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Calculator Exercise 1

Real Estate Finance Class
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Calculator Exercise 1- HP10BII

You arrange a loan for the borrower on the purchase of their new home. The purchase Price is \$750,000. The acquisition costs of the home are $1\frac{1}{2}\%$ of the purchase price, or \$11,250. ($\frac{1}{2}\%$ would be the approximate and normal acquisition costs, the other 1% will be the loan origination fee, one point on the face amount of the loan.

Your buyer/borrower sold their existing home and they will have \$170,000 for the cash down payment on their new home. This will equate to a 20% down payment and cover the acquisition costs of \$11,250, leaving the buyer/borrower \$8,750 with which they intend to purchase new furnishings and do some minor maintenance.

The purchase price will be \$750,000, the cash down payment will be 20% of the purchase price, or \$150,000, the acquisition costs will amount to \$11,250. The borrower has ample funds to meet the cash down payment and the acquisition costs. The buyer will need to obtain a new 1st Trust Deed and Note in the amount of \$600,000 at $6\frac{1}{2}\%$ interest, amortized for 30 years and payable in equal monthly installments.

To Simplify:

Purchase Price of Home	–	\$750,000
Cash Down Payment 20%	–	\$150,000
Acquisition Costs $\frac{1}{2}\%$	–	\$ 3,750
Loan Origination Fee 1%	-	\$ 6,000
New 1 st Trust Deed	-	\$600,000

Using your financial Calculator find the following:

What is the monthly payment on this 30 year loan?

What is the total interest that the buyer will pay over a 30 year period?

What will the balance be at the end of the 10th year?

Assuming the buyer could get a \$600,000 at 6% interest if they got a 15 Year Loan?

What is the monthly payment on this 15 year loan?

What is the total interest the buyer will pay over a 15 year period?

What will the balance be at the end of the 10 year?

If the buyer made the payment on the 15 year loan at 6%, on the 30 year loan at $6\frac{1}{2}\%$;

How long would it take to pay off the $6\frac{1}{2}\%$ loan?

How much interest would the buyer have paid over that period?





Solution 10BII

Some of the loan function keys:

- N = Periods in months, years, quarters, daily semi-annually whatever time period you can think of.
- i = Interest rate. It can be monthly, annually, daily, semi-annually. (HP 10BII = I%Yr)
- PV = The Present Value of whatever you are trying to find.
- FV = Future Value is used when you have an annuity, a savings account, a savings account that you are depleting on a regular basis. Appreciating rents. The future value of a building.

You always clear all registers on financial calculators.

You will set your calculator to END MODE this is the mode for loans when the payment is made at the end of the period, which is the case with real estate loans.

1. Clear all financial functions  C All 
2. Set the Begin/End to suit the type of loan you are working with  Beg/End you will see the BEGIN in the mantissa if begin is set. If End is set, being the more common, you will see no indication.
3. Set the number of payments per year normally 12  P/YR
4. Finally the important thing is do many financial problems with the same basic structure to ingrain the concept in your mind.

Our current Problem.

What is the monthly payment on this \$600,000 loan at 6^{1/2}% interest, amortized for 30 years, and payable in equal monthly installments of \$?????,

Input 360 months in the N or period function, input 6.5 in the i/YR, input the loan amount in PV 600,000

N	i/YR	PV	PMT	FV
360	6.5	600,000	?	NA

Notice you have a question mark at PMT that is your unknown. Press PMT and you will get \$3,792.41

N	i/YR	PV	PMT	FV
360	6.5	600,000	- 3,792.41	NA

The payment then is \$3,792.41. Notice that with the HP Calculators that the payment is put in as a negative

What is the total interest that the buyer will pay over a 30 year period?

Set the problem up normally and solve for the payment.

N	i/YR	PV	PMT	FV
360	6.5	600,000	3,792.41	NA

Now find the total Principal and Interest Paid over the 30 year period

Press the number 1 and press INPUT

Enter 360, the total periods, Press the Yellow key  Press AMORT

Your calculator will show 1-360 press the = key and you will get the total balance paid in 360 periods, or -599,999.95 ~ now press the = key again and you will get the total interest paid -765,266.96 Press the = 's again and you will get the balance of the loan or \$0.0459 about 5¢

The next part of our problem is;


What will the balance be at the end of the 10th year?

Clear Financial registers  and press C ALL

Set the problem up normally and solve for the payment.

N	i/YR	PV	PMT	FV
360	6.5	600,000	3,792.41	NA

Press the number 1 and press INPUT

Input 120 the total months in 10 years and press  AMORT

Your register will show 1 – 120 meaning you have amortized the payments from 1 through 120

Press = and you will get -91,343.23 the amount of Principal paid in 10 years

Press = again and you will get -363,745.74

Press = a third time and you will get the loan balance \$508,656.77

Pretty easy stuff huh? Realize that you have to do a lot of the same problem to get proficient.

Assuming the buyer could get a \$600,000 at 6% interest if they got a 15 Year Loan?

What is the monthly payment on this 15 year loan?

Here you input 180 periods for N, change I to 6, re-input the 600,000 and solve for the PMT


N	i/YR	PV	PMT	FV
180	6	600,000	?	NA

N	i/YR	PV	PMT	FV
180	6	600,000	5,063.14	NA

The answer for the payment is \$5,063.14 – a bit stiff, but people get interested in the lower rate and the more rapid payoff.

What is the total interest the buyer will pay over a 15 year period?

Press the number 1 and press INPUT

Input 180 the total months in 15 years and press  AMORT

Your register will show 1 – 180 meaning you have amortized the payments from 1 through 180

Press = and you will get -600,000.0093 the amount of Principal paid in 15 years

Press = again and you will get -311,365.3707 the interest paid in 15 years


Press = a third time and you will get the loan balance at the end of 15 years -0.0093

What will the balance be at the end of the 10 year?

Clear Financial and set your calculator up again

N	i/YR	PV	PMT	FV
180	6	600,000	5,063.14	NA

Press the number 1 and press INPUT

Input 120 the total months in 10 years and press  AMORT

Your register will show 1 – 180 meaning you have amortized the payments from 1 through 180

Press = and you will get -338,106.1994 the amount of Principal paid in 10 years

Press = again and you will get -269,470.7206 the amount of interest paid in 10 years

Press = a third time and you will get 261,893.8006 the balance of the loan at the end of year 10

If the buyer made the payment on the 15 year loan at 6%, on the 30 year loan at 6^{1/2}%;

How long would it take to pay off the 6^{1/2}% loan? First set up your problem as a 30 year, 6^{1/2}% loan

Make sure your problem is set up correctly in your calculator.

N	i/YR	PV	PMT	FV
360	6.5	600,000	3,792.41	NA

Now you will change the payment and solve for the periods. Make sure the -5,063.41 monthly payment is entered as a negative.

N	i/YR	PV	PMT	FV
?	6.5	600,000	-5,063.14	NA

N	i/YR	PV	PMT	FV
190	6.5	600,000	-5,063.14	NA

With the larger payment from the 15 year, 6% loan, applied to the 30 year, 6.5% loan we find we will have 10 additional payments, or 190 (*15.83333 Years*) payments instead of 180 payments. This would amount to \$50,631.40 over the life of the loan. Still we would always have the alternative, if things got tough, to go back to the \$3,792.41 payment.

How much interest would the buyer have paid over that period?

Press the number 1 and press INPUT

Input 190 the total months in 10 years and press



AMORT

Your register will show 1 – 190 meaning you have amortized the payments from 1 through 190

Press = and you will get -599,497.8726 the amount of Principal paid in 15.83333 years

Press = again and you will get -362,498.7274 the amount of Interest paid in 190 periods

Press = a third time and you will get \$502.1274 the balance of the loan at the end of 15.8333 years

The amount of interest paid will be \$362,498.7274 on the 6.5% 15.8333 year loan and,

The amount of interest paid on the 15 year loan = -311,365.3707

The difference is the \$51,133.3567 . In other words we paid \$51,133.3567 more for the 30 year loan at 6.5% when we made the \$5,063.14 payment on the 6% loan.

The advantage is that we could always go back to the \$3,792.41 payment if our income was impeded. Prepayment penalties shouldn't enter into the problem as we wouldn't have more than \$120,000 in any given year. (*20% of the total loan balance for the first 5 years*)