

Building an Amortization Table with an HP10B

TERRY COLLEGE OF BUSINESS- REAL ESTATE PROGRAM

Suppose a borrower wants to take out a \$100,000 mortgage loan. The lender wants to earn a 12 percent interest rate and be repaid in equal monthly payments over 20 years. What is the monthly payment?

$ANN = PV \left[MC_{i/m, nm} \right]$ $= 100,000 \left[MC_{0.12/12, 240} \right]$ $= 100,000 \left[\frac{0.12/12}{1 - \frac{1}{(1 + 0.12/12)^{240}}} \right]$ $= 1101.08613$ <p style="margin-top: 20px;"> PV = 100,000 N = 20 m = 12 i = 12 ANN = ? </p>	<p style="text-align: center;"><i>Mortgage Constant</i></p> $\left[MC_{i/m, nm} \right] = \left[\frac{i/m}{1 - \frac{1}{(1 + i/m)^{nm}}} \right]$
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The following steps can be used to calculate the interest & principal paid over a **single period of time** (e.g., the fifth period), as well as principal outstanding at the end of the period of the mortgage, after the mortgage information provided above has been entered.

$$OMB_t = ANN \left[PVA_{i/m, nm-t} \right]$$

$$OMB_5 = 1101.08613 \left[PVA_{0.12/12, 240-5} \right]$$

$$= 1101.08613 \left[\frac{1 - \frac{1}{(1 + 0.12/12)^{235}}}{0.12/12} \right]$$

$$= 99,484.3588$$

$$OMB_4 = 99,589.54944$$

$$\Delta OMB_{5\text{ month}} = OMB_4 - OMB_5$$

$$= 99,589.54944 - 99,484.3588$$

$$= 105.19064$$

$$\Delta Interest_{5\text{ month}} = \# \text{ pmt}(PMT) - (OMB_{BEG} - OMB_{END})$$

$$= 1101.08613 - (99,589.54944 - 99,484.3588)$$

$$= 995.89549$$

The following steps can be used to calculate the interest & principal paid **over a time interval** (i.e., over the 6th year of the mortgage), as well as principal outstanding at the end of the period of the mortgage, after the mortgage information provided above has been entered. Note that the sixth year of this mortgage starts with period 61 and ends with period 72.

$$OMB_t = ANN \left[PVA_{i/m, nm-t} \right]$$

$$OMB_{72} = 1101.08613 \left[PVA_{0.12/12, 240-72} \right]$$

$$= 1101.08613 \left[\frac{1 - \frac{1}{(1 + 0.12/12)^{68}}}{0.12/12} \right]$$

$$= 89,415.27762$$

$$OMB_{60} = 91,744.32855$$

$$\Delta OMB_{6\text{th yr}} = OMB_{60} - OMB_{72}$$

$$= 91,744.32855 - 89,415.27762$$

$$= 2,329.05093$$

$$\Delta Interest_{6\text{th yr}} = \# \text{ pmt}(PMT) - (OMB_{BEG} - OMB_{END})$$

$$= 12(1101.08613) - (91,744.32855 - 89,415.27762)$$

$$= 10,883.98263$$

Suppose a borrower wants to take out a \$100,000 mortgage loan. The lender wants to earn a 12 percent interest rate and be repaid in equal monthly payments over 20 years. What is the monthly payment?

Procedure	Keystrokes	Display	
Clear TVM	[SHIFT – the orange key] [CLEAR ALL]	0.00	This sets N , I/YR , PV , PMT , and FV to zero and briefly displays the current value of P/YR .
Set the payment per year (if necessary)	12 [SHIFT][P/YR]	12.00	Note that holding [CLEAR ALL] after pressing [SHIFT] briefly displays the current value of P/YR .
Enter present value	100,000 [PV]	100,000	
Enter interest rate	12 [I/YR]	12.00	
Enter total number of payments	240 [N] or 20 [SHIFT][xP/YR][N]	240.00	
Compute annuity cash flow	[PMT]	-1101.08613	

The following steps can be used to calculate the interest & principal paid over a *single period of time* (e.g., the fifth period), as well as principal outstanding at the end of the period of the mortgage, after the mortgage information provided above has been entered.

Procedure	Keystrokes	Display
Enter the period for which you want to calculate the information	5 [INPUT] [SHIFT] [AMORT]	PEr 5-5
To calculate the interest, principal, and Outstanding Mortgage Balance (OMB)	[=] (<i>flashes INT</i>) [=] (<i>flashes Prin</i>) [=] (<i>flashes bAL</i>)	-995.89550 -105.19063 99,484.35915

The following steps can be used to calculate the interest & principal paid *over a time interval* (i.e., over the 6th year of the mortgage), as well as principal outstanding at the end of the period of the mortgage, after the mortgage information provided above has been entered. Note that the sixth year of this mortgage starts with period 61 and ends with period 72.

Procedure	Keystrokes	Display
Enter the period for which you want to calculate the information	61 [INPUT] 72 [SHIFT] [AMORT]	PEr 61-72
To calculate the interest, principal, and Outstanding Mortgage Balance (OMB)	[=] (<i>flashes INT</i>) [=] (<i>flashes Prin</i>) [=] (<i>flashes bAL</i>)	-10,883.98271 -2,329.05085 89,415.27830