

HOW TO USE THE REAL ESTATE CALCULATOR TO SIMPLIFY REAL ESTATE MATH

Use Answer Sheet on Pages 30 & 31 to Enter Your Work

Credits:

Portion of this section on the use and application of real estate calculators is adopted from:

- (1) **The HP-12C IN ACTION!**, with permission of the author, Robert J. Bond and Financial Publishing House, Sherman Oaks, California.
- (2) Texas Instruments (website)
- (3) Real Estate Qualifier (website)

Unit One – The HP-12C IN ACTION!

The materials are designed to achieve two objectives:

1. Save time

Securing knowledge of how to master the use a real estate calculator and how to apply it to actual real estate problems will save valuable time. Hastening problem-solving frees up time to accomplish other things. Truly, “time is money”!

- A. Client-agent relationship: Clients ask the same basic questions on most transaction. The licensee is expected to have a working knowledge to quickly and actually answer common questions such as:

- ❖ How much will I met at close of escrow of I sell at the price?
- ❖ How much do I need to close escrow?
- ❖ What will be my buy total monthly payment?

To determine the above, the agent needs to know how to calculate:

- ❖ What is the current unpaid loan balance?
- ❖ What are normal seller closing costs?
- ❖ How much is the down payment plus buyer closing costs?
- ❖ How do I calculate the principal and interest, property taxes and special assessments, and various required insurance policies (hazard, mortgage, flood, etc)?

- B. Investor-Purchaser, whether buying or exchanging property for your own portfolio or for someone else, the common financial questions are usually asked:

- ❖ When will I reach break-even?
- ❖ Can I afford to buy this property (qualifying and rates)?
- ❖ What is the rate of return and yield?

- C. Instructor:

Most people have electronic devices that will do tones more functions than the owner knows how to use or would use (your phone, computer, etc). If you visit a showroom for a washer or dryer, the salesperson will show you unit with all the bells and whistles that has 18 cycles and sounds great. When you get at home you revert back to using two cycles, one for whites and one for color, perm press. A few of you will actually use a third cycle for delicates. This is the same with using a real estate financial calculator. Each of the three calculators demonstrated in this section is NOT to sell you any particular one. The Real Estate Education Center is not trying to influence what is best for you, but to show you each to empower you with the selection choice.

However, your instructor may try to determine which one you should use based on their knowledge of how to use only one, or based on one particular function that a particular calculator does which is not you are unlikely to even use.

Typically, the Texas Instrument (Business Analysis) BA is used at the four years university for those who major in Finance and calculate yield, discount and returns on stocks and bonds, the HP112C (10B and other models are often used by men who have taught for over 20 or 30 years when the HP was the only calculator on the market that performed real estate math functions that was not a sacrifice calculator. Also, those in advanced appraisal most often use the HP12C, the Real Estate Qualifier (11X) (111x) (Plus) is the newer calculator of the three and the most often used by real estate sales agents, and often mortgage loan brokers because it is the easiest to use to qualify a buyer on calculate loan information.

2. Understanding complex computations

Performing application on a financial calculator does not allocate the learner from real estate math would be calculated. The move complete the computation the greater the need to have an understanding of how manual calculators, use of tables and other checks and balances are derived.

The financial calculator is: (1) tool (2) a way to simplify and (3) a way to reduce incorrect answers. When using a real estate specific calculator, this not necessary to be an expert and computations. The machine does not get hurt when a wrong button is pushed. Simply clear the machine and try again.

The chapter gives step-by-step operations to solve problems. On the most common used real estate finance calculators. Practice makes perfect. Continue proficient at solving real estate financial problems. Quizzes appear throughout this chapter offering opportunities to master the calculator. You are to mark your answer on the answer sheet that appears on page _____. The correct answers are available from your instructor, so you can verify your responses. If your answers don't match the correct ones, given, you'll need to go over the model problem again, and then substitute the quiz data until your answers match the correct one.

This section does not every problem found in real estate practice and investing. Some problems are exercises proceeding from the simple, to the complex.

Unless you work with the same problem over and over again, it is not likely that you would remember the calculating steps. Refer to this manual whenever needed. It does not become outdated.

- A. The first step is to determine which calculator is best for you. Go online and look at each of these real estate financial calculators. Compare the sign, weight cost, function, keys, battery type and life, case and features use online demonstration of the same problem for each calculator. Do not let an instructor (who may have use the same calculator for 30 years and who does not want to change and use a new one) on you text book determine which is easiest for you to master. The key is find what works best for you.
- B. The second step is taking the manual that come with the calculator and go through each and every page. Perform all key strokes shown.

- C. Go to the website of the calculator manufacture and locate each calculator of your choice.
- D. Go through each page of the section of the study guide and complete the page with quiz answer sheet.
- E. Practice until you are comfortable and confident in the use of the calculator of your choice.

KEY FUNCTIONS

Most of the key on each real estate calculators has more than one use.

|ON| Both the “on” and “off” key. The calculator has built-in memory and will retain information for as long as you wish.

|ENTER| Enters numbers into the calculator; displays on the screen; for doing calculations.

The Financial Keys

In the top row of the HP-12C the five financial keys that are use most are:

|n| |i| |PV| |PMT| |FV|.

Here is a brief description of what the letters generally mean:

 n 	 i 	 PV 	 PMT 	 FV
(number of remaining payments)	(rate per period)	(amount of loan)	(amount of payments)	(remaining balance)

<----- DATA keys and QUESTION keys ----->

The arrows indicate that these five keys in essence are data and questions keys. Why? Because we enter data into four of the keys, the known, and compute the fifth key ("cell"), the unknown. So if you know how long a loan is to run (n), its interest rate (i), the amount of loan (PV), and amortization provision (FV)

- balloon vs no balloon - you push the PMT button to determine the amount of payments.

The |n| represents number of monthly payments, or it may be quarterly, semi-annual, annual, or any other payment form. The |i| is always the rate of interest or yield. The three remaining keys, |PV|, |PMT|, and |FV| are always expressed in monetary terms, though the monetary symbols never show up on the screen, such as the \$ or pound sign.

To summarize the financial keys:

|n| Registers the number of periods, or term.

|i| Registers the interest rate per period.

|PV| Registers the Present Value, or initial cash flow, of a loan or investment amount.

|PMT| Registers Payments for money paid out or received.

|FV| Registers the Future Value, or final cash flow, of a loan or investment.

Let's now examine some less frequently used, but equally important keys, to help round out our knowledge of the keyboard:

|f| Gold-colored key to the right of |ON|, used to answer questions for the 16 keys where the gold appears at the top.

|g| Blue-colored key to the right of |f|, used to answer questions for the 30 keys where the blue appears at the bottom.

|CHS| **CH**ange**S** a number from positive to negative, or from negative to a positive.

|%| Computes the ratio, or percentage (%).

|R/S| **R**uns and **S**tops programs, similar to a full-fledged computer.

|SST| **S**ingle **S**Tep in a series of steps used when the calculator is in the program mode.

|R| **R**olls down data stored within the calculator.

|X Y| Exchanges stored data, in the X register and Y register.

|CLX| **CL**ears the data displayed in the **X** register.

|1/x| Reciprocal key. Used to change whole or mixed numbers to fractions, or fractions to whole numbers.

|%| Calculated % of difference between two numbers (stored in the calculator's X and Y registers).

|%T| Calculated % that one number represents of a **T**otal.

|STO| **STO**res numbers into each of the cells labeled 1 through 9 for later use through recall.

|RCL| **ReCaLL**s stored numbers by pressing RCL and the numerical cell (0 through 9) into which the data was stored.

0, 1, 2, 3, 4, 5, 6, 7, 8, 9 keys on right side of calculator.

Used for calculating the numerical or arithmetic functions: addition, subtraction, multiplication, division. When STO key is pressed at the same time as one of the cells, data can be stored in that cell.

+ - x - Keys used to calculate the four basic arithmetic functions: addition, subtraction, multiplication, division.

= there is no equal sign for the HP12C (none).

Unit Two - HOW DO I CALCULATE TRUST DEED PAYMENTS?

DATA : 1st Trust Deed \$100,000
 Interest Rate 10%
 Term 30 years
 Balloon payments none
 QUESTION : How much are the monthly payments?

Solution:

Step	HP 12 C		QP IIIx: Model 3415		TI: BA II Plus	
	Screen	Key	Screen	Key	Screen	Key
1	300	30 <input type="text" value="g"/> <input type="text" value="12"/>	0.00	[On/C] [On/C]	P/Y=12.0000	<input type="text" value="2nd"/> <input type="text" value="P/Y"/> <input type="text" value="12"/> =
2	0.83	10 <input type="text" value="g"/> <input type="text" value="12"/>	30.00	30 [Term]	0.00	<input type="text" value="2nd"/> <input type="text" value="QUIT"/>
3	100,000	100000 <input type="text" value="PV"/>	10.00	10 [Int]	I/Y = 10.00	10 <input type="text" value="I/Y"/>
4	0.00	0 <input type="text" value="FV"/>	100,000.00	100 [000] [Loan Amt]	N=360.00	360 <input type="text" value="N"/>
5	?	<input type="text" value="PMT"/>	877.57	[Pmt]	PV=100,000.00	100,000 <input type="text" value="PV"/>
					?	<input type="text" value="CPT"/> <input type="text" value="PMT"/>
ANSWER		<u>\$ 877.57</u>		<u>\$ 877.57</u>		<u>\$ 877.57</u>

NOTES FOR HP 12C ONLY:

- (1) In step 1, we enter the number of years, 30, followed by the blue-colored g key that converts 30 years into months. (The blue key is described in the Footnote at the end of this exercise.)
- (2) In step 2, the annual interest rate of 10% is automatically converted into the monthly rate by using the blue key.
- (3) Enter the loan amount into the PV cell for step 3.
- (4) The number 0 is entered for step 4 to reflect that there is no balloon payment, which means that the loan is fully amortized with equal monthly installments for the full term.
- (5) In step 5 the negative figure showing on your screen reflects money *paid out*. You would read the monthly payments as shown in the answer below.

SELF-HELP: To help you master certain financial calculations, throughout this manual we offer a series of test questions. See how well you understand the calculation of mortgage payments by doing the self-test questions that are found on the next page. After you finish, compare your answers to the correct ones given at the end of the test.

Self Test 1 : Trust Deed \$200,000
 Interest Rate 10%
 Term 30 years
 QUESTION : How much are the monthly payments?

Self Test 2	:	Trust Deed	\$200,000
		Interest Rate	10%
		Term	15 years

QUESTION : How much are the monthly payments?

Self Test 3	:	Trust Deed	\$100,000
		Interest Rate	5%
		Term	30 years

QUESTION : How much are the annual payments?

Self Test 4	:	Trust Deed	\$100,000
		Interest Rate	10%
		Term	30 years

QUESTION : How much are the annual payments?

Note: When calculating annually, do *not* convert years into months, and do *not* convert annual interest into monthly interest. (QPIIIx: When calculating annual payments the payments per year need to be changed to 1 via [Shift] [÷], for monthly payments change payments per year back to 12.)

FOOTNOTE concerning the gold and blue keys (for HP 12C calculator only):

To the right of the ON button at the lowest rung of keys are the so-called prefix keys, which are secondary to the primary keys that you have been dealing with up to this point.

The |f| key is colored gold. The |g| key is colored blue.

These have no meanings per se, but they offer a second and third level of calculations, so that each of the keys in the top three rows to the left of the ENTER key, including the enter key itself, can perform three separate functions. Thus if you wanted to calculate the amortization of a mortgage loan, you would press the gold f key before pressing in the AMORT that shows up above the n key. This will be demonstrated in a later unit, so don't be concerned at this stage. All you need to know now is that the HP-12C is a very versatile instrument, allowing you to perform zillions of calculations, combinations and permutations, offering added meanings when the two specially-colored keys are used in conjunction with most of the other keys.

|f|, the **gold** key, is used for solving problems *above* the key.

Example: The AMORT above the n key computes the loan payments attributable to principal reduction, called amortization, as well as remaining balances.

|g|, the **blue** key, is used for solving problems *below* the key.

Example: The 12x below the n key is used to multiply the years by 12.

Unit Three - HOW DO I CALCULATE MORTGAGE INTEREST RATES?

DATA : 1st Trust Deed \$100,000
 Monthly Payments \$877.57
 Term 30 years

QUESTION : What is the interest rate?

Solution:

Step	Key		QP IIIx: Model 3415		TI: BA II Plus	
	Screen	HP 12C	Screen	Key	Screen	Key
1	300	30 <input type="text" value="g"/> <input type="text" value="12x"/>	0.00	[On/C] [On/C]	P/Y = 30.0000	<input type="text" value="2nd"/> <input type="text" value="P/Y"/> <input type="text" value="12"/> <input type="text" value="ENTER"/>
2	100,000	100000 <input type="text" value="PV"/>	30.00	30 [Term]	0.0000	<input type="text" value="2nd"/> <input type="text" value="QUIT"/>
3	0.00	0 <input type="text" value="FV"/>	100,000.00	100 [000] [Loan Amt]	N= 300.00	360 <input type="text" value="N"/>
4	-877.57	877.57 <input type="text" value="CHS"/> <input type="text" value="PMT"/>	877.57	877.57 [Pmt]	PV = 100,000	100,000 <input type="text" value="PV"/>
5	0.83%	<input type="text" value="i"/>	10.00	[Int]	PMT = 877.57	877.57 <input type="text" value="+/-"/> <input type="text" value="PMT"/>
6	10.00%	12 <input type="text" value="x"/>	0.83	[Int]	I/Y = ?	<input type="text" value="CPT"/> <input type="text" value="I/Y"/>
ANSWER		0.83% monthly interest rate, or 10% annual rate		10.00% annual rate or 0.83% monthly interest rate		10.00%

Self Test 1 : Trust Deed \$200,000
 Monthly Payments \$1,755.14
 Term 30 years

QUESTION : What is the monthly interest rate?
 What is the annual rate?

Self Test 2 : Trust Deed \$200,000
 Monthly Payments \$2,149.21
 Term 15 years

QUESTION : What is the monthly interest rate?
 What is the annual rate?

Self Test 3 : Trust Deed \$100,000
Monthly Payments \$536.82
Term 30 years

QUESTION : What is the monthly interest rate?
What is the annual rate?

Self Test 4 : Trust Deed \$100,000
Monthly Payments \$10,607.93
Term 30 years

QUESTION : What is the monthly interest rate?

Careful: This asks you for *annual* interest rate, so do not convert annual payments to monthly payments. Thus you'll have the annual rate instantly calculated when you hit the |i| button.

Unit Four - HOW DO I CALCULATE ANNUAL PERCENTAGE RATES (APR) ADJUSTED FOR A FLAT LOAN FEE?

The calculation for APR is very similar to deriving the so-called nominal, or stated, rate that was performed in the previous unit. What is the difference? In computing an APR, loan costs, called "prepaid interest", must be deducted from the face amount of loan.

What constitutes prepaid interest? It includes the familiar "points" paid by the borrower; origination fee; pro-rata interest, since there usually are interest charges accumulated from close of escrow to date of the initial mortgage payment; first year's mortgage insurance premium (MIP); and a few smaller items. Prepaid interest does *not* include fees paid for an appraisal, credit report, title insurance, and other forms of insurance and costs that are independent of the loan, such as a homeowner's policy or homeowners association (HOA) fees.

In this example, we'll assume the same facts as before, except that the borrowers are charged \$5000 loan costs.

DATA : 1st Trust Deed \$100,000
 Prepaid interest / Loan costs \$5,000
 Nominal Interest Rate 10%
 Term 30 years
 QUESTION : What is the Annual Percentage Rate (APR)?
 Answer Self : 0.88% monthly, or 10.58% APR

Solution:

Step	Key			QP IIIx: Model 3415		TI: BA II Plus	
	Screen	HP 12C		Screen	Key	Screen	Key
1	360	30	g 12x	0.00	[On/C][On/C]		
2	0.83	10	g 12÷	30.00	30 [Term]		
3	100.000	100000	PV	10.00	10 [Int]		
4	0.00	0	FV	100,000.00	100 [000] [Loan Amt]		
5	-877.57		PMT	877.57	[Pmt]		
6	95,000	RCL PV 5000		APR 10.62%	5 [000] [Shift] [Int]		
7	?		i				
8		12 X {or g					
		12x					
ANSWER		0.89% monthly rate, or 10.62% annual rate		10.62% annual rate			

Note for H 12C only: In step 8 we convert the monthly rate to an *annual* rate by multiplying step 7 result by twelve, the number of months in a year. Step 8 could also be computed by pressing the blue |g| button followed by 12x

Bottom Line: With interest prepayments the effective rate, or APR, increased by .62% when compared to the nominal rate. This is equivalent to an increase of 62 "basis points", with each basis point the same as 1/100th of a percent.

Test Yourself

DATA	:	1 st Trust Deed	\$150,000
		Prepaid interest / Loan costs	\$7,000
		Nominal Interest Rate	10%
		Term	30 years
QUESTION	:	What is the Annual Percentage Rate (APR)?	

Unit Five - HOW DO I CALCULATE WHICH LOAN IS BEST BASED UPON COSTS AND HOLDING PERIOD?

Data		Option A	Option B
Original 1 st Trust Deed		\$100,000	\$100,000
Interest Rate		11%	10%
Term		360 months	360 months
Loan Fees		None	3 points + \$300
Expected Holding Period		30 years	3 years
Question :	Which is better, Option (A), the "no cost loan", or Option (B), which costs 3 points plus \$300 in loan fees, based upon the holding period or occupancy?		

Solution for HP 12C

Step	Screen(A)	Key Option A		Screen (B)	Key Option B	
1	360	30	<input type="text" value="g"/> <input type="text" value="12x"/>	360	30	<input type="text" value="g"/> <input type="text" value="12x"/>
2	0.92	11	<input type="text" value="g"/> <input type="text" value="12÷"/>	0.83	10	<input type="text" value="g"/> <input type="text" value="12÷"/>
3	100,000	100000	<input type="text" value="PV"/>	100,000	100000	<input type="text" value="PV"/>
4	0.00	0	<input type="text" value="FV"/>	0.00	0	<input type="text" value="FV"/>
5	-952.32		<input type="text" value="PMT"/>	-877.57		<input type="text" value="PMT"/>
6	0.92		<input type="text" value="i"/>	100,000		<input type="text" value="RCL"/> <input type="text" value="PV"/>
7	11.00	12	<input type="text" value="X"/>	96,700	3	<input type="text" value="%"/> <input type="text" value="-"/> 300 <input type="text" value="-"/>
8				0.87		<input type="text" value="i"/>
9				10.40	12	<input type="text" value="X"/>
	ANSWER	0.92% per month (step 6), or <u>11%</u> per annum (step 7)			0.87% per month (step 9), or <u>10.40%</u> APR annually (step 10)	

NOTE for:

Option A: The 11% APR is the same as the nominal rate given in the data. This is because there are no loan costs. Let's see how this compares to Option B.

Option B: The 10.40% APR is higher than the nominal rate of 10% because there are \$3,300 in loan costs, calculated in step 7, and thus results in only \$96,700 in net loan proceeds to the borrower. Step 8 is necessary in order to lock in the \$96,700 into the calculator's memory.

On the surface it appears as if Option B is the better choice because its APR is 10.40%, in contrast to the 11% APR in Option A. But remember, we need to deal with the holding period, which will have an impact on the real cost of the loan to us, beyond the required APR disclosure. So let's continue with additional steps needed to compute the APR adjusted for the holding period, when the loan is to be paid off.

Step	Screen	Key	
		Option A & B	
11	100,000	100000	PV
12	0.83	10	g 12÷
13	36	36	n
14	-98,151.65		FV
15	96,700	RCL	PV 3 % - 300 -
16	96,700		PV
17	.94		i
18	11.31	12	X

NOTE: It is necessary to re-enter the original loan amount, \$100,000, in step 11 because that's the amount the borrowers will repay to the lender, and not the \$96,700 that they actually received after discounting by the loan fees of \$3,300. For the same reason we restore the nominal interest rate, 10%, in step 12.

In step 13 we enter the period that the borrowers expect to stay with the loan, three years or 36 months. Step 14 displays the loan balance at the end of the three-year period. Step 15 calculates the net proceeds, while step 16 locks the figure into the memory. Step 17 recomputed the true rate based upon the three-year holding period, and not the original 30 years.

BOTTOM_LINE: Though the APR in Option B, the 10% loan, was still lower (10.4%) than the 11% loan in Option A, it is higher when adjusted for the holding period. The APR for Option B rises to 11.31% in three years because of the much shorter period for recovery of the one-time up-front fees. (Recall the *time value of money* from the introductory chapters.)

Unit Six - HOW DO I CALCULATE WHICH LOAN IS BEST BASED UPON COSTS AND HOLDING PERIOD?

Data		Option A	Option B
Original 1 st Trust Deed		\$100,000	\$100,000
Interest Rate		11%	10%
Term		360 months	360 months
Loan Fees		None	3 points + \$300
Expected Holding Period		30 years	3 years
Question	:	Which is better, Option (A), the "no cost loan", or Option (B), which costs 3 points plus \$300 in loan fees, based upon the holding period or occupancy?	

Solution for QPIIx

Step	Screen(A)	Key	Screen (B)	Key
		Option A		Option B
	30.00	30 [Term]	30.00	30 [Term]
2	11.00	11[Int]	10.00	10 [Int]
3	100,000.00	100 [000] [Loan Amt]	100,000.00	100 [000] [Loan Amt]
4	952.32	[Pmt]	877.57	[Pmt]
5	11.00	[Shift] [Int]	100,000.00	[Rcl] [Loan Amt]
6			3,300.00	[x] 3 [%] [+] 300 [=]
7			10.40 %	[Shift] [Int]
	ANSWER	<u>11%</u> per annum	<u>10.40%</u> APR annually	

NOTE for:

Option A: The 11% APR is the same as the nominal rate given in the data. This is because there are no loan costs. Let's see how this compares to Option B.

Option B: The 10.40% APR is higher than the nominal rate of 10% because there are \$3,300 in loan costs, calculated in step 7, and thus results in only \$96,700 in net loan proceeds to the borrower. Step 8 is necessary in order to lock in the \$96,700 into the calculator's memory.

On the surface it appears as if Option B is the better choice because its APR is 10.40%, in contrast to the 11% APR in Option A. But remember, we need to deal with the holding period, which will have an impact on the real cost of the loan to us, beyond the required APR disclosure. So let's continue with additional steps needed to compute the APR adjusted for the holding period, when the loan is to be paid off.

Step	Screen	Key
		Option A & B
1	100,000.00	100 [000] [Loan Amt]
2	10.00	10 [Int]
3	30.00	30 [Term]
4	877.57	[Pmt]
5	3.00	3 [Term]
6	98,151.65	[Shift] [Loan Amt]
7	run	3300 [Shift] [Int]
8	APR 11.31%	

NOTE: Though the APR in Option B, the 10% loan, was still lower (10.4%) than the 11% loan in Option A, it is higher when adjusted for the holding period. The APR for Option B rises to 11.31% in three years because of the much shorter period for recovery of the one-time up-front fees. (Recall the *time value of money* from the introductory chapters.)

Unit Seven - HOW DO I DETERMINE THE UNPAID BALANCE OF A LOAN?

DATA : 1st Trust Deed \$100,000
 Interest Rate 10%
 Term 30 years

QUESTION : What is the unpaid balance after five years?

Solution:

Step	Key			QP IIIx: Model 3415		TI: BA II Plus				
	Screen	HP 12C		Screen	Key	Screen	Key			
1	360	30	g 12x	0.00	[On/C] [On/C]	P/Y = 12.00	2nd	P/Y	12	Enter
2	0.83	10	g 12÷	30.00	30 [Term]	0.00	2nd	Quit		
3	100,000	100000	PV	10.00	10 [Int]	I/Y = 10.00	10	I/Y		
4	0.00	0	FV	100,000.00	100 [000] [Loan Amt]	N= 360.00	360	N		
5	-877.57		PMT	877.57	[Pmt]	PV= 100,000	100,000	PV		
6	-877.57	F RND PMT		BAL 96,574.32	5 [Shift] [Amort]	-877.57	CPT	PMT		
7	60.00	5	g 12x			P1= 1.00	2nd	AMORT		
8	?		FV			P1= 1.00	2nd	CLR WORK		
						P2=60.00	↓	5	2nd	xP/Y
							ENTER	2nd		
ANSWER		\$ 96,574.44			\$ 96,574.32	\$96,574.41	↓			

NOTES FOR HP 12C: Step 6 is not absolutely necessary. It simply rounds off the monthly payments to the *nearest penny*. Remember, the calculator has a continuous memory, hence carries the theoretical payment to fractions of a cent. But since the lowest currency in the U.S. Dollar is a penny, it is impossible to pay in smaller denominations, i.e., \$877.5715701 if carried to the seventh decimal place.

All the digits following \$877.57 are adjusted up or down (depending on the precise language in the promissory note) in the final monthly installment. Since there are digits that follow the .57, you'd have a larger final installment 360 months from now. If on the other hand the note called for monthly payments of \$877.58, your final payment would be *less* than \$877.58.

For those who appreciate precision, without step 6 the unpaid balance at end of 5 years would amount to \$96,574.32, or a decrease of 12 cents.

Self Test 1 : 1st Trust Deed \$120,000
Interest Rate 10%
Term, payable monthly 30 years

QUESTION : (1) What is the unpaid balance after three years?
(2) What is the unpaid balance after five years?

Self Test 2 : 1st Trust Deed \$150,000
Interest Rate 10%
Term, payable monthly 30 years

QUESTION : (1) What is the unpaid balance after three years?
(2) What is the unpaid balance after five years?

Unit Eight - HOW DO I CALCULATE INTEREST AND PRINCIPAL COMPONENTS OF A LOAN?

DATA : Trust Deed Loan \$100,000
 Interest Rate 10%
 Term payment monthly, fully amortized 30 years

QUESTION : (1) How much are the monthly payment at 10%
 (2) Of the monthly payments, how much represents interest and how much represent principal during each of the first five years?

Solution:

Step	Key		QP IIIx: Model 3415		TI: BA II Plus	
	Screen	HP 12C	Screen	Key	Screen	
1a	360	30 <input type="text" value="g"/> <input type="text" value="12x"/>	0.00	[On/C] [On/C]	P/Y= 12.00	<input type="text" value="2nd"/> <input type="text" value="I/Y"/> <input type="text" value="12"/> <input type="text" value="ENTER"/>
1b	0.83	10 <input type="text" value="g"/> <input type="text" value="12÷"/>	10.00	10 [Int]		<input type="text" value="2nd"/> <input type="text" value="CPT"/>
1c	100,000	100000 <input type="text" value="PV"/>	100,000.00	100 [000] [Loan Amt]	I/Y= 10.00	10 <input type="text" value="I/Y"/>
1d	0.00	0 <input type="text" value="FV"/>	30.00	30 [Term]	PV= 100,000.00	100,000 <input type="text" value="PV"/>
1e	-877.57	<input type="text" value="PMT"/>	877.57	[Pmt]	N= 360.00	30 <input type="text" value="2nd"/> <input type="text" value="xP/Y"/> <input type="text" value="N"/>
2a	-9,974.98	12 <input type="text" value="f"/> <input type="text" value="AMOR"/>	9,974.98	1[Amort][Amort]	-877.57	<input type="text" value="CPT"/> <input type="text" value="PMT"/>
2b	-555.86	<input type="text" value="x=y"/>	555.88	[Amort]	PI=1.00	<input type="text" value="2nd"/> <input type="text" value="AMORT"/>
3a	-9,916.77	12 <input type="text" value="f"/> <input type="text" value="AMORT"/>	9,916.77	2[Amort][Amort]	P2=12.00	<input type="text" value="↓"/> <input type="text" value="12"/> <input type="text" value="ENTER"/>
3b	-614.07	<input type="text" value="x=y"/>	614.09	[Amort]	Bal = 99,444.14	<input type="text" value="↓"/>
4a	-9,852.46	12 <input type="text" value="f"/> <input type="text" value="AMORT"/>	9,852.47	3[Amort][Amort]	Prin= 555.86	<input type="text" value="↓"/>
4b	-678.38	<input type="text" value="x=y"/>	678.39	[Amort]	Int =9,974.98	<input type="text" value="↓"/>
5a	-9,781.44	12 <input type="text" value="f"/> <input type="text" value="AMORT"/>	9,781.43	4[Amort][Amort]	PI=13.00	<input type="text" value="↓"/>
5b	-749.40	<input type="text" value="x=y"/>	749.4	[Amort]	P2=24.00	<input type="text" value="↓"/>
6a	-9,702.96	12 <input type="text" value="f"/> <input type="text" value="AMORT"/>	9,702.96	5[Amort][Amort]	Bal=98,930 .07	<input type="text" value="↓"/>
6b	-827.88	<input type="text" value="x=y"/>	827.90	[Amort]	Prin = 614.07	<input type="text" value="↓"/>

Step	Key		QP IIIx: Model 3415		TI: BA II Plus	
	Screen	HP 12C	Screen	Key	Screen	
					Int = 9,916.77	↓
ANSWER		<u>\$ 877.57</u>	<u>\$ 827.90</u>			

NOTES HP 12C: Steps 1a through 1e calculate the monthly payments for the thirty-year loan. Steps 2a and 2b compute the (decreasing) interest and (increasing) principal portions of the first year's payments. Steps 3a and 3b compute the interest and principal portions of the second year's payments.

Steps 4a and 4b compute the interest and principal portions of the third year's payments. Steps 5a and 5b compute the interest and principal portions of the fourth year's payments. Steps 6a and 6b compute the interest and principal portions of the fifth year's payments.

We can summarize these in simpler tabular form:

Answer 2:

Year	Interest	Principal
1	\$ 9,874.98	\$555.86
2	9,916.77	614.07
3	9,852.46	678.38
4	9,781.44	749.40
5	9,702.96	827.88

NOTES QP IIIx only: The assumed range for a single entry can be revised within the preference settings. It can be set to cover from the beginning of loan to the entered period/year, or cover for the entered period/year time-frame only, which is the factory default setting.

Test Yourself

DATA : Trust Deed Loan \$100,000
 Interest Rate 12%
 Term payment monthly, fully amortized 30 years

QUESTION : (1) How much are the monthly payment at 12%?
 (2) Of the monthly payments, how much represents interest and how much represent principal during each of the first two years?

Unit Nine - HOW DO I CALCULATE AMORTIZATION OF MORTGAGE PAYMENTS?

DATA : 1st Trust Deed \$100,000
 Interest Rate 10%
 Term payment monthly, fully amortized 30 years

QUESTION : What are the interest and principal components of the payment, and how much is the unpaid balance:
 A. At the end of the first year (12 months) ?
 B. At the end of the second year (24 months)?
 C. At the end of the fifth year (60 months) ?
 D. At the end of the tenth year (120 months)?

Solution:

Step	Key		QP IIIx: Model 3415		TI: BA II Plus	
	Screen	HP 12C	Screen	Key	Screen	Key
1	360	30 <input type="text" value="g"/> <input type="text" value="12x"/>	0.00	<input type="text" value="[On/C]"/> [On/C]	P/Y=12.00	<input type="text" value="2nd"/> <input type="text" value="I/Y"/> 12 <input type="text" value="ENTER"/>
2	0.83	10 <input type="text" value="g"/> <input type="text" value="12÷"/>	10.00	10 <input type="text" value="[Int]"/>		<input type="text" value="2nd"/> <input type="text" value="CPT"/>
3	100,000	100000 <input type="text" value="PV"/>	100,000.00	100 <input type="text" value="[000]"/> <input type="text" value="[Loan Amt]"/>	I/Y=10.00	10 <input type="text" value="I/Y"/>
4	0.00	0 <input type="text" value="FV"/>	30.00	30 <input type="text" value="[Term]"/>	PV=100,000.00	100,000 <input type="text" value="PV"/>
5	-877.57	<input type="text" value="PMT"/>	877.57	<input type="text" value="[Pmt]"/>	N=360,000	30 <input type="text" value="2nd"/> <input type="text" value="xP/Y"/> <input type="text" value="N"/>
6			9,974.98	1 <input type="text" value="[Amort]"/> [Amort]	-877.57	<input type="text" value="CPT"/> <input type="text" value="PMT"/>
7			555.88	<input type="text" value="[Amort]"/>	PI=1.00	<input type="text" value="2nd"/> <input type="text" value="AMORT"/>
8			99,444.12	<input type="text" value="[Amort]"/> [Amort]	P2=12.00	<input type="text" value="↓"/> 12 <input type="text" value="ENTER"/>
9			19,891.75	1 <input type="text" value="[:]"/> 2 <input type="text" value="[Amort]"/> [Amort]	Bal=99,444.14	<input type="text" value="↓"/>
10			1,169.96	<input type="text" value="[Amort]"/>		Press <input type="text" value="↓"/> to Cycle thru
11			98,830.04	<input type="text" value="[Amort]"/> [Amort]		
12			49,228.61	1 <input type="text" value="[:]"/> 5 <input type="text" value="[Amort]"/> [Amort]		
13			3,425.68	<input type="text" value="[Amort]"/>		
14			96,574.32	<input type="text" value="[Amort]"/> [Amort]		
15			96,246.61	1 <input type="text" value="[:]"/> 10 <input type="text" value="[Amort]"/> [Amort]		
16			9,061.98	<input type="text" value="[Amort]"/>		
17			90,938.02	<input type="text" value="[Amort]"/> [Amort]		

Answers:

Step	End of	Principal		
		Interest Key	Reduction Key	Balance Key
A	1 st year	12 <input type="text" value="f"/> <input type="text" value="AMORT"/>	<input type="text" value="x = y"/>	<input type="text" value="RCL"/> <input type="text" value="PV"/>
		-9,974.48	-555.86	99,444.14 (refer to page 11,3A and 4A for QP IIIx and TI calculation)
B	2 nd year	24 <input type="text" value="f"/> <input type="text" value="AMORT"/>	<input type="text" value="x = y"/>	<input type="text" value="RCL"/> <input type="text" value="PV"/>
		-19,891.75	-1,169.93	98,830.07
C	5 th year	60 <input type="text" value="f"/> <input type="text" value="AMORT"/>	<input type="text" value="x = y"/>	<input type="text" value="RCL"/> <input type="text" value="PV"/>
		-49,228.61	-3,425.59	96,574.41
D	10 th year	120 <input type="text" value="f"/> <input type="text" value="AMORT"/>	<input type="text" value="x = y"/>	<input type="text" value="RCL"/> <input type="text" value="PV"/>
		-96,246.75	-9,061.65	90,938.35

NOTES: The negative figure that shows up in step 5 reflects money *paid out*. We need to compute this before calculating the principal and interest breakdowns for each of the payments and, thereby, the outstanding principal balances at the end of the 1st, 2nd, 5th, and 10th years.

For each of the periods following the first year, re-enter the original loan amount, \$100,000, into PV, and the original number of months, 360, into the n key.

Test Yourself

Self Test 1

- Trust deed : \$200,000
- Interest rate : 10%
- Terms : 30 years

Questions:

(1) What is the monthly payment?

(2) What is the amount of interest paid out in the first year?

(3) What is the amount of principal paid out in the first year?

(4) What is the outstanding principal balance owed at the end of the first year?

Self Test 2

Trust deed : \$200,000
Interest rate : 10%
Terms : 15 years

Questions:

(1) What is the monthly payment?

(2) What is the amount of interest paid out in the first year?

(3) What is the amount of principal paid out in the first year?

(4) What is the outstanding principal balance owed at the end of the first year?

Self Test 3

Trust deed : \$100,000
Interest rate : 5%
Terms : 30 years, payable monthly

Questions:

(1) What is the monthly payment?

(2) What is the amount of interest paid out in the first year?

(3) What is the amount of principal paid out in the first year?

(4) What is the outstanding principal balance owed at the end of the first year?

Unit Ten - HOW DO I CALCULATE NEGATIVE AMORTIZATION?

DATA : 1st Trust Deed \$100,000
 Interest Rate: 9% the first year 10%, thereafter
 Term, payable monthly 30 years

QUESTION : What will the loan balance be at the end of the first year?

Solution:

Step	HP 12C		QP IIIx: Model 3415		TI: BA II Plus	
	Screen	Key	Screen	Key	Screen	Key
1	360	30 <input type="text" value="g"/> <input type="text" value="12x"/>	100,000.00	100 [000] [Loan Amt]	PV=100,000	100,000 <input type="text" value="PV"/>
2	0.75	9 <input type="text" value="g"/> <input type="text" value="12÷"/>	30.00	30 [Term]	N=360.00	30 <input type="text" value="2nd"/> <input type="text" value="xP/Y"/>
3	100,000	100000 <input type="text" value="PV"/>	9.00	9 [Int]	I/Y=9.00	<input type="text" value="N"/> <input type="text" value="I/Y"/>
4	0.00	0 <input type="text" value="FV"/>	804.62	[Pmt]	PMT=804.62	<input type="text" value="CPT"/> <input type="text" value="PMT"/>
5	-804.62	<input type="text" value="PMT"/>	10.00	10 [Int]	I/Y=10.00	10 <input type="text" value="I/Y"/>
6	0.83	10 <input type="text" value="g"/> <input type="text" value="12÷"/>	1.00	1 [Term]	PI=1.00	<input type="text" value="2nd"/> <input type="text" value="AMORT"/> 1 <input type="text" value="ENTER"/>
7	12.00	12 <input type="text" value="n"/>	100,360.77	[Shift] [Loan Amt]	P2=12.00	<input type="text" value="↓"/> 12 <input type="text" value="ENTER"/>
8	?	<input type="text" value="FV"/>				<input type="text" value="↓"/>
Answer		<u>\$100,360.77</u>	100,360.77 FV		100,360.79	

NOTES: Step 6 shows the new interest rate, 10%, converted into a monthly rate. Observe also that the \$100,361 (enter |f| |0| to get rid of the pennies) balance is larger than the loan originally secured, \$100,000. That's because you paid less than the 10% contract interest rate during the first year, resulting in *negative amortization*.

Test Yourself

Self Test 1

1st Trust deed : \$120,000
Interest rate : 9%, but at only 8% the first year
Terms, payable monthly : 30 years

Question : What will be the loan balance at the end of the first year?

Self Test 2

1st Trust deed : \$150,000
Interest rate : 5% the first year, 10% thereafter
Terms, payable monthly : 30 years

Question : What will be the remaining balance at the end of the first year?

Unit Eleven - HOW DO I CALCULATE BLENDED INTEREST RATES?

DATA : First Trust Deed \$100,000
 Interest rate on 1st TD 10
 Second Trust Deed \$25,000
 Interest rate on 1st TD 12%
 Term of each loan, payable monthly 30 years

QUESTION : What is the blended or composite interest rate?

Solution:

Step	HP 12C		QP IIIx: Model 3415		TI: BA II Plus	
	Screen	Key	Screen	Key	Screen	Key
1	100,000	100000 STO 0	All Cleared 0.00	[Shift] [x]	0.00	2nd CE/C 2nd FV
2	10,000	10 %	100,000.00	100 [000] [Loan Amt]	PV=100,000	100,000 PV
3	3,000	25000 STO + 0 12 %	30.00	30 [Term]	N=360.00	30 2nd x I/Y N
4	13,000	x=y R! +	10.00	10 [Int]	I/Y=10.00	10 x I/Y
5	125,000	RCL 0	877.57	[Pmt]	PMT= -877.57	CPT PMT
6	?	-	877.57	[M+]	-877.57	STO 0
			25,000	25 [000] [Loan Amt]	PV=25,000	25000 PV
			12.00	12 [Int]	I/Y=12.00	12 I/Y
			257.15	[Pmt]	PMT=257.15	CPT PMT
			257.15	[M+]	-257.15	STO + 0
			1,134.72	[Rcl] [M+]	PMT= -1134.72	RCL 0 PMT
			1,134.72	[=] [Pmt]	PV=125,000.00	125,000 PV
			125,000.00	125 [000] [Loan Amt]	I/Y=10.41	CPT I/Y
			10.41	[Int]		
Answer	0.10, or <u>10%</u> .		10.41 ANN INT %			

NOTES: Step 1 stores the existing 1st loan balance for later recall. Step 2 shows the first year's interest on that loan. Step 3 stores the \$25,000 second loan, then adds this amount to the stored first loan and computes the first year's interest on the second loan. Step 4 combines total interest, adding up steps 2 and 3. Step 5 recalls the total amount of loans (\$125,000) and divides this into the total interest of \$13,000 (step 4) to answer the question asked in step 6 (0.10).

Test Yourself

Self-Test 1

1 st Trust deed	:	\$100,000
Interest rate on 1 st TD	:	8%
Second Trust Deed	:	\$20,000
Interest rate no 2 nd TD	:	10%
Term of each loan, payable monthly	:	30 years

Question : What is the blended or composite interest rate?

Self-Test 2

1 st Trust deed	:	\$150,000
Interest rate on 1 st TD	:	9%
Second Trust Deed	:	\$50,000
Interest rate no 2 nd TD	:	10%
Term of each loan, payable monthly	:	30 years

Question : What is the blended or composite interest rate?

Unit Twelve - HOW DO I CALCULATE THE COST OF A TEMPORARY BUY-DOWN LOAN?

DATA : Trust Deed \$100,000
 Term, payable monthly for 30 years
 Interest Rate:
 First five years 7%
 Each year thereafter 10%

QUESTION : What is the cost of the buy-down loan?

Solution:

Step	HP 12C		QP IIIx: Model 3415		TI: BA II Plus	
	Screen	Key	Screen	Key	Screen	Key
1	360	30 <input type="text" value="g"/> <input type="text" value="12x"/>	All Cleared 0.00	[Shift] [X]	N=360.00	30 <input type="text" value="2nd"/> <input type="text" value="xP/Y"/> <input type="text" value="N"/>
2	0.83	10 <input type="text" value="g"/> <input type="text" value="12 ÷"/>	30.00	30 [Term]	I/Y=10.00	10 <input type="text" value="I/Y"/>
3	100,000	100000 <input type="text" value="PV"/>	10.00	10 [Int]	PV=100,000.00	100,000 <input type="text" value="PV"/>
4	0.00	0 <input type="text" value="FV"/>	100,000.00	100 [000] [Loan Amt]	PMT=-877.57	<input type="text" value="CPT"/> <input type="text" value="PMT"/>
5	-877.57	-877.57 <input type="text" value="PMT"/>	877.57	[Pmt]	-877.57	<input type="text" value="STO"/> 0
6	-877.57	<input type="text" value="STO"/> <input type="text" value="O"/>	877.57	[M+]	I/Y=7.00	7 <input type="text" value="x I/Y"/>
7	-96,574.32	5 <input type="text" value="g"/> <input type="text" value="12x"/> <input type="text" value="FV"/>	7.00	7 [Int]	PMT=-665.30	<input type="text" value="CPT"/> <input type="text" value="PMT"/>
8	360	30 <input type="text" value="g"/> <input type="text" value="n"/>	665.30	[Pmt]	665.30	<input type="text" value="+/-"/>
9	0.58	7 <input type="text" value="g"/> <input type="text" value="i"/>	665.30	[Shift] [M+]	665.30	<input type="text" value="STO"/> <input type="text" value="+"/> 0
10	0.00	0 <input type="text" value="FV"/>	665.30	[Rcl]	-212.27	<input type="text" value="RCL"/> 0
11	-665.30	<input type="text" value="PMT"/>	212.27	[Rcl]	-2547.23	
12	2,547.23	<input type="text" value="RCL"/> 0 <input type="text" value="-"/> 12 <input type="text" value="x"/>	2,547.23	[x] 12 [=]	-12,736.14	<input type="text" value="x"/> 12 <input "="" type="text" value="="/>
13	12,736.14	5 <input type="text" value="x"/>	12,736.14	[x] 5 [=]		<input type="text" value="x"/> 5 <input "="" type="text" value="="/>
Answer	<u>\$12,736.14</u>		<u>\$12,736.14</u>			

ANSWER: The cost of the buy-down loan is \$12,736.14

NOTES: Step 5 calculates the monthly payments that are due under the 10% loan after the buy-down term. Step 6 stores it, since we'll need to recall that number in order to compute the payment differentials for the first five years. Step 7 computes the loan balance at the end of the *fifth* year. Steps 8 through 11 computes the buy-down rate, 7%, for the monthly payments for the first five years, shown in step 11 as \$665.30. Step 12 computes the annual subsidy simply by multiplying the difference in monthly payments, resulting in the buy-down amount of \$2547.23 for each of the first five years. Step 13 computes the total subsidy, the buy-down amount of \$12,736.14 over the entire five-year period.

FUTURE VALUE vs PRESENT VALUE

The answer of \$12,736.14 is the total buy-down amount, without adjusting for the time value of money. But we know that the difference between what would have been paid under the note rate of 10% and the first five years of subsidy at 7% can be generate additional earnings if put to work.

If therefore we want to be more precise, the \$12,736.14 difference (\$39,918.15 paid during the first five years vs the \$52,654.29 that would have been paid without the buy-down) should reflect what the monthly savings could be realistically earning. If we project this at 6%, the Present Value Factors table in Unit One show .7473 at the intersection where the 6% column meets the 5 year period. Multiplying \$12,736.14 by .7473 gives us a present value of \$9,517.72 for the five year buy-down.

Conclusion: The buy-down is effectively worth \$9,517.72, and not \$12,736.14, after adjusting for the time value of money.

Test Yourself

DATA	:	Trust Deed Loan	\$100,000
		Term, payable monthly for	30 years
		Interest rate:	
		First ten years	5%
		Each year thereafter	10%
Question	:	What is the cost of the buy-down loan?	

Unit Thirteen - HOW DO I CALCULATE A BI-WEEKLY MORTGAGE?

DATA : 1st Trust Deed \$100,000
 Interest Rate 10%
 Term, payable every 2 weeks for 30 years

QUESTION : A. What are the biweekly payments?
 B. How long will it take to pay off the loan?

Solution:

Step	HP 12C		QP IIIx: Model 3415		TI: BA II Plus	
	Screen	Key	Screen	Key	Screen	Key
1	360	30 <input type="text" value="g"/> <input type="text" value="12x"/>	All Cleared 0.00	[Shift] [x]		
2	0.83	10 <input type="text" value="g"/> <input type="text" value="12 ÷"/>	30.00	30 [Term]		
3	100,000	100000 <input type="text" value="PV"/>	10.00	10 [Int]		
4	0.00	0 <input type="text" value="FV"/>	100,000.00	100 [000] [Loan Amt]		
5	-877.57	<input type="text" value="PMT"/>	877.57	[Pmt]		
6	-438.79	2 <input type="text" value="-"/>	20.96	[Shift][Term]		
7	-438.79	<input type="text" value="PMT"/>	438.79	[Pmt]		
8	0.38	10 <input type="text" value="ENTE"/> <input type="text" value="PV"/>				
9	0.38	<input type="text" value="i"/>				
10	545	<input type="text" value="n"/>				
11	20.96	<input type="text" value="PV"/> <input type="text" value="-"/>				
Answer A		The payments are \$438.79 every biweekly period	The payments are \$438.79 every biweekly period			
Answer B		The loan will be repaid in full in 20.96 years, or a hair under 21 years, which means that the final biweekly payment will be just slightly under \$438.79.	The loan will be repaid in full in 20.96 years, or a hair under 21 years, which means that the final biweekly payment will be just slightly under \$438.79.			

NOTES:

1. Don't be confused by the negative figure that shows up in step 5. It simply follows the opposite sign convention, and reflects money *paid out*. Read the monthly payments as: \$877.57 without regard to the negative sign. But our question asks what payments are *each two weeks*. Without disturbing the data you have in your calculator, proceed to step 6.
2. Step 7 is required to lock in the payments for each two weeks into the memory of the calculator. In step 8, we divide the annual interest rate by 26, because there are 26 two-week periods, called "biweekly", in a year. In step 9 we lock in the biweekly rate by pressing $\frac{1}{26}$. For step 10 we determine the number of two-week periods that it will take to pay off the loan. Step 11 converts this information into periods

Test Yourself**Self Test 1**

DATA	:	Trust Deed	\$200,000
		Interest Rate	10%
		Term, payable biweekly for	30 years
		Biweekly payment?	
		Number of years to repay?	

Self Test 2

DATA	:	Trust Deed	\$200,000
		Interest Rate	10%
		Term, payable biweekly for	15 years
		Biweekly payment?	
		Number of years to repay?	

Self Test 3

DATA	:	Trust Deed	\$100,000
		Interest Rate	10%
		Term, payable biweekly for	30 years
		Biweekly payment?	
		Number of years to repay?	

Real Estate Finance

Calculator Exercises Appendix

Points Page5&6

- 1 1. \$ _____
- 1 2. \$ _____
- 1 3. \$ _____
- 1 4. \$ _____

Page 7&8

- 1 1. _____% monthly interest rate, or _____% annual rate
- 1 2. _____% monthly interest rate, or _____% annual rate
- 1 3. _____% monthly interest rate, or _____% annual rate
- 1 4. _____% annual interest rate.

(The loan is paid once annually, so no need to convert from monthly.)

Page 10

- 1 1. _____% monthly, or _____% APR

Page 16

- 1 1-1. \$ _____ after three years
(\$ _____ if payments of \$ _____ are rounded via |f| |RND|)
- 1 1-2. \$ _____ after five years
(\$ _____ if payments are rounded)
- 1 2-1. \$ _____ after three years
(\$ _____ if payments of \$ _____ are rounded via |f| |RND|)
- 1 2-2. \$ _____ after five years
(\$ _____ if payments are rounded via |f| |RND|)

Page 18

- 1 1. \$ _____
- 2.

<u>Year</u>	<u>Interest</u>	<u>Principal</u>
1	\$ _____	\$ _____
2	\$ _____	\$ _____

Page 20&21

- 1 1-1. Monthly payments: \$ _____
- 1 1-2. First year interest: \$ _____
- 1 1-3. First year principal: \$ _____
- 1 1-4. Balance end of first year: \$ _____
- 1 2-1. Monthly payments: \$ _____
- 1 2-2. First year interest: \$ _____
- 1 2-3. First year principal: \$ _____
- 1 2-4. Balance end of first year: \$ _____
- 1 3-1. Monthly payments: \$ _____
- 1 3-2. First year interest: \$ _____
- 1 3-3. First year principal: \$ _____
- 1 3-4. Balance end of first year: \$ _____

Page 23

- 1 1. \$ _____
- 1 2. \$ _____

Page 25

- 1 1. _____ or _____ %
- 1 2. _____ or _____ %

- 1 **Page 27** \$ _____

Page 29

- 1 1. \$ _____ biweekly payments
_____ biweekly periods, or _____ years to repay.
- 1 2. \$ _____ biweekly payments
_____ biweekly periods, or _____ years to repay
- 1 3. \$ _____ biweekly payments
_____ biweekly periods, or _____ years to repay

36 total points