 10 years, monthly payments) if she can realize a 14% yield. What price must she pay for it to realize the desired yield?

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	
2.	Enter total # of payments	120 n	120.00
3.	Enter note's interest rate	10 g i	0.83
4.	Enter loan amount	10000 CHS PV	-10,000.00
5.	Calculate monthly payment	PMT	132.15
6.	Enter investor's desired yield	14 g i	1.17
7.	Calculate price investor will pay for note	PV	-8,511.22

PROBLEM #35: BUYING A NOTE WHEN PAYMENTS HAVE ALREADY BEEN MADE

Your investor considers buying a note written at 10½% with monthly payments of $269.87. The balance remaining on the note is $18,593.56. What price would she pay in order to realize a 16% yield on her investment?

The steps for working this problem are:

- Calculate the number of payments remaining
- Calculate the price to be paid in the same manner as for a new note

	PROCEDURE	PRESS	DISPLAY
1.	Enter interest rate	10.5 g i	0.88
2.	Enter balance as cash outflow	18593.96 CHS PV	-18,593.96
3.	Enter payment as cash inflow	269.87 PMT	269.87
4.	Calculate number of payments remaining	n	106.00
5.	Enter investor's desired yield	16 g i	1.33
6.	Calculate price to pay for note	PV	-15,268.96

PROBLEM #36: PAYING A SPECIFIED AMOUNT FOR A NOTE

An investor wants to buy a $20,000 2nd written at 11% for 15 years. 12 payments have been made. What is the investor's yield if he pays $13,700 for the note.

	PROCEDURE	PRESS	DISPLAY
1.	Clear financial registers	f FIN	-8,511.22
2.	Enter total # of payments	15 g n	180.00
3.	Enter note's interest rate	11 g i	0.92
4.	Enter original loan amount	20000 CHS PV	-20,000.00
5.	Calculate monthly payment	PMT	227.32
6.	Recall # of payments	RCL n	180.00
7.	Subtract payments already made; enter as new "n"	12 - n	168.00
8.	Enter price paid for note	13700 CHS PV	-13,700.00
9.	Calculate monthly yield	i	1.53
10.	Calculate yearly yield	12 x	18.36
11.	Expand to 4 decimal places	f 4	18.3574
12.	Return to 2 decimal places	f 2	18.36

NOTES:

1. Steps #6 & 7 subtract the number of payments which the seller has already received since the investor will not be getting that amount.

2. Step #11 shows the non-rounded yield: 18.3574%. When giving a yield to an investor, it is important to use a non-rounded number. In this example, for instance, quoting "18.357%" is more acceptable than rounding off to "18.36%."

EXERCISE

Complete the practice problems for "Calculating Discount and Yield" beginning on page 85.

CHAPTER XIX: PROGRAMMING THE HP-12C

The real power of the HP-12C becomes clear once you learn how to program it. A sequence of keystrokes (a program) is stored in the calculator, then, when you want to perform an operation such as qualifying a buyer or determining an after-tax p.i. payment, you simply enter the known information, push a button, and the calculator does the rest.

Suppose, for example, you worked for the "Ever Right Dividing Company, Inc.," and your only job was to divide any number that came across your desk by 12. One day, the number is 500. The next day, the number is 4.2, and the third day the number is 356.2. Solving the 3 problems would take a total of 23 keystrokes:

500 ENTER 12 ÷
4.2 ENTER 12 ÷
356.2 ENTER 12 ÷

Tiring, isn't it? As you look at the keystrokes, though, notice that each problem has 4 keystrokes in common: ENTER, 1, 2 and ÷. These are the keystrokes that can be made into a program. Then, when it is time to divide a number by 12, simply put the number to be divided in the display and press one key: the repetitive keystrokes are done automatically.

Using a program, the process of dividing each of the 3 numbers (500, 4.2 and 356.2) by 12 takes only about 6 seconds. When it comes to larger programs, such as qualifying a buyer or determining the after tax loan payment, the time saved is even more dramatic.

HELPFUL HINT!

Remember: almost anything you do repetitively can be made into a program for the HP-12C. It takes a little time to learn programming, but the results are worth it!

STEPS TO PROGRAMMING THE HP-12C

When you think you have a repetitive function which can be programmed, follow these steps:

1. Write your program.
2. Revise the program into the fewest possible number of lines.
3. Enter the program and test it with an answer you already know.
4. If necessary, revise the program again.
5. Place the final program into the 12-C.

WRITING YOUR PROGRAM

Follow these two steps to write any program:

1. Decide what you want to do (qualify a buyer, calculate an after-tax payment, etc.)
2. Run the steps manually on the HP-12C; write down each key you press as you do the steps.

Dividing 500 by 12, for example, would require the following keystrokes: **500 ENTER 12 ÷**. As a starting point to writing a program, write down the keystrokes that, given a new number to divide each day, would be repetitive: **ENTER 1 2 ÷**.

Remember: "500" is not part of the program. It is a "variable," something which changes each time the program is run and which will be entered manually before running the program. If you were to write a program for qualifying prospects, for example, the prospects' income would be entered into the display at the start of the program, then the program would calculate the maximum loan payment the prospects could carry based on that income. The income would be the variable.

Programming the 12C

PROGRAM LINES

Each step in a program takes up one "line" of program memory. The divide by 12 program would be a 4 line program: ENTER, 1, 2 and ÷ are all separate lines. In some instances, 2 keystrokes combine to make one line of memory. Instructions beginning with f, g, STO, RCL, and GTO would each take up one line of memory.

The only limitation to programming the 12C is the number of program lines which can be stored. The 12C allows a maximum of 99 separate programming lines. Whether these 99 lines are taken up by 1 program or by a number of separate programs, the 99 line limit cannot be exceeded.

PRIMARY PROGRAM KEYS

The following keys are used when programming the 12C. Each will be covered in detail in this chapter.

f P/R Key #31. Moves the calculator into (and out of) "program" mode. Programs can only be written or edited while in the program mode.

f PRGM Key #33. Erases all programs in memory. To guard against accidental erasure of stored programs, this can only be done while the calculator is in the "program" mode.

g MEM Key #19. Displays the number of program lines which are currently stored in program memory and the number of storage registers still available for use.

g PSE Key #31. Causes the program to pause at a certain point when it is keyed in as an instruction. After the pause, the program will continue running automatically.

R/S Key #31.

When this key is inserted as an instruction in a program, it causes the program to stop at that point in the program. The number or result at that point is shown in the display and will stay there until you re-start the program by pressing the R/S key.

When pressed while in "run" mode, it causes the program to start running.

ENTERING A PROGRAM

Once a program is written down (and you have done all you can to make it as brief as possible), it is ready to be entered. To do so, follow these steps:

1. **Press f P/R to get into programming mode.**

   You do not have to hold down f while you press P/R; simply press f, release it, then press P/R. You are now in program mode, and each key you press will be entered as a program instruction.

2. **Enter each step of your written program.**

   Press the keys in the order you have written them. Each time you press a key (or a sequence such as STO 5, for example), a line of programming will automatically be entered. Continue until you have entered all the written steps.

3. **Leave program mode by again pressing f P/R.**

   The 12C is now back in "run" mode; keys pressed will have their normal operating function.

SAMPLE PROGRAM: DIVIDING ANY NUMBER BY 12

Now, enter the "divide by 12" example as your first program. The first number in each problem (500, 4.2, 356.2) is the number which will be divided; since this number changes each time, it is not part of the program. Instead, it will be placed in the display before the program is started.

Enter the following. For now, disregard what you see in the display as you enter the various steps.

If you have programs entered which you want saved, do not do the following. Instead, refer to page 52, "Inserting Multiple Programs," for instructions on how to enter another program if you already have a program or programs in memory.

Programming the 12C

Sample Program: Dividing any number by 12

Follow each of the following steps in order:

	PRESS	EXPLANATION
1.	f P/R	Gets you into "program" mode
2.	ENTER	"Enters" any number you have put into the display when the program starts
3.	1	
4.	2	
5.	÷	Divides the number in the display by 12
6.	f P/R	Gets you out of program mode and back into run mode

CONGRATULATIONS! You have just programmed your HP-12C! If you followed all of the above steps, you should be back in "run" mode: you should not see any of the "shorthand" lines you see when in program mode.

REVIEWING A PROGRAM

After entering a program, the next step is to review it in order to make sure it does what you want it to do. The program can be reviewed while in either the "run" or the "program" mode, but in most cases, it is safest to review the program while in "run" mode in order to avoid entering any unwanted program lines.

The following keystrokes are used to review a program:

REVIEWING WHEN YOU ARE IN THE "RUN" MODE:

g GTO "00" (Keys 43, 33 and the first line of the program)

This sequence moves the program to a certain line: "00" is the number of the program's first line. If you wanted to move to line 1, the keystrokes would be **g GTO 01**. GTO is located at the bottom of key #33.

When this instruction is given, the display does not change. The calculator sets itself to whatever line has been chosen, but the number in the display is retained. When you enter program mode or when you review your program, the line you set will be the first one shown.

SST (Key 32)

Pressing and holding down this key reviews and executes a program in order, starting at whatever line you have chosen using g GTO.

When you use the SST key, the program is shown one line at a time. As you release the key, the program will have executed the instruction for that line and the result will be shown in the display.

g BST (Keys 43 and 32)

Pressing BST after pressing g also reviews the program, but in reverse order.

Remember: when reviewing your program, the review will always begin on the line you have set using the g GTO command.

REVIEWING WHEN YOU ARE IN THE "PROGRAM" MODE:

g GTO ".00" (Keys 43, 33, 48 and the line number for the desired line)

This moves your program to any line you choose, as does g GTO "00" when in run mode. The difference is placing a decimal point before the line number. It must be inserted before the line number when reviewing a program while in program mode or you will be entering another line of programming rather than setting the program to a particular line.

If, for example, you were in program mode and wanted to see line 6 and entered g GTO 06 (forgetting the . before entering 06) you would be entering an instruction telling your program to go to line 6 when it reached that point.

Remember: the correct way to go to a certain line when you are in program mode is g GTO . and the line number you want to see.

SST (Key 32)

When you press and release SST while in program mode, the individual program lines will be reviewed in order. If SST is pressed and held down, each line is reviewed in order and flashes in the display for about ½ second.

The difference between reviewing the program while in "program" mode as opposed to "run" mode is that the program is not executed while reviewing in "program" mode.

g BST (Keys 43 and 32)

Does a continuous (automatic) reverse order review of your program when used in program mode.

> HELPFUL HINT!
> Remember: it is safest to review a program while in "run" mode. This way, you don't run the risk of unintentionally adding an unwanted line to your program!

WHAT YOU SEE IN PROGRAM MODE

While writing a program (or while reviewing the steps of a program in "run" mode), the 12C displays a "shorthand" version of each program entry. The individual lines of the "divide by 12" program look like this:

LINE		EXPLANATION
01-	36	Line 1: key 36 (ENTER) is pressed
02-	1	Line 2: Puts the number "1" in the display
03-	2	Line 3: Puts the number "2" behind number "1" in the display
04-	10	Line 4: key 10 (÷) is pressed

Steps #1 (f P/R) and #6 (f P/R) do not show up as program lines, since f P/R simply gets you into and out of program mode and has no part in the program itself.

The shorthand shows a line number (01-, 02-, etc.) and the instruction for that line written in the form of key numbers. You will sometimes see lines which contain more than one key number, such as:

09- 45 2 The command for line 9 is to recall (key 45) what is stored in STO 2.

12- 43,33 08 The command for line 12 is g GTO (go to) line 8.

REVIEWING YOUR "DIVIDE BY 12" PROGRAM

To review the program you entered earlier, do the following. Be sure to hold down SST so that you can see each line, and disregard any numbers or "Error" message which appear in the display when the SST key is released. The right hand column below explains the instruction given for the program line displayed.

	PRESS	DISPLAY	INSTRUCTION
1.	g GTO 00	No change	Internally resets program to line 00
2.	SST	01- 36	ENTER (key #36)
3.	SST	02- 1	Press "1"
4.	SST	03- 2	Press "2" ("12" is now entered)
5.	SST	04- 10	÷ (key #10)
6.	SST	05- 43,33 00	g GTO 00 (resets program to line 00 after it has run)

If your display matched what is shown in the display column above, the program is entered correctly. If not, go back to the section "Entering Your Program." Reread it and enter your program again following exactly the steps for entering the "divide by 12" program.

RUNNING A PROGRAM

Follow these steps whenever you want to run a program you have entered:

1. **Store any information the program will need.**

   There is no information to store for our "divide by 12" program. However, most programs will require some information to be stored before running the program. When the program runs, it will pick up this information and use it at the proper time. The conventional qualifying program found on page 54, for example, asks you to store taxes, insurance, homeowner's or condo fee and any p.m.i. in one data storage register and the prospect's debts in another. When the program runs, it picks up this information at the appropriate place in the program.

2. **Make sure you are in "run" mode.**

   PRGM is not showing in the right hand corner of the display, and the "shorthand" for individual program lines is not showing.

3. **Set the calculator to the first line of the program you want to run.**

   This is done by pressing g GTO and the number of the first line of your program. This step is not necessary if you only have one program in memory but must be done when you have 2 or more programs. Remember: the display will not change when you do this step.

4. **Place any starting information in the display.**

   If you wanted to divide 500 by 12 using the "divide by 12" program, you would place 500 in the display. Likewise, you would place a prospect's income in the display before beginning a qualifying program.

5. **Press R/S to start running the program.**

   The program will start running and will continue to run until finished. The only exception occurs if the program contains a g PSE or R/S instruction. If so, the program will either pause for a second or stop completely at the point where the instruction occurs.

EXERCISE: Divide 80 by 12, using Program #1

	PROCEDURE	PRESS	DISPLAY
1.	Make sure calculator is in "run" mode: PRGM is not showing in the display		
2.	Go to beginning of program	g GTO 01	
3.	Enter 80 in display	80	80.00
4.	Begin program	R/S	6.67

EXERCISE: Divide 38.6 by 12, using Program #1

	PROCEDURE	PRESS	DISPLAY
1.	Enter number to be divided	38.6	38.6
2.	Begin program	R/S	3.22

You did not have to reset the program to line 00, since there is only one program in the calculator; therefore, the program automatically resets itself every time it is run.

CHANGING INDIVIDUAL PROGRAM LINES

There are times when you will want to change individual lines in the program. Suppose, for example, that you were so successful dividing numbers by 12 using your HP-12C that you were given a promotion: your new job is to divide numbers by 13. The instruction for line 3 (03-2) would need to be changed to a "3." Line 2 would enter the "1," and line 3 would then complete the "13" by entering a "3."

Follow these steps to change individual program lines:

1. **Set the program to the line before the one you want to change.**

   Press **g GTO** and the appropriate line number. Whatever is in the display will not change, but the calculator sets itself internally to the correct line, the line before the one to be changed.

2. **Enter program mode.**

   Press f P/R. You will now see the line before the one you want to change.

3. **Enter the desired change.**

   You can change one line or several lines as long as they are adjoining lines. If, for example, you want to change lines 5 and 6, go to line 4, then enter the correct instruction for line 5 followed by the correct instruction for line 6.

   If you next wanted to change line 18, you would go to line 17 and then enter the correct instruction for line 18.

4. **Return to run mode.**

   Press f P/R as soon as you have made your change.

EXERCISE: Change Program #1 so that it divides any entered number by 13.

	PROCEDURE	PRESS	DISPLAY
1.	Set the program to line 2, the line before the change	g GTO 02	(No change)
2.	Enter "program" mode	f P/R	02- 1
3.	Enter "3" to indicate that you want to divide the number in the display by 13	3	03- 3
4.	Leave "program" mode	f P/R	

DETERMINING AVAILABLE PROGRAM MEMORY

You can add other programs to program memory as long as the total number of program lines used does not exceed 99. Before adding another program, therefore, you will want to determine how many lines of program memory have been used so that you can make sure there is enough available memory to store the new program.

Pressing g followed by MEM (key #19) displays the number of program memory lines which have been used. Do the following: press and release g, then hold down MEM. If you have entered the "divide by 12" program (now changed to a "divide by 13" program), or even if you have not stored any programs, you should see the following: P-08 r-20.

The "P-08" means that 8 lines of program memory have been used. The 8 lines are built into the 12C and will show up even if you have not entered any programs at this point. Once you exceed 8 lines, the number changes.

If you saw anything other than "P-08," you already have a program (or programs) entered which takes up more than 8 lines of memory.

The "r-20" in the right hand corner of the display shows how many of the 20 data storage registers remain usable for storage. As you write programs, up to 13 of the 20 data storage registers are converted into additional program memory. When you enter your ninth program instruction, for example, storage register .9 is converted into 7 new lines of programming memory and is no longer available for use as a storage register. If, after using more than 9 lines of programming, you tried to store something in storage register .9, an ERROR 6 message would appear in your display.

The data storage registers are converted to program memory in the following order: .9, .8, .7, etc. Seven storage registers, 0-6, will always be available for storing data in the usual manner.

INSERTING MULTIPLE PROGRAMS

Listing and selling situations present many opportunities to use programs stored in your HP-12C. You might want a seller's net program, an after-tax payment program and programs for qualifying a prospect for both conventional and government loans, for example. When it comes time to add a 2nd program (or any subsequent programs) to memory, specific steps must be followed if all programs are to run properly.

1. Go to the last line of the previously entered program.

   The last line of the "divide by 13" program, for example, is line 04. If you wanted to keep that program and add another behind it, you would set the calculator to line 04 by pressing **g GTO 04**. Remember: the display will not change.

2. Press **f P/R** to enter "Program" mode.

3. Do one of the following:

   a) If the new program is the second program you are entering, press **g GTO 00**. This adds a "reset" line to the first program so that it will set itself to run again each time it is run.

   b) If 2 or more programs are already stored in memory, do not enter the "**g GTO 00**" line: proceed with step 4 below.

4. Key in the new program.

5. Add the instructions R/S and then g GTO followed by the line number of the first line of the program you have just entered. These instructions become the last lines of the program you have just entered and stop the program when it has run and then set it to run again.

6. Exit program mode by pressing f P/R again.

EXERCISE: Enter a program which multiples any number by 8 while leaving the "divide by 13" program in the calculator.

	PROCEDURE	PRESS	DISPLAY
1.	Go to the last line of the previous program	g GTO 04	
2.	Enter program mode	f P/R	04- 10
3.	Insert buffer line	g GTO 00	05- 43,33, 00
4.	Add new program:	ENTER	06- 36
		8	07- 8
		x	08- 20
5.	Add end lines:	R/S	09- 31
		g GTO 06	10- 43,33 06
6.	Exit program mode	f P/R	

RUNNING A PROGRAM WHEN 2 OR MORE PROGRAMS ARE STORED

When only one program is stored, the 12C is always set on its first line, ready to run the program when given the R/S instruction. When 2 or more programs are stored, however, the calculator needs to know which program you want to run. The following steps insure that the program you want is the one which is activated.

1. Make sure calculator is in "Run" mode.

2. Enter desired information into display and storage.

3. Press "g GTO" followed by the line number of the first line of the program you want to run.

4. Press "R/S" to begin program.

CHAPTER XX: PROGRAMS FOR THE HP-12C

Each of the following programs can be used by the residential sales associate. Due to the 99 line space limitation, however, not all of the programs can be stored in the 12C at the same time. Therefore, the following procedure is recommended before entering any of them in your calculator:

1. Decide which programs are of the most benefit to you.

2. Count the total number of lines needed by the programs you want to store; make sure the total number of lines used is within the 99 line limit.

3. Enter those programs which are the most useful and which will fit into the 99 lines of program memory.

PROGRAM 1: DETERMINING MAXIMUM P.I. - CONVENTIONAL

PROGRAM DESCRIPTION

The program gives you the maximum loan payment a buyer can carry using conventional financing. The F.N.M.A. qualifying format shown in Appendix B, p. 73, has been followed, using the standard 28%/36% ratios.

The number which appears will be the maximum conventional p.i. payment for the 36% ratio; pressing R↓ twice at that point will display the 28% maximum p.i.

NOTES

1. If the lender's ratios are other than 28%-36%, only lines 5, 6, 11 and 12 need to be changed. For example, if the lenders ratios were 30%-38%, the following changes would be made to the lines listed below:

   5. 3 (05- 3)
   6. 0 (06- 0)
   12. 8 (12- 8)

2. After the program runs, you can determine the maximum loan the prospects can qualify for by simply placing the smallest of the 2 payments into PMT, entering a rate and term, and solving for PV.

3. The storage registers coincide with the registers used for the V.A./F.H.A. qualifying program. Therefore, both programs can be stored and the data entered for one can be used with the other.

STORED INPUT

1. Store estimated taxes, insurance, homeowner's or condo fee and p.m.i., if any, in STO 1.
2. Store the prospect's recurring monthly debts in STO 2.

ENTERING THE PROGRAM

	PRESS	DISPLAY	EXPLANATION
	f REG	0.00	Clears previously stored registers
	f P/R	0.00-	Enters "program" mode
	f PRGM (ONLY IF YOU HAVE NO STORED PROGRAMS YOU WANT TO SAVE!)		
1.	1	01- 1	
2.	2	02- 2	
3.	÷	03- 10	Calculates gross monthly income
4.	STO 5	04- 44 5	Stores monthly income for later use
5.	2	05- 2	
6.	8	06- 8	
7.	%	07- 25	Calculates 28% g.m.i.
8.	RCL 1	08- 45 1	
9.	-	09- 30	Subtracts estimated t.i., h.o.a., condo dues, p.m.i.; result = 28% max. p.i.
10.	RCL 5	10- 45 5	Recalls g.m.i.
11.	3	11- 3	
12.	6	12- 6	
13.	%	13- 25	Calculates 36% g.m.i.
14.	RCL 1	14- 45 1	
15.	-	15- 30	Subtracts estimated t.i., h.o.a./condo dues, p.m.i.
16.	RCL 2	16- 45 2	
17.	-	17- 30	Subtracts monthly debts
	f P/R		Returns calculator to "Run" mode

RUNNING THE PROGRAM

1. Make sure calculator is in "Run" mode.
2. Clear registers (f REG).
3. Enter new assumptions into STO 1 and STO 2.
4. Enter prospects' gross annual income into display.
5. Press g GTO 00 if more than 1 program is in storage.
6. Press R/S to start the program: number which appears in the display will be the maximum allowable p.i. for the 36% ratio.
7. Pressing the R↓ key twice will recall the 28% maximum allowable p.i.: twice more will recall the 36% figure.
8. Enter the smaller number as PMT; enter rate and term; solving for PV gives you the largest conventional loan the prospect can carry at that rate and term.
9. Keeping the same PMT while using different rates and terms will show other maximum loan amounts for those rates and terms.

PROBLEM #37: QUALIFYING FOR MAXIMUM CONVENTIONAL P.I.

Your prospects have a gross annual income of $50,000 and recurring debts of $300. You estimate monthly taxes and insurance as $120. They will be putting 10% down, so you estimate $30 as the monthly p.m.i. charge. There are no homeowners or condo fees. What is the maximum p.i. they can qualify for?

	PROCEDURE	PRESS	DISPLAY
1.	Make sure calculator is in "run" mode		
2.	Clear all registers	f REG	0.00
3.	Store estimated monthly t.i., h.o.a./condo fee, p.m.i.	150 STO 1	300.00
4.	Store monthly debts	300 STO 2	120.00
5.	Display annual income	50000	50,000.00
6.	Begin program; number which appears is the maximum 36% p.i. payment	R/S	1,050.00
7.	Display maximum 28% p.i. payment	R↓ R↓	1,016.67

NOTE: With the smallest of the 2 numbers (1,016.67) in the display, press CHS PMT. The prospect's maximum affordable conventional p.i. is now ready to use with various conventional rates and terms to determine maximum loan capability under various options.

PROBLEM #38: CALCULATING MAXIMUM CONVENTIONAL LOAN

Using the maximum conventional p.i. the prospects in problem #37 can carry, determine their maximum loan capability for a 10.75%, 30 year fixed rate loan and an 8.75%, 30 year a.r.m.

	PROCEDURE	PRESS	DISPLAY
1.	Enter lesser of the 2 numbers as PMT	R↓ R↓ CHS PMT	-1,016.67
2.	Enter rate & term for 1st loan	10.75 g i	0.90
		30 g n	360.00
3.	Calculate maximum loan (1st loan)	PV	108,911.30
4.	Enter rate for 2nd loan (term is the same for both loans)	8.75 g i	0.73
5.	Calculate maximum loan (2nd loan)	PV	129,231.75

PROGRAM 2: MAXIMUM P.I., V.A./F.H.A.

PROGRAM DESCRIPTION

The program calculates the maximum p.i. a prospect can qualify for using V.A. financing. It follows the standard V.A. qualifying form found in Appendix C, p. 74. In most areas of the country, the maximum allowable F.H.A. p.i. will be approximately $300 less than the maximum V.A. p.i. shown by the program.

STORED INPUT

The input for this program correlates with the input for the conventional maximum loan program. Both programs can be stored in the 12C at the same time, and data stored for the conventional program (in STO 1 and STO 2) need not be reentered in order to run the V.A./F.H.A. program.

1. Store estimated monthly taxes, insurance, homeowner's or condo fees, and m.i.p. for F.H.A. loans in STO 1 (if not previously stored in the conventional qualifying program).
2. Store the prospect's recurring monthly debts in STO 2 (if not previously stored in the conventional qualifying program)..
3. Store the authorized V.A. or F.H.A. monthly housing allowance (taken from charts available through lenders) in STO 3.
4. Store V.A. or F.H.A. maintenance/utilities allowance (from lenders charts) in STO 4.

NOTES

1. The program estimates that 29% of the purchasers' gross monthly income is withheld for the total monthly federal tax, monthly state tax and social security, government retirement or self-employment tax. If a different percentage for total withholding is desired, simply enter different numbers into lines 4 and 5 of the program.

2. The line numbers (shown under the "display" column) for entering the program assume that the first program, conventional maximum p.i., is still in the calculator. This is done to show how a second program is entered, using the "g GTO" lines which must follow the first program when a second is entered.

ENTERING THE PROGRAM

	PRESS	DISPLAY	EXPLANATION
	g GTO 17	(No change)	Resets to last line of previous program
	f P/R	17- 30	Shows last line of previous program
	g GTO 00	18- 43,33 00	Adds buffer line between programs
1.	1	19- 1	
2.	2	20- 2	
3.	÷	21- 10	Calculates gross monthly income
4.	2	22- 2	
5.	9	23- 9	
6.	%	24- 25	
7.	-	25- 30	Subtracts 29% of gross monthly income
8.	RCL 1	26- 45 1	
9.	-	27- 30	Subtracts estimated t.i., homeowner's or condo dues, m.i.p.
10.	RCL 2	28- 45 2	
11.	-	29- 30	Subtracts monthly debts
12.	RCL 3	30- 45 3	
13.	-	31- 30	Subtracts family allowance
14.	RCL 4	32- 45 4	
15.	-	33- 30	Subtracts maintenance/utility estimate
16.	R/S	34- 31	Halts program at end
17.	g GTO 19	35- 43,33 19	Sets program to beginning
	f P/R		Returns calculator to "Run" mode

RUNNING THE PROGRAM

1. Make sure calculator is in "run" mode.
2. Clear registers (f REG) only if you do not want to retain debts, t.i., h.o.a./condo fee from previous conventional qualifying program.
3. Enter new assumptions into STO 1 - STO 4. Remember, you can use what is already stored in STO 1 and STO 2 if you are qualifying the same prospect.
4. Place prospect's annual income in the display.
5. Press g GTO 19 R/S to begin the program. This instruction assumes that the program begins on line #19. If not, substitute the correct line number.

PROBLEM #39: QUALIFYING FOR MAXIMUM VA/FHA P.I.

Qualify the same prospects from problem #37 for a maximum V.A. p.i. payment. Use the same t.i. ($120) from the previous problem. Use a V.A. family allowance of $781 and a maintenance allowance of $200. Do not include a homeowner's or condo fee, since the prospects want a detached home. Do not include an estimate for F.H.A. m.i.p., since the prospects are overqualified for the maximum F.H.A. loan.

	PROCEDURE	PRESS	DISPLAY
1.	Make sure calculator is in "run" mode		
2.	Clear registers	f REG	0.00
3.	Store monthly t.i., h.o.a./condo, m.i.p.	120 STO 1	300.00
4.	Store monthly debts	300 STO 2	120.00
5.	Store family allowance	781 STO 3	81.00
6.	Store maintenance/utilities	200 STO 4	00.00
7.	Display annual income	50000	50,000.00
8.	Set to first program line	g GTO 19	50,000.00
9.	Begin program; number showing when the program stops is the maximum allowable p.i. for V.A.financing.	R/S	1,557.33

NOTE: The maximum F.H.A. p.i. in most areas of the country is approximately $300-$400 less than the maximum V.A. p.i. Therefore, simply subtract the desired amount from the figure given by the 12C if you are qualifying for an F.H.A. loan.

PROGRAM 3: AMORTIZING A LOAN

PROGRAM DESCRIPTION

This program shows you the principal and interest portion of each month's loan payment, as well as the remaining loan balance after each payment.

NOTES

1. The R/S instruction in lines 7, 9 and 11 causes the program to stop at an answer until you press R/S again to re-start the program. If you prefer, you can replace the R/S command with a g PSE instruction (or several of them for a longer pause) to have the answer displayed briefly, then have the program re-start itself.

2. Remember to add the "buffer" lines if you are entering this behind another program.

ENTERING THE PROGRAM

	PRESS	DISPLAY	EXPLANATION
1.	1	01- 1	
2.	n	02- 11	
3.	1	03- 1	
4.	f n	04- 42 11	Calculates 1 month's interest
5.	R/S	05- 31	Stops program
6.	x≈y	06- 34	Calculates 1 month's principal
7.	R/S	07- 31	Stops program
8.	RCL PV	08- 45 13	Calculates remaining balance
9.	R/S	09- 31	Stops program
10.	RCL n	10- 45 11	Displays # of next payment
11.	R/S	11- 31	Stops program
12.	g GTO 03	12- 43,33 03	"Loops" program to beginning

RUNNING THE PROGRAM

1. Run the program after you have calculated a loan payment and the payment is in the display. With the payment in the display, press R/S.

2. The first number shown is the interest portion of payment #1; the second number is the principal portion of payment #1; the third number shown is the balance remaining after payment #1.

3. Thereafter, the sequence shown is: the number of the payment, the interest portion of that payment, the principal portion of that payment, and the balance remaining.

PROBLEM #40: AMORTIZING A LOAN

Calculate the monthly payment for an $80,000 loan written at 10½% for 30 years. Calculate the interest and principal portion of payments 1 and 2, as well as the remaining balance after each of the first 2 payments.

	PROCEDURE	PRESS	DISPLAY
1.	Clear registers	f REG	0.00
2.	Enter total # of payments	30 g n	360.00
3.	Enter the interest rate per pmt.	10.5 g i	0.88
4.	Enter loan amount	80000 PV	80,000.00
5.	Compute monthly payment	PMT	-731.79
6.	Calculate interest portion of payment #1 (program begins at this point)	R/S	-700.00
7.	Calculate principal portion of payment #1 (program continues)	R/S	-31.79
8.	Display remaining balance after payment #1	R/S	79,968.21
9.	Display number of next payment	R/S	2.00
10.	Continue for payment #2; interest portion of payment #2 is shown	R/S	-699.72
11.	Display principal portion of payment #2	R/S	-32.07
12.	Display remaining balance after payment #2	R/S	79,936.14

NOTE: The program could be continued until all 360 payments had been amortized.

PROGRAM 4: ADJUSTABLE RATE MORTGAGE

PROGRAM DESCRIPTION

Given the initial rate, the term of the loan, and the periodic and lifetime "caps," this program shows prospective borrowers a "worst case" scenario of their maximum monthly payment each year of the loan until the maximum possible payment has been reached.

STORED INPUT

1. The number 324 is placed in STO 1. This number assumes you are calculating a 1 year adjustment period. If you are calculating any other adjustment period, use the correct number given below:

6 month a.r.m.-------	342
2 year a.r.m.--------	288
3 year a.r.m.--------	252

2. Store the periodic cap (the maximum rate increase per adjustment period), divided into monthly payments, in STO 2. If a loan has a 2% periodic cap, press "2," press g i, then press STO 2.

3. Store the final rate increase in STO 3. If a loan had a 2% periodic cap and a 5% lifetime cap, for instance, you would store 1/12 of 2 in STO 2 and 1/12 of 1 in STO 3; the loan would have risen a maximum of 4% over its first two adjustment periods, leaving a maximum 1% increase before reaching the lifetime cap.

NOTES

1. Lines 5 and 6 assume a 1 year adjustment period. A remaining balance after one year has been calculated (lines 1-3), and the 12C automatically adds 12 months to the original 360 month term when this is done. Therefore, 24 months need to be subtracted to get the loan to the correct number of payments remaining after 12 payments have been made (372 - 24 = 348).

   If you are calculating an a.r.m. with an adjustment period other than 1 year, substitute the correct number to be subtracted as shown below:

6 month a.r.m.	line 5 = 1; line 6 = 2	(subtracts 12 months)
2 year a.r.m.	line 5 = 4; line 6 = 8	(subtracts 48 months)
3 year a.r.m.	line 5 = 7; line 6 = 2	(subtracts 72 months)

2. The number stored in STO 1 is a "test value" used to "branch" the program forward at the proper time. When the program reaches line 10, the stored number "324," is recalled and placed in the "x" register; line 11 then switches it with the number in the "y" register, the number of months currently remaining on the loan, calculated in line 8.

   For the first two run-throughs of the program, the number of months remaining is greater than the test number: 348 months and 336 months. Line 12 tests whether the number in the "x" register (348 and then 336) is less then or equal to the test number (324). Since it is not during the first two passes, the program skips line 13, which is the instruction to go to line 21. It recalls the last interest rate (line 14), adds the correct monthly rate for a 2% maximum increase (lines 15 & 16), then calculates the new payment. The program then goes back to line 01 when it reaches the instruction in line 20.

   When line 12 is reached the third time, the number in the "x" register is 324 and the number in the "y" register is 324 (the number of months remaining in the loan, which had been in the "x" register). Since the number in the "x" register is equal to the number in the "y" register, the program continues to line 13, the instruction to go to line 21. The latest interest rate is recalled (line 21) and the monthly rate for a 1% increase is added (lines 22 and 23) since two 2% caps have already been added and there is a 5% maximum rate increase. The payment is calculated at this new, maximum rate.

   Although not covered in detail in our text, "branching" and "looping" can help save program lines by making programs go backward or forward at a certain point. For more on these techniques, see Section 9: "Branching and Looping" in your HP-12C "Owner's Handbook and Problem-Solving Guide".

ENTERING THE PROGRAM

	PRESS	DISPLAY	EXPLANATION
1.	1	01- 1	
2.	2	02- 2	
3.	f n	03- 42 11	Amortizes the 1st 12 payments & gives a remaining balance after the 1st year
4.	RCL n	04- 45 11	Recalls n, now 12 payments more than original number of payments

(contd.)

12C Programs

5.	2	05- 2	
6.	4	06- 4	
7.	-	07- 30	Subtracts 24 payments; result is correct # of payments at start of year #2
8.	n	08- 11	Enters new # of payments
9.	ENTER	09- 36	Enters new # of payments into stack registers
10.	RCL 1	10- 45 1	Recalls test value
11.	x≈y	11- 34	Places test value in y register; places remaining payments in x register
12.	g x≤y	12- 43 34	Tests whether value in x register is equal to or greater than the value in y register
13.	g GTO 21	13- 43,33 21	Instruction followed if line 12 is true
14.	RCL i	14- 45 12	Recalls last interest rate used
15.	RCL 2	15- 45 2	
16.	+	16- 40	Adds 2% ÷ 12 to rate in line 14
17.	i	17- 12	Enters result of line 16 as new interest rate
18.	PMT	18- 14	Calculates new payment
19.	R/S	19- 31	Stops program so that payment is displayed
20.	g GTO 01	20- 43,33 01	Sends program back to line 1 for another run
21.	RCL i	21- 45 12	Recalls latest interest rate; program has gone ahead to this line if line 12 proves false
22.	RCL 3	22- 45 3	Recalls last possible rate increase
23.	+	23- 40	Adds last possible increase to last rate used
24.	i	24- 12	Enters maximum interest rate
25.	PMT	25- 14	Calculates maximum possible payment

RUNNING THE PROGRAM

1. Make sure calculator is in "run" mode
2. Clear registers
3. Enter data into **STO 1-3**
4. Calculate the loan payment for the desired loan.
5. Enter **g GTO** and the starting line of this program, if necessary.
6. Press **R/S** to begin the program: the number which appears in the display is the maximum payment for the next period (year #2 in a 1 year a.r.m., for example).
7. Press **R/S** again: the number which next shows in the display will be the maximum payment for the next adjustment period.
8. Press **R/S** one additional time; the number appearing in the display will be the highest loan payment the borrower would have over the life of the loan.

PROBLEM #41

You are considering an $80,000 a.r.m. with an initial interest rate of 7.5% and a term of 30 years. The maximum annual cap is 2%, and the maximum lifetime cap is 5%. Using the a.r.m. program, calculate a "worst case" scenario.

	PROCEDURE	PRESS	DISPLAY
1.	Clear all registers	f REG	0.00
2.	Store test value	324 STO 1	324.00
3.	Store maximum periodic rate increase as a monthly increase	2 g i STO 2	0.17
4.	Store maximum final rate increase as a monthly increase	1 g i STO 3	0.08
5.	Enter loan data:	80000 PV	80,000.00
		7.5 g i	0.63
		360 n	360.00
6.	Calculate 1st year payment	PMT	-559.37
7.	Calculate maximum 2nd year payment	R/S	-670.62
8.	Calculate maximum 3rd year payment	R/S	-786.32
9.	Calculate maximum possible payment	R/S	-845.25

PROGRAM 5: AFTER-TAX PAYMENT ESTIMATE

PROGRAM DESCRIPTION

This program provides an estimate of the borrower's true, after-tax payment. The final amount displayed is the result of subtracting tax deductions for interest and taxes from the borrower's monthly p.i.t.i. payment.

STORED INPUT

1. Place the property taxes in STO 1.

2. Place the buyer's estimated tax bracket in STO 2.

3. Place the total of the monthly property taxes, homowner's insurance, any homeowner's or condominium fee and any p.m.i. or m.i.p. in STO 3.

NOTES

1. If desired, an R/S instruction can be placed after line 11. If this is done, the program will stop and display the tax savings.

2. The program does not take into account the $5,000 standard deduction taken by those prospects who have not been itemizing their deductions, such as first-time homebuyers. If you wish to take this into consideration, add the following lines between lines 9 and 10:

10.	416.67	(1/12 of the yearly $5,000 deduction)
11.	-	(Subtracts the monthly standard deduction from the total monthly interest/tax deduction)

ENTERING THE PROGRAM

	PRESS	DISPLAY	EXPLANATION
1.	1	01- 1	
2.	2	02- 2	
3.	f AMORT	03- 42 11	Calculates 1st year's interest
4.	1	04- 1	
5.	2	05- 2	
6.	÷	06- 10	Calculates average monthly interest
7.	CHS	07- 16	Changes negative interest # to a positive
8.	RCL 1	08- 45 1	Recalls monthly property taxes
9.	+	09- 40	Adds property taxes & interest
10.	RCL 2	10- 45 2	Recalls buyer's estimated tax bracket
11.	%	11- 25	Calculates interest & taxes saved
12.	STO 4	12- 44 4	Stores tax savings in register 4
13.	RCL PMT	13- 45 14	Recalls p.i. payment
14.	CHS	14- 16	Changes p.i. to a positive number
15.	RCL 3	15- 45 3	Recalls total taxes, insurance, homeowners/condo fee + p.m.i./m.i.p.
16.	+	16- 40	Calculates total p.i.t.i. + homeowners/condo fee + p.m.i./m.i.p.
17.	RCL 4	17- 45 4	Recalls tax savings
18.	-	18- 30	Subtracts tax savings; result = estimated after-tax payment

RUNNING THE PROGRAM

1. Clear all registers (f REG)

2. Store the monthly property taxes in STO 1.

3. Store the buyer's estimated tax bracket in STO 2. Store it as a whole number, not a percentage (i.e., "28" not ".28").

4. Store the total of the following in STO 3: monthly property taxes, homeowner's insurance, any homeowner's or condominium fee, any p.m.i. or m.i.p. payment.

5. Calculate the loan payment in the usual manner.

6. With the loan payment in the display, press R/S. The number which appears will be the buyer's approximate after-tax house payment.

PROBLEM #42: BUYER'S AFTER-TAX PAYMENT ESTIMATE

A buying couple hesitates at buying a home which would require an $80,000 loan, monthly payments, written at 10½% for 30 years. The home has monthly property taxes of $100 and homeowner's insurance of $20 per month. There is no homeowner's/condo fee or p.m.i. To close the sale, you show them what an estimate of what their $851.79 p.i.t.i. payment would be after taxes. They are in the 28% tax bracket. What would the after-tax payment be?

	PROCEDURE	PRESS	DISPLAY
1.	Clear all registers	f REG	0.00
2.	Store monthly property taxes	100 STO 1	100.00
3.	Store tax bracket	28 STO 2	28.00
4.	Store total of taxes & insurance	120 STO 3	120.00
5.	Calculate monthly mortgage payment	80000 PV	80,000.00
		10.5 g i	0.88
		360 n	360.00
		PMT	-731.79
6.	Calculate after-tax payment estimate	R/S	628.23

PROGRAM 6: ANNUAL PERCENTAGE RATE

PROGRAM DESCRIPTION

This program calculates the annual percentage rate (a.p.r.) for a loan, taking into account the "points" and other loan fees paid at closing.

STORED INPUT

Store the total of loan fees and points in **STO 1**.

ENTERING THE PROGRAM

	PRESS	DISPLAY	EXPLANATION
1.	RCL PV	01- 45 13	Recalls loan amount
2.	RCL 1	02- 45 1	Recalls loan fees
3.	-	03- 10	Subtracts loan fees from loan to reflect actual amount received
4.	PV	04- 13	Enters amount received as new PV
5.	i	05- 12	Calculates new monthly interest rate
6.	RCL g i	06- 45,43 12	Calculates annual a.p.r.

RUNNING THE PROGRAM

1. Clear all registers by pressing **f REG**.
2. Store the estimated loan fees in **STO 1**.
3. Calculate the loan payment in the usual manner.
4. Press **R/S**. The number in the display is the a.p.r. for the loan.

PROBLEM #43: DETERMINING ANNUAL PERCENTAGE RATE

You are getting a $78,000 loan, monthly payments, written at 10½% for 30 years. A total of 2 points ($1,560) will be charged at settlement. What is the a.p.r. for the loan?

	PROCEDURE	PRESS	DISPLAY
1.	Clear all registers	f REG	**0.00**
2.	Store the loan fees in STO 1	1560 STO 1	**1,560.00**
3.	Calculate the monthly payment	78000 PV	**78,000.00**
		10.5 g i	**0.88**
		360 n	**360.00**
		PMT	**-713.50**
4.	Calculate the a.p.r.	R/S	**10.75**

APPENDIX A: THE STACK REGISTERS

One feature of the 12C which saves you time and effort is the "stack registers." These 4 storage areas automatically store numbers you enter into the display or answers to calculations, so that they may be recalled for future use.

WHAT THE STACK REGISTERS DO

The stack registers can be thought of as a record changer; you have four "records" in place on a spindle, waiting to drop on the turntable. The "spindle" is the stacks, the "records" are entries or answers to previous problems, while the "turntable" is the 12C's display.

Each time you enter a number in the display or calculate a loan payment, it automatically goes into the lowest stack; when you hit ENTER, the number is entered into the next highest stack. There are 4 stacks: "X," "Y," "Z" and the top, or "T" stack.

On page 9, we had the following problem:

$$\frac{(3 \times 4) + (5 \times 6)}{7}$$

The stack registers made it possible for you to do the 4 separate elements of this problem without having to manually store each answer along the way or, as would be required with calculators having only 1 memory storage register, to write down an answer to one part of the problem and then re-enter it later.

The problem would look like this as the stack registers retain different calculations in memory:

T	0	0	0	0	0	0	0	0	0	0	0
Z	0	0	0	0	0	12	12	0	0	0	0
Y	0	3	3	0	12	5	5	12	0	42	0
X	3	3	4	12	5	5	6	30	42	7	6
ENTRY	3	ENT	4	X	5	ENT	6	X	=	7	+
STEP	1	2	3	4	5	6	7	8	9	10	11

Appendix A: The Stack Registers

To use our record player comparison, the "X" register contains the record being played (the number showing in the display). The "Y" stack holds the record (number) ready to drop into play if you need it. Above it is the record (number) in the "Z" stack, and above it is the record (number) in the "T" stack.

When 3 was placed in the window in step 1, for example, it automatically went into the "X" register, the display register; when you hit ENTER in step 2, the 3 stayed in the display register ("X") and was also entered into the next register ("Y") to be held for future use. When you pressed 4, the 4 replaced the 3 in the "X" or display register; when you performed an operation, in this case multiplication in step 4 by pressing x, the bottom 2 registers were combined. The numbers in the "X" and "Y" registers were multiplied, thus giving you "12" in your display.

When you press ENTER, the number in your display moves into the "Y" stack; any number in the "Y" stack moves up into the "Z" stack, and any number in the "Z" stack moves to the top, or "T," stack. If there was a number in the "T" stack, it is lost.

Any operation (add, subtract, multiply or divide) you perform combines the numbers in the bottom 2 stack registers. This occurred in steps 4, 8, 9 and 11. Note that when the bottom 2 numbers are combined, the numbers in the stack registers above drop down one register. When you multiplied 6 x 5 in step 8, for example, the 12 in the "Z" register dropped to the "Y" register, ready for future use.

MAKING THE STACKS WORK FOR YOU

Having numbers stored in the stack registers allows you to bring them back into the display for use in other problems. Two keys make this possible:

x≈y Key #34. Exchanges the numbers stored in the "X" and "Y" registers. It allows you to bring into the display the answer to the last problem you worked on without losing the number currently in your display.

In the above problem, for example, pressing x≈y after having performed step 7 would have put "5" in your window, ready to be used in a problem, while the "6" which had been in the "X" register would have been stored in the "Y" register.

R↓ Key #33. Causes the number in each stack register to drop into the next lowest register. When it is pressed, the number formerly in "X" register goes to the top, or "T" register.

Appendix A: The Stack Registers

R↓ allows you to roll through the stack registers so that you can recover a previous number to use in a current calculation. If, for example, you wanted to recover the "12" stored in the "Z" register after step 6, you would press the R↓ 2 times; the "12" would appear in the display. Meanwhile, the 5's would have moved to the "Z" and "T" registers, ready to be recalled if you needed them.

PROBLEM #44: USING R↓

	PROCEDURE	PRESS	DISPLAY
1.	Multiply 28 by 12	28 ENTER 12 x	336.00
2.	Divide 3 by 4	3 ENTER 4 ÷	0.75
3.	Add 28 and 2	28 ENTER 2 +	30.00
4.	Recall the answer from step #1	R↓ R↓	336.00
5.	Divide the number by 12.5	12.5 ÷	26.88

NOTE: By looking at the right hand column above, you can see what was happening in the stacks as you did the problem. You first answer, 336.00, gets pushed up in the stacks by the next 2 answers. After you finish step 3, and 30 is showing in the display, the other 2 answers are right on top of it. Pressing R↓ twice would bring 336.00 back into the display.

PROBLEM #45: Calculate 90%, 85% and 75% loans for a $120,000 purchase

	PROCEDURE	PRESS	DISPLAY
1.	Clear all registers	f REG	0.00
2.	Enter sales price	120000 ENTER	120,000.00
3.	Calculate 90% loan	90 %	108,000.00
4.	Recall sales price	R↓	120,000.00
5.	Calculate 85% loan	85 %	102,000.00
6.	Recall sales price	R↓	120,000.00
7.	Calculate 75% loan	75 %	90,000.00

NOTE: When calculating percentages using the % key, the numbers in the X and Y registers do not combine, as they do when multiplying, adding, subtracting or dividing. The original number, 120,000 in the above problem, remains intact.

USING CONSTANTS

There are times when using a "constant" number is useful. An example would be calculating individual year's appreciation. The stack registers allow you to do this.

When performing arithmetic operations such as adding, multiplying, dividing or subtracting, the bottom 2 registers combine, and the stacks "drop": what was in the Z register drops into the Y register. Whatever is in the T register, however, does not drop. It remains there and can be used as a constant. The following problem illustrates a procedure known as "loading the stacks." The number 1.07 represents a 7% appreciation rate per year and is entered three times (if a property appreciates 7%, it is worth 107% of what it was previously; 1.07 is the decimal equivalent of 107%). Each time the **x** key is pressed, the value in the display is multiplied by 107% and the new value of the property is shown.

PROBLEM #46: Using a constant number

You are showing a property listed at $128,000. To help the buyers make a decision, you show them what the property should be worth each year for 3 years if your area's historical appreciation rate of 7% per year continues.

	PROCEDURE	PRESS	DISPLAY
1.	Clear all registers	f REG	0.00
2.	Enter 1.07 as a constant	1.07 ENTER ENTER ENTER	1.07
3.	Key in property's original value	128000	128,000
4.	Calculate value after 1 year	x	136,960.00
5.	Calculate value after 2 years	x	146,547.20
6.	Calculate value after 3 years	x	156,805.50

NOTES:

1. This procedure could be continued. If you wanted to find the approximate value at the end of the 8th year, for example, you would press the **x** key 5 more times.

2. If you simply wanted to show value at the end of one particular year, you would not need to load the stack registers. If you just wanted to calculate value at the end of the 3rd year, for example, you would enter 128000 as PV, 7 as i, 3 as n, and press FV.

APPENDIX B: CONVENTIONAL QUALIFYING FORM

STEP ONE: Determine Maximum Allowable Loan Payment (Max. p.i.)
Complete both columns below, using whatever qualifying ratios your lenders are using. The purchaser's maximum allowable loan payment will be the lesser of (A) or (B).

$_____ Gross Annual Income

$_____ Gross Monthly Income

X 28% = _____ (piti)	X 36% = _____ (piti + debts)
- _____ (Est. taxes)	- _____ (Est. taxes)
- _____ (Est. insurance)	- _____ (Est. insurance)
- _____ (Est. p.m.i.)	- _____ (Est. p.m.i.)
- _____ (Est. h.o.a./condo)	- _____(Est.h.o.a./condo)
	- _____ (Monthly debts)
= _____ (A)	= _____ (B)

STEP TWO: Determine The Purchaser's Maximum Loan Amount

A. Research loans offered by local lenders: fixed rate and a.r.m.'s

B. Use the lesser of the two amounts above together with the rate and term of each lender's offering. Remember to use the qualifying rate, not the payment rate, for a.r.m.'s. if both rates are given.

C. Enter your data into a financial calculator and compute several maximum loan amounts.

1. The lesser of the two amounts above will be PMT
2. The rate offered will be i
3. The term offered will be n
4. Solve for PV

APPENDIX C: V.A./F.H.A. QUALIFYING FORM

Gross Annual Income $_____

Gross Monthly Income $_____

Subtract The Following:

1. Monthly Federal Tax Withheld -_____

2. Monthly State Tax Withheld -_____

3. Social Security -_____
   -or-
   Govt. Retirement Tax -_____
   -or-
   Self-Employment Tax -_____

=_____

Add Any Non-Taxable Income +_____

Total Qualifying Income: =_____

Subtract The Following: (over 70K loan)

1. Single Adult....$ 393 -_____
   Family of 2.....$ 658
   " " 3.....$ 792
   " " 4.....$ 893
   " " 5.....$ 925
   (Add $75 for each additional family member up to 7)

2. Long Term Debts -_____
   VA: over 6 months
   FHA: over 12 months

3. Maintenance & Utilities -_____

TOTAL AMOUNT AVAILABLE FOR P.I.T.I. =_____

PRACTICE PROBLEMS

BASIC CALCULATOR OPERATIONS

(Answers begin on page 86)

1. 25 + 31.6 _____

2. 25 + 31.6 + 8 _____

3. 3 ÷ 20 _____

4. (10 + 2) ÷ 12 _____

5. (89 ÷ 14) + (6 x 4) _____

6. $\frac{(43 + 13) - (9 \times 16)}{8}$ _____

7. $\frac{(16 \div 5) + (12 - 8)}{(8 + 12) + (10 \div 4)}$ _____

STORAGE REGISTERS

(Answers begin on page 86)

8. A. Store the number 24 in register 0
   B. Add 2 plus 4
   C. Recall the number in register 0

9. A. Store the number 15 in register .0 and the number 2 in register 6
   B. Divide 12 by 8
   C. Recall the numbers in the storage registers

10. Replace the number 15 in register .0 with the number 45.

DATES

(Answers begin on page 87)

11. You are writing a contract on April 27, 1989 and want to close in 45 days. What is the day and date of the settlement? _____

Date Problems

12. It is January 14, 1989, and your youngest child asks you how many days remain until Christmas. Calculate the number of days. _____

13. Determine the day of the week you were born on. _____

PERCENTAGES

(Answers begin on page 87)

14. 20% of 1,280 is _____

15. 20% of $145,000 is _____

16. 35% of 85,000 is _____

17. A buyer wants to put down 15% on an $86,500 home. What is the buyer's down payment and loan amount?

    Down Payment: _____ Loan Amount: _____

18. A home originally sold for $60,000 and was sold 7 years later for $123,000. What was the total percentage of appreciation for the home? _____%

19. What was the average yearly appreciation for the home in problem #18? _____%

20. Calculate 15% of each of the following numbers:

    a. 123 _____
    b. 1,487 _____
    c. 143,700 _____

21. You earned a total of $185,000 in commissions last year, $92,345 of which came from sales to small investors. What percentage of your commissions came from the investors?

    Investment Commissions: _____% of total commissions

ENTERING RATE AND PERIODS

(Answers begin on page 88)

Calculate the total number of payments or the interest rate per payment in the following problems. Use the **g n** or **g i** key combination whenever applicable.

22. 15 year loan, monthly payments _____total payments

23. 10% interest, monthly payments _____interest per payment

24. 30 year loan, monthly payments _____total payments

25. 30 year loan, 9.8% interest, monthly payments _____interest per payment

26. 30 year loan, 9.8% interest, quarterly payments _____interest per payment

27. 15 year loan, quarterly payments _____total payments

28. 10% interest, semi-annual payments _____interest per payment

29. 30 year loan, quarterly payments _____total payments

CALCULATING MONTHLY PAYMENT

(Answers begin on page 89)

Calculate the monthly payment for the following loans:

30. Loan Amount: 65,000
    Interest Rate: 10%
    Term: 30 years
    Monthly Payment: _____

31. Loan Amount: 118,000
    Interest Rate: 10¼%
    Term: 20 years
    Monthly Payment: _____

Monthly Payment Problems

32. Loan Amount: 135,000
    Interest Rate: 10¼%
    Term: 20 years
    Monthly Payment: _____

33. Loan Amount: 54,000
    Interest Rate: 10½%
    Term: 30 years
    Monthly Payment: _____

34. Loan Amount: 54,000
    Interest Rate: 9.876%
    Term: 25 years
    Monthly Payment: _____

35. Loan Amount: 54,000
    Interest Rate: 10¼%
    Term: 25 years
    Monthly Payment: _____

36. Loan Amount: 168,000
    Interest Rate: 10½%
    Term: 30 years
    Monthly Payment: _____

37. Loan Amount: 172,000
    Interest Rate: 10%
    Term: 30 years
    Monthly Payment: _____

38. Loan Amount: 172,000
    Interest Rate: 10%
    Term: 20 years
    Monthly Payment: _____

39. Loan Amount: 125,000
    Interest Rate: 10¼%
    Term: 30 years
    Monthly Payment: _____

Monthly Payment Problems

40. Loan Amount: 67,000
    Interest Rate: 10%
    Term: 25 years
    Monthly Payment: _____

41. Loan Amount: 67,000
    Interest Rate: 8%
    Term: 25 years
    Monthly Payment: _____

42. Loan Amount: 72,000
    Interest Rate: 10½%
    Term: 20 years
    Monthly Payment: _____

43. Loan Amount: 25,000
    Interest Rate: 10½%
    Term: 30 years
    Monthly Payment: _____

44. Loan Amount: 77,000
    Interest Rate: 10%
    Term: 30 years
    Monthly Payment: _____

45. Loan Amount: 870,000
    Interest Rate: 10%
    Term: 30 years
    Monthly Payment: _____

46. Loan Amount: 12,000
    Interest Rate: 10½%
    Term: 20 years
    Monthly Payment: _____

47. Loan Amount: 125,000
    Interest Rate: 10%
    Term: 30 years
    Monthly Payment: _____

Monthly Payment Problems

48. Loan Amount: 79,000
    Interest Rate: 12%
    Term: 30 years
    Monthly Payment: _____

49. Loan Amount: 470,000
    Interest Rate: 10¼%
    Term: 30 years
    Monthly Payment: _____

CALCULATING PERIODIC PAYMENT

(Answers begin on page 92)
Calculate whatever periodic payment is called for in the following loans:

50. Loan Amount: 128,000
    Interest Rate: 10½%
    Term: 25 years
    Quarterly Payment: _____

51. Loan Amount: 89,000
    Interest Rate: 11%
    Term: 30 years
    Semi-Annual Pmt.: _____

52. Loan Amount: 245,000
    Interest Rate: 11%
    Term: 30 years
    Semi-Annual Pmt.: _____

53. Loan Amount: 100,000
    Interest Rate: 10¾%
    Term: 30 years
    Quarterly Payment: _____

54. Loan Amount: 98,000
    Interest Rate: 9½%
    Term: 30 years
    5 Payments p/yr.: _____

Periodic Payment Problems

55. Loan Amount: 98,000
    Interest Rate: 9½%
    Term: 30 years
    Annual Payment: _____

56. Loan Amount: 120,000
    Interest Rate: 11½%
    Term: 30 years
    Quarterly Payment: _____

57. Loan Amount: 215,000
    Interest Rate: 11¾%
    Term: 30 years
    Quarterly Payment: _____

58. Loan Amount: 80,000
    Interest Rate: 10½%
    Term: 30 years
    Quarterly Payment: _____

59. Loan Amount: 198,000
    Interest Rate: 9½%
    Term: 30 years
    5 Payments p/yr.: _____

60. Loan Amount: 198,000
    Interest Rate: 9½%
    Term: 30 years
    Annual Payment: _____

CALCULATING MAXIMUM LOAN AMOUNT

(Answers begin on page 93)

61. Loan Amount: _____
    Interest Rate: 10%
    Term: 20 years
    Monthly Payment: 687.00

62. Loan Amount: _____
    Interest Rate: 10%
    Term: 30 years
    Monthly Payment: 687.00

63. Loan Amount: _____
    Interest Rate: 8½%
    Term: 30 years
    Monthly Payment: 687.00

64. Loan Amount: _____
    Interest Rate: 10%
    Term: 20 years
    Monthly Payment: 987.00

65. Loan Amount: _____
    Interest Rate: 10%
    Term: 20 years
    Monthly Payment: 765.00

CALCULATING REMAINING BALANCE

(Answers begin on page 94)

66. Calculate the monthly payment and the remaining balance at the end of the 3rd year for the following loan:

    Loan Amount: 100,000
    Interest Rate: 10%
    Term: 30 years
    Monthly Payment: _____
    Remaining Balance: _____

Remaining Balance Problems

67. Calculate the monthly payment and the remaining balance at the end of the 5th year for the same loan:

Loan Amount:	100,000
Interest Rate:	10%
Term:	30 years
Remaining Balance:	_____

ACCUMULATED INTEREST AND REMAINING BALANCE

(Answers begin on page 94)

68. Calculate the monthly payment, the accumulated interest and remaining balance at the end of the 3rd year for the following loan.

Loan Amount:	100,000
Interest Rate:	11%
Term:	30 years
Monthly Payment:	_____
Accumulated Interest:	_____
Remaining Balance:	_____

69. Calculate the quarterly payment, accumulated interest and remaining balance at the end of the 1st year for the following loan.

Loan Amount:	100,000
Interest Rate:	10%
Term:	30 years
Quarterly Payment:	_____
Accumulated Interest:	_____
Remaining Balance:	_____

70. Calculate the monthly payment, accumulated interest and remaining balance at the end of the 4th year for the following loan.

Loan Amount:	68,000
Interest Rate:	10½%
Term:	25 years
Monthly Payment:	_____
Accumulated Interest:	_____
Remaining Balance:	_____

Accumulated Interest/Remaining Balance Problems

71. Calculate the monthly payment and the total interest paid over the life of the following loan.

Loan Amount:	122,000
Interest Rate:	10¾%
Term:	30 years
Monthly Payment:	_____
Accumulated Interest:	_____

PAYMENTS TO INTEREST AND PRINCIPAL

(Answers begin on page 95)

72. You get a $152,000 loan @ 10¾% interest, 30 years, monthly payments. How much would be applied to interest your first year? How much to principal?

Monthly Payment:	_____
1st Year Interest:	_____
1st Year Principal:	_____

73. How much interest would you pay during the 2nd year of the above loan? How much principal?

2nd Year Interest:	_____
2nd Year Principal:	_____

74. Calculate the monthly payment, the amount of accumulated interest and the amount paid to principal during the 5th year, and the remaining balance at the end of the 5th year for a $98,000 loan @ 10%, 30 years.

Monthly Payment:	_____
5 Year's Interest:	_____
5th Year's Principal:	_____
Remaining Balance:	_____

CALCULATING DISCOUNT AND YIELD

(Answers begin on page 96)

75. Your seller is asked to hold a $15,000 2nd written at 10% for 10 years. Calculate the monthly payment and the price an investor wanting an 18% yield would pay for the note when no payments have been made.

    Monthly Payment: _____
    Price Investor Would Pay: _____

76. A note has a balance of $19,316.88 and is written at 10¼% with a monthly payment of 221.08. What price would your investor pay if she required a 16% yield?

    Price Investor Would Pay: _____

SOLUTIONS TO PRACTICE PROBLEMS

BASIC CALCULATOR OPERATIONS

	PRESS	DISPLAY
1.	25 ENTER 31.6 +	56.60
2.	8 +	64.60
	(Using information from previous problem)	
3.	3 ENTER 20 ÷	0.15
4.	10 ENTER 2 + 12 ÷	1.00
5.	89 ENTER 14 ÷	6.36
	6 ENTER 4 x	24.00
	+	30.36
6.	43 ENTER 13 +	56.00
	9 ENTER 16 x	144.00
	-	-88.00
	8 ÷	-11.00
7.	16 ENTER 5 ÷	3.20
	12 ENTER 8 -	4.00
	+	7.20
	8 ENTER 12 +	20.00
	10 ENTER 4 ÷	2.50
	+	22.50
	÷	0.32

STORAGE REGISTERS

	PRESS	DISPLAY
8. A.	24 STO 0	24.00
B.	2 ENTER 4 +	6.00
C.	RCL 0	24.00

Storage Register Answers

9. A.	15 STO . 0	15.00
	2 STO 6	2.00
B.	12 ENTER 8 ÷	1.50
C.	RCL . 0	15.00
	RCL 6	2.00
10.	45 STO . 0	45.00

DATES

(Solutions are shown using the **M.DY** format)

	PRESS	DISPLAY
11.	4.271989 ENTER	4.27
	45	45.
	g DATE	6,11,1989 7
12.	1.141989 ENTER	1.14
	12.251989 g ▲DYS	345

13. a) Enter the date 2 days after your birthday
    b) Enter **2 CHS** and press **g DATE.**
    c) The number to the right indicates the day of the week you were born on.

PERCENTAGES

	PRESS	DISPLAY	
14.	1280 ENTER 20 %	256.00	
15.	145000 ENTER 20 %	29,000.00	
16.	85000 ENTER 35 %	29,750.00	
17.	86500 ENTER	86,500.00	
	15 %	12,975.00	(Down Payment)
	-	73,525.00	(Loan Amount)
18.	60000 ENTER	60,000.00	
	123000 ▲%	105.00	(105%)

Percentage Answers

19.	7 ÷	15.00 (15%)
20.	a. 123 ENTER 15 %	18.45
	b. 1487 ENTER 15 %	223.05
	c. 143700 ENTER 15 %	21,555.00
21.	185000 ENTER	185,000.00
	92345	92,345.
	%T	49.92 (49.92%)

ENTERING RATE AND PERIODS

	PRESS	DISPLAY
22.	15 g n	180.00
23.	10 g i	0.83
24.	30 g n	360.00
25.	9.8 g i	0.82
26.	9.8 ENTER 4 ÷ i	2.45
27.	15 ENTER 4 x n	60.00
28.	10 ENTER 2 ÷ i	5.00
29.	30 ENTER 4 x n	120.00

CALCULATING MONTHLY PAYMENT

The following solutions assume you are doing the practice problems in order. Therefore, steps which need not be re-entered because the information has not changed from the previous problem have been omitted.

	PRESS	DISPLAY
30.	f FIN	
	360 n	360.00
	10 g i	0.83
	65000 PV	65,000.00
	PMT	-570.42
31.	f FIN	-570.42
	20 g n	240.00
	10.25 g i	0.85
	118000 PV	118,000.00
	PMT	-1,158.34
32.	10.75 g i	0.90
	135,000 PV	135,000.00
	PMT	-1,370.56
	(You did not have to re-enter the number of payments, since they were the same as in problem 31.)	
33.	f FIN	-1,370.56
	360 n	360.00
	10.5 g i	0.88
	54000 PV	54,000.00
	PMT	-493.96
34.	25 g n	300.00
	9.876 g i	0.82
	PMT	-485.99
	(Loan amount remains from previous problem)	
35.	10.25 g i	0.85
	PMT	-500.25
	(Loan amount and term did not change from previous problem)	

Monthly Payment Answers

36.	f FIN	-500.25
	360 n	360.00
	10.5 g i	0.88
	168,000 PV	168,000.00
	PMT	-1,536.76
37.	10 g i	0.83
	172000 PV	172,000.00
	PMT	-1,509.42
	(Number of payments did not change from previous problem)	
38.	20 g n	240.00
	PMT	-1,659.84
	(Loan amount and interest rate did not change)	
	NOTE: Remember that pressing R↓ three times, will display the answers to the last 3 problems.	
39.	f FIN	
	360 n	360.00
	10.75 g i	0.90
	125,000 PV	125,000.00
	PMT	-1,166.85
40.	f FIN	-1,166.85
	25 g n	300.00
	10 g i	0.83
	67,000 PV	67,000.00
	PMT	-608.83
41.	8 g i	0.67
	PMT	-517.12
	(Term and loan amount did not change)	
42.	f FIN	-517.12
	20 g n	240.00
	10.5 g i	0.88
	72000 PV	72,000.00
	PMT	-718.83

Monthly Payment Answers

43.	360 n	360.00
	25000 PV	25,000.00
	PMT	-228.68
	(Rate did not change)	
44.	10 g i	0.83
	77000 PV	77,000.00
	PMT	-675.73
	(Term did not change)	
45.	870000 PV	870,000.00
	PMT	-7,634.87
	(Term and rate did not change)	
46.	f FIN	-7,634.87
	20 g n	240.00
	10.5 g i	0.88
	12000 PV	12,000.00
	PMT	-119.81
47.	f FIN	-119.81
	360 n	360.00
	10 g i	0.83
	125000 PV	125,000.00
	PMT	-1,096.96
48.	12 g i	1.00
	79000 PV	79,000.00
	PMT	-812.60
	(Term did not change)	
49.	10.5 g i	0.88
	470000 PV	470,000.00
	PMT	-4,299.27
	(Term did not change)	

CALCULATING PERIODIC PAYMENT

	PRESS	DISPLAY
50.	f FIN	-4,299.27
	100 n	100.00
	10.5 ENTER 4 ÷ i	2.63
	128000 PV	128,000.00
	PMT	-3,632.18
51.	f FIN	-3,632.18
	60 n	60.00
	11 ENTER 2 ÷ i	5.50
	89000 PV	89,000.00
	PMT	-5,100.33
52.	245000 PV	245,000.00
	PMT	-14,040.23
	(Rate and term did not change)	
53.	f FIN	-14,040.23
	120 n	120.00
	10.75 ENTER 4 ÷ i	2.69
	100000 PV	100,000.00
	PMT	-2,803.82
54.	f FIN	-2,803.82
	150 n	150.00
	9.5 ENTER 5 ÷ i	1.90
	98000 PV	98,000.00
	PMT	-1,979.61
55.	30 n	30.00
	9.5 i	9.50
	PMT	-9,964.70
	(Loan amount did not change)	
56.	f FIN	-9,964.70
	30 ENTER 4 x n	120.00
	11.5 ENTER 4 ÷ i	2.88
	120000 PV	120,000.00
	PMT	-3,568.95

Periodic Payment Answers

57.	11.75 ENTER 4 ÷ i	2.94
	215000 PV	215,000.00
	PMT	-6,517.58
	(Number of payments did not change)	
58.	10.5 ENTER 4 ÷ i	2.63
	80000 PV	80,000.00
	PMT	-2,198.10
	(Number of payments did not change)	
59.	f FIN	-2,198.10
	30 ENTER 5 x n	150.00
	9.5 ENTER 5 ÷ i	1.90
	198000 PV	198,000.00
	PMT	-3,999.62
60.	30 n	30.00
	9.5 i	9.50
	PMT	-20,132.76
	(Loan amount did not change)	

CALCULATING MAXIMUM LOAN AMOUNT

(Note: With actual loans, the loan amount would be rounded down to the next nearest $50)

	PRESS	DISPLAY
61.	f FIN	-20,132.76
	20 g n	240.00
	10 g i	0.83
	687 CHS PMT	-687.00
	PV	71,190.11
	(Payment was entered as a negative; it can be entered as a positive, without pressing CHS, and loan amount will be shown as a negative.)	
62.	360 n	360.00
	PV	78,284.21
	(Rate and payment did not change)	

Maximum Loan Amount Answers

63.	8.5 g i	0.71
	PV	89,346.85
	(Payment and term did not change)	
64.	987 CHS PMT	-987.00
	240 n	240.00
	10 g i	0.83
	PV	102,277.50
65.	765 CHS PMT	-765.00
	PV	79,272.83
	(Rate and term did not change)	

CALCULATING REMAINING BALANCE

	PRESS	DISPLAY
66.	f FIN	79,272.83
	30 g n	360.00
	10 g i	0.83
	100000 PV	100,000.00
	PMT	-877.57
	36 n FV	-98,151.65
67.	60 n FV	-96,574.32
	(No loan elements needed to be re-entered)	

CALCULATING ACCUMULATED INTEREST/REMAINING BALANCE

	PRESS	DISPLAY
68.	f FIN	-96,574.32
	360 n	360.00
	11 g i	0.92
	100000 PV	100,000.00
	PMT	-952.32
	36 f AMORT	-32,771.03
	RCL PV	98,487.51

Accumulated Interest/Remaining Balance Answers

69.	f FIN	
	120 n	120.00
	10 ENTER 4 ÷ i	2.50
	100000 PV	100,000.00
	PMT	-2,636.18
	4 f AMORT	-9,979.24
	RCL PV	99,434.52
70.	f FIN	98,121.34
	25 g n	300.00
	10.5 g i	0.88
	68000 PV	68,000.00
	PMT	-642.04
	48 f AMORT	-28,026.77
	RCL PV	65,208.85
71.	f FIN	65,208.85
	360 n	360.00
	10.75 g i	0.90
	122000 PV	122,000.00
	PMT	-1,138.85
	360 f AMORT	-287,978.75

PAYMENTS TO INTEREST AND PRINCIPAL

	PRESS	DISPLAY
72.	f FIN	65,208.85
	30 g n	360.00
	10.75 g i	0.90
	152000 PV	152,000.00
	PMT	-1,418.89
	12 f AMORT	-16,305.13
	x≈y	-721.55
73.	12 f AMORT	-16,223.63
	x≈y	-803.05

Interest/Principal Payment Answers

74.	f FIN	-803.05
	30 g n	360.00
	10 g i	0.83
	98000 PV	98,000.00
	PMT	-860.02
	60 f AMORT	-48,244.03
	x≈y	-3,357.17
	RCL PV	94,642.83

CALCULATING DISCOUNT AND YIELD

	PRESS	DISPLAY
75.	f FIN	94,642.83
	10 g n	120.00
	10 g i	0.83
	15000 PV	15,000.00
	PMT	-198.23
	18 g i	1.50
	PV	11,001.24
76.	f FIN	11,001.24
	10.5 g i	0.88
	19316.88 CHS PV	-19,316.88
	221.08 PMT	221.08
	n	166.00
	16 g i	1.33
	PV	-14,741.40

INDEX

OTHER LEARNING TOOLS WRITTEN BY ALLEN F. HAINGE

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This six cassette album, taped at a full day Allen F. Hainge "Innovative Financing Seminar," gives you specific innovative financing strategies designed to help you earn more commissions! Contents include:

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- 22 ways to help the cash poor buyer
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- State funded loan programs
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- Smoothing out loan processing
- Conducting the qualifying interview
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NAME:_____ OFFICE PHONE:_____
STREET:_____ HOME PHONE: _____
CITY: _____ STATE:_____ ZIP:_____

___Enclosed is my check for _____
___Please charge to my: ____Visa ____MasterCard ____American Express
Account #:_____ Expiration Date:_____
Signature:_____

PLEASE NOTE

MAKE THE FOLLOWING CHANGES TO YOUR MANUAL:

Page 56: The "Display" column for problem #37 should read "150" for step 3 and "300" for step 2.

Page 59: The "Display" column for problem #39 should read "120" for step 3 and "300" for step 2.

ADDITIONAL NOTES ON PROGRAMS

1. The first 5 programs (conventional qualifying, V.A./F.H.A. qualifying, amortization, maximum a.r.m. payment and after-tax payment) are of the most value to the residential agent and can all be stored in the 12C at the same time.

2. If you choose to store all 5 programs in sequence, their line numbers will be as follows:

   Conventional qualifying: 1-18
   V.A./F.H.A.: 19-35
   Amortization: 36-47
   A.R.M.: 48-74
   After-tax payment: 75-94

3. Remember to add the R/S line, followed by **g GTO** and the number of the first line of the program as the last 2 lines of the program when storing multiple programs. These steps are already included for programs #1 and #2 but are not included in programs #3, #4, #5 or #6. Be sure to add them.

4. Remember to change the **g GTO** lines if necessary. For example:

   a. Line #12 in program #3 needs to be changed to **g GTO 38** if the program is stored behind the first 2 programs.

   b. Line #13 in program #4 needs to be changed to **g GTO 68** if the program is stored behind the first 3 programs.

   c. Line #20 in program #4 needs to be changed to **g GTO 48** if the program is stored behind the first 3 programs.

5. Finally, **remember to tell the 12C which line to start on when doing the programming problems**. The starting line will be the first line of the program as you have it entered into your calculator.

Good luck & good selling!

Allen