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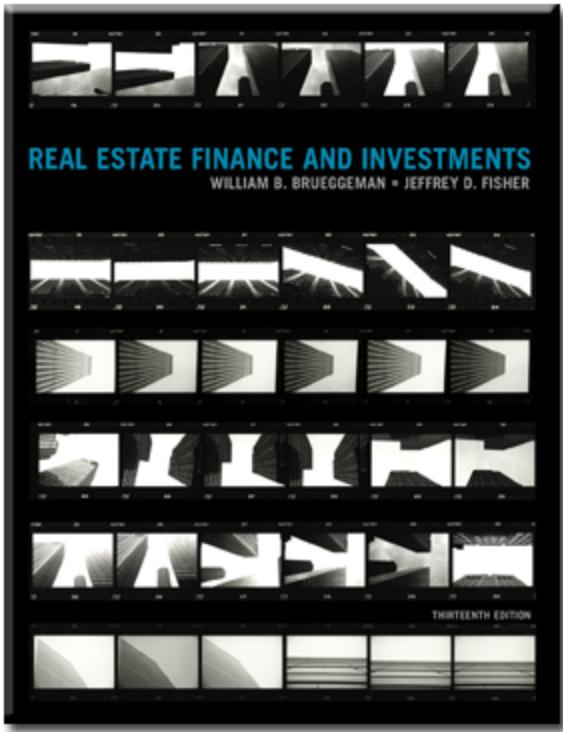
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CHAPTER

4



Fixed Rate Mortgage Loans



Components of the Mortgage Interest Rate

- Default Risk
- Interest Rate Risk
 - Anticipated Inflation and Unanticipated Inflation
- Prepayment Risk
- Liquidity Risk
- Legislative Risk



Components of the Mortgage Interest Rate

$$i_t = r_1 + p_1 + f_1$$

r = Real Rate

f_1 = Inflation Rate

p_1 = Risk Premiums



TERM SHEET
Prepared for
ABC Company, Inc.
June 27, 2007

This is the confidential work of [REDACTED] and, as such, represents intellectual property not to be shared with other financial institutions. The terms of this discussion sheet are good through June 27, 2007, after which time it expires.

Borrower: ABC Company, Inc.

Purpose: To purchase the existing building located at 2659 Street Drive in Dallas, Texas ("Building")

Amount: \$2,250,000

Rate: The fixed rate is subject to change with market conditions prior to the closing of the loan. The rates listed below are based on the rates as of June 27, 2007. Once the option is chosen below, the rate can be locked for a 6 day period.

Fixed Rate Options (Fixed for the term of the loan):

Term	Amortization	Rate
10	20	7.50%

Fee: 1% of the loan amount.

Prepayment Penalty: There will be a prepayment penalty within the first three years of the loan.

Repayment: Interest only monthly payments for the first three months; thereafter monthly principal and interest payments based on an amortization up to 20 years.

Maturity: 10 years.

Collateral: First Lien Deed of Trust on property and improvements located at 2659 Street Drive, Dallas, Texas. Assignment of Rents and Leases.

Formula: Loan-to-value not to exceed 75%; Loan-to-cost after first three months not to exceed 90% (will be met with one-time principal reduction of \$250,000).

Guarantors: Unlimited personal guarantee of the owners of the company.

Covenants: Minimum of a \$250,000 one-time principal payment reduction within the first three months after closing.

Minimum Debt Service Coverage ratio of 1.25x (to be monitored annually).

Reporting:
Annual Compiled Financial Statements on borrower
Annual Tax Returns on borrower
Annual Personal Financial Statements on guarantors

Closing Costs:

The Borrower is responsible for the payment of costs including but not limited to appraisal, survey, title searches, title insurance policy, environmental study, recording taxes, and UCC fees. The Borrower will provide insurance on the collateral with the Bank named as loss payee. The estimated cost of legal fees with this transaction is \$2,000. The Bank will pay for the legal fees associated with the preparation of the loan documents for this transaction.

Subject to:

Satisfactory review of appraisal and environmental due diligence.

Please note that this is not the final agreement between the borrower and the bank. All other terms and conditions will be final in the loan documents signed between the borrower and the bank. If you are acceptable to these terms, and would like for please sign below.

on _____, 2007.

Mortgage Payment Patterns

- Constant Payment Mortgage (CPM)
 - Loan Amortization Changes
 - Monthly Payment Remains the Same
- Constant Amortization Mortgage (CAM)
 - Loan Amortization portion of the Payment Remains the Same
 - Monthly Payment Changes

Mortgage Payment Patterns

- Example 4-1
- Calculating the Payment for a CPM
 - \$100,00 Mortgage
 - 7% Interest
 - 30 Years
 - Monthly Payments



Mortgage Payment Patterns

PV = \$100,000

n = $30 \times 12 = 360$

FV = \$0

i = $7/12 = .58333$

(or change P/Y to 12 and enter 7)

CPT **PMT** = \$665.30



Mortgage Payment Patterns

- Interest paid in the first month
 - $(.07/12) \times \$100,000 = \583.33
- Principal paid in the first month
 - $\$665.30 - \$583.33 = \$81.96$
- Every month, interest portion declines
- Every month, principal portion increases.





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Amortization table for \$100,000.00 borrowed on Mar 03, 2012

Month / Year	Payment	Principal Paid	Interest Paid	Total Interest	Balance
April 2012	\$665.30	\$81.97	\$583.33	\$583.33	\$99,918.03
May 2012	\$665.30	\$82.45	\$582.86	\$1,166.19	\$99,835.58
June 2012	\$665.30	\$82.93	\$582.37	\$1,748.56	\$99,752.66
July 2012	\$665.30	\$83.41	\$581.89	\$2,330.45	\$99,669.24
Aug. 2012	\$665.30	\$83.90	\$581.40	\$2,911.86	\$99,585.34
Sept. 2012	\$665.30	\$84.39	\$580.91	\$3,492.77	\$99,500.96
Oct. 2012	\$665.30	\$84.88	\$580.42	\$4,073.19	\$99,416.08
Nov. 2012	\$665.30	\$85.38	\$579.93	\$4,653.12	\$99,330.70
Dec. 2012	\$665.30	\$85.87	\$579.43	\$5,232.35	\$99,244.83
Jan. 2013	\$665.30	\$86.37	\$578.93	\$5,811.48	\$99,158.45
Feb. 2013	\$665.30	\$86.88	\$578.42	\$6,389.90	\$99,071.58
Mar. 2013	\$665.30	\$87.38	\$577.92	\$6,967.82	\$98,984.19
April 2013	\$665.30	\$87.89	\$577.41	\$7,545.23	\$98,896.30
May 2013	\$665.30	\$88.41	\$576.90	\$8,122.12	\$98,807.89
June 2013	\$665.30	\$88.92	\$576.38	\$8,698.50	\$98,718.96
July 2013	\$665.30	\$89.44	\$575.86	\$9,274.36	\$98,629.52
Aug. 2013	\$665.30	\$89.96	\$575.34	\$9,849.70	\$98,539.56
Sept. 2013	\$665.30	\$90.49	\$574.81	\$10,424.52	\$98,449.07
Oct. 2013	\$665.30	\$91.02	\$574.29	\$10,998.80	\$98,358.05
Nov. 2013	\$665.30	\$91.55	\$573.76	\$11,572.56	\$98,266.51
Dec. 2013	\$665.30	\$92.08	\$573.22	\$12,145.78	\$98,174.43
Jan. 2014	\$665.30	\$92.62	\$572.68	\$12,718.46	\$98,081.81
Feb. 2014	\$665.30	\$93.16	\$572.14	\$13,290.61	\$97,988.65
Mar. 2014	\$665.30	\$93.70	\$571.60	\$13,862.21	\$97,894.95
April 2014	\$665.30	\$94.25	\$571.05	\$14,433.26	\$97,800.70
May 2014	\$665.30	\$94.80	\$570.50	\$15,003.77	\$97,705.90
June 2014	\$665.30	\$95.35	\$569.95	\$15,573.72	\$97,610.55
July 2014	\$665.30	\$95.91	\$569.39	\$16,143.11	\$97,514.64
Aug. 2014	\$665.30	\$96.47	\$568.84	\$16,711.95	\$97,418.17
Sept. 2014	\$665.30	\$97.03	\$568.27	\$17,280.22	\$97,321.14
Oct. 2014	\$665.30	\$97.60	\$567.71	\$17,847.93	\$97,223.55
Nov. 2014	\$665.30	\$98.17	\$567.14	\$18,415.06	\$97,125.38
Dec. 2014	\$665.30	\$98.74	\$566.56	\$18,981.63	\$97,026.65
Jan. 2015	\$665.30	\$99.31	\$565.99	\$19,547.62	\$96,927.33

			Print Story		
Feb. 2015	\$665.30		\$99.89	\$565.41	\$20,113.03
Mar. 2015	\$665.30		\$100.48	\$564.83	\$20,677.85
April 2015	\$665.30		\$101.06	\$564.24	\$21,242.09
May 2015	\$665.30		\$101.65	\$563.65	\$21,805.74
June 2015	\$665.30		\$102.24	\$563.06	\$22,368.80
July 2015	\$665.30		\$102.84	\$562.46	\$22,931.26
Aug. 2015	\$665.30		\$103.44	\$561.86	\$23,493.13
Sept. 2015	\$665.30		\$104.04	\$561.26	\$24,054.38
Oct. 2015	\$665.30		\$104.65	\$560.65	\$24,615.04
Nov. 2015	\$665.30		\$105.26	\$560.04	\$25,175.08
Dec. 2015	\$665.30		\$105.88	\$559.43	\$25,734.50
Jan. 2016	\$665.30		\$106.49	\$558.81	\$26,293.31
Feb. 2016	\$665.30		\$107.11	\$558.19	\$26,851.50
Mar. 2016	\$665.30		\$107.74	\$557.56	\$27,409.06
April 2016	\$665.30		\$108.37	\$556.93	\$27,966.00
May 2016	\$665.30		\$109.00	\$556.30	\$28,522.30
June 2016	\$665.30		\$109.64	\$555.67	\$29,077.97
July 2016	\$665.30		\$110.28	\$555.03	\$29,633.00
Aug. 2016	\$665.30		\$110.92	\$554.38	\$30,187.38
Sept. 2016	\$665.30		\$111.57	\$553.74	\$30,741.12
Oct. 2016	\$665.30		\$112.22	\$553.09	\$31,294.20
Nov. 2016	\$665.30		\$112.87	\$552.43	\$31,846.64
Dec. 2016	\$665.30		\$113.53	\$551.77	\$32,398.41
Jan. 2017	\$665.30		\$114.19	\$551.11	\$32,949.52
Feb. 2017	\$665.30		\$114.86	\$550.44	\$33,499.96
Mar. 2017	\$665.30		\$115.53	\$549.77	\$34,049.74
April 2017	\$665.30		\$116.20	\$549.10	\$34,598.84
May 2017	\$665.30		\$116.88	\$548.42	\$35,147.26
June 2017	\$665.30		\$117.56	\$547.74	\$35,695.00
July 2017	\$665.30		\$118.25	\$547.06	\$36,242.06
Aug. 2017	\$665.30		\$118.94	\$546.37	\$36,788.43
Sept. 2017	\$665.30		\$119.63	\$545.67	\$37,334.10
Oct. 2017	\$665.30		\$120.33	\$544.97	\$37,879.07
Nov. 2017	\$665.30		\$121.03	\$544.27	\$38,423.34
Dec. 2017	\$665.30		\$121.74	\$543.57	\$38,966.91
Jan. 2018	\$665.30		\$122.45	\$542.86	\$39,509.77
Feb. 2018	\$665.30		\$123.16	\$542.14	\$40,051.91
Mar. 2018	\$665.30		\$123.88	\$541.42	\$40,593.33
April 2018	\$665.30		\$124.60	\$540.70	\$41,134.03
May 2018	\$665.30		\$125.33	\$539.97	\$41,674.01
June 2018	\$665.30		\$126.06	\$539.24	\$42,213.25
July 2018	\$665.30		\$126.80	\$538.51	\$42,751.76
Aug. 2018	\$665.30		\$127.53	\$537.77	\$43,289.52
Sept. 2018	\$665.30		\$128.28	\$537.02	\$43,826.35
Oct. 2018	\$665.30		\$129.03	\$536.28	\$44,362.82
Nov. 2018	\$665.30		\$129.78	\$535.52	\$44,898.35
Dec. 2018	\$665.30		\$130.54	\$534.77	\$45,433.11
Jan. 2019	\$665.30		\$131.30	\$534.00	\$45,967.12

Feb. 2019	\$665.30	Print Story	\$533.24	\$46,500.36	\$91,280.25
Mar. 2019	\$665.30	\$132.06	\$533.24	\$46,500.36	\$91,280.25
April 2019	\$665.30	\$132.83	\$532.47	\$47,032.82	\$91,147.41
May 2019	\$665.30	\$133.61	\$531.69	\$47,564.52	\$91,013.80
June 2019	\$665.30	\$134.39	\$530.91	\$48,095.43	\$90,879.42
July 2019	\$665.30	\$135.17	\$530.13	\$48,625.56	\$90,744.24
Aug. 2019	\$665.30	\$135.96	\$529.34	\$49,154.90	\$90,608.28
Sept. 2019	\$665.30	\$136.75	\$528.55	\$49,683.45	\$90,471.53
Oct. 2019	\$665.30	\$137.55	\$527.75	\$50,211.20	\$90,333.98
Nov. 2019	\$665.30	\$138.35	\$526.95	\$50,738.15	\$90,195.62
Dec. 2019	\$665.30	\$139.16	\$526.14	\$51,264.29	\$90,056.46
Jan. 2020	\$665.30	\$139.97	\$525.33	\$51,789.62	\$89,916.49
Feb. 2020	\$665.30	\$140.79	\$524.51	\$52,314.13	\$89,775.70
Mar. 2020	\$665.30	\$141.61	\$523.69	\$52,837.82	\$89,634.09
April 2020	\$665.30	\$142.44	\$522.87	\$53,360.69	\$89,491.65
May 2020	\$665.30	\$143.27	\$522.03	\$53,882.72	\$89,348.38
June 2020	\$665.30	\$144.10	\$521.20	\$54,403.92	\$89,204.28
July 2020	\$665.30	\$144.94	\$520.36	\$54,924.28	\$89,059.33
Aug. 2020	\$665.30	\$145.79	\$519.51	\$55,443.79	\$88,913.54
Sept. 2020	\$665.30	\$146.64	\$518.66	\$55,962.46	\$88,766.90
Oct. 2020	\$665.30	\$147.50	\$517.81	\$56,480.26	\$88,619.41
Nov. 2020	\$665.30	\$148.36	\$516.95	\$56,997.21	\$88,471.05
Dec. 2020	\$665.30	\$149.22	\$516.08	\$57,513.29	\$88,321.83
Jan. 2021	\$665.30	\$150.09	\$515.21	\$58,028.50	\$88,171.74
Feb. 2021	\$665.30	\$150.97	\$514.34	\$58,542.84	\$88,020.77
March 2021	\$665.30	\$151.85	\$513.45	\$59,056.29	\$87,868.92
April 2021	\$665.30	\$152.73	\$512.57	\$59,588.86	\$87,716.19
May 2021	\$665.30	\$153.62	\$511.68	\$60,080.54	\$87,562.57
June 2021	\$665.30	\$154.52	\$510.78	\$60,591.32	\$87,408.05
July 2021	\$665.30	\$155.42	\$509.88	\$61,101.20	\$87,252.62
Aug. 2021	\$665.30	\$156.33	\$508.97	\$61,610.17	\$87,096.29
Sept. 2021	\$665.30	\$157.24	\$508.06	\$62,118.24	\$86,939.05
Oct. 2021	\$665.30	\$158.16	\$507.14	\$62,625.38	\$86,780.90
Nov. 2021	\$665.30	\$159.08	\$506.22	\$63,131.60	\$86,621.81
Dec. 2021	\$665.30	\$160.01	\$505.29	\$63,636.90	\$86,461.81
Jan. 2022	\$665.30	\$160.94	\$504.36	\$64,141.26	\$86,300.86
Feb. 2022	\$665.30	\$161.88	\$503.42	\$64,644.68	\$86,138.98
March 2022	\$665.30	\$162.83	\$502.48	\$65,147.16	\$85,976.16
April 2022	\$665.30	\$163.77	\$501.53	\$65,648.68	\$85,812.38
May 2022	\$665.30	\$164.73	\$500.57	\$66,149.26	\$85,647.65
June 2022	\$665.30	\$165.69	\$499.61	\$66,648.87	\$85,481.96
July 2022	\$665.30	\$166.66	\$498.64	\$67,147.51	\$85,315.30
Aug. 2022	\$665.30	\$167.63	\$497.67	\$67,645.18	\$85,147.67
Sept. 2022	\$665.30	\$168.61	\$496.69	\$68,141.88	\$84,979.07
Oct. 2022	\$665.30	\$169.59	\$495.71	\$68,637.59	\$84,809.48
Nov. 2022	\$665.30	\$170.58	\$494.72	\$69,132.31	\$84,638.89
Dec. 2022	\$665.30	\$171.58	\$493.73	\$69,626.04	\$84,467.32
Jan. 2023	\$665.30	\$172.58	\$492.73	\$70,118.76	\$84,294.74

Amortization

The HP-12C enables you to calculate the amounts applied toward principal and toward interest from a single loan payment or from several payments, and also tells you the remaining balance of the loan after the payments are made.*

To obtain an amortization schedule:

1. Press **f** [CLEAR FIN] to clear the financial registers.
2. Enter the periodic interest rate, using **i** or **12+**.
3. Enter the amount of the loan (the principal), using **PV**.

* All amounts calculated when **f** [AMORT] is pressed are automatically rounded to the number of decimal places specified by the display format. (The display format is described in section 5.) This rounding affects the number *inside* the calculator as well as how the number appears in the display. The amounts calculated on your HP-12C may differ from those on the statements of lending institutions by a few cents, since different rounding techniques are sometimes used. To calculate answers rounded to a different number of decimal places, press **f** followed by the number of decimal places desired before you press **f** [AMORT].

4. Key in the periodic payment, then press **CHS** **PMT**. (The sign of *PMT* must be negative, in accordance with the cash flow sign convention.)
5. Press **g** **BEG** or (for most direct reduction loans) **g** **END** to set the payment mode.
6. Key in the number of payments to be amortized.
7. Press **f** **AMORT** to display the amount from those payments applied toward interest.
8. Press **$x \geq y$** to display the amount from those payments applied toward the principal.
9. To display the number of payments just amortized, press **R↓** **R↓**.
10. To display the remaining balance of the loan, press **RCL** **[PV]**.
11. To display the *total* number of payments amortized, press **RCL** **[n]**.

Example: For a house you're about to buy, you can obtain a 25-year mortgage for \$50,000 at 13 1/4% annual interest. This requires payments of \$573.35 (at the end of each month). Find the amounts that would be applied to interest and to the principal from the first year's payments.

Keystrokes

f CLEAR [FIN]	Display
13.25 [g] [12÷]	1.10
50000 [PV]	50,000.00
573.35 CHS [PMT]	-573.35
g [END]	-573.35
12 f [AMORT]	-6,608.89
$x \geq y$	-271.31

Display

Enters <i>i</i> .	
Enters <i>PV</i> .	
Enters <i>PMT</i> (with minus sign for cash paid out).	
Sets payment mode to End.	
Portion of first year's payments (12 months) applied to interest.	
Portion of first year's payments applied to principal.	

Keystrokes	Display
RCL [PV]	49,728.69 Balance remaining after
[RCL] [<i>n</i>]	12.00 1 year. Total number of payments amortized.

The number of payments keyed in just before **f [AMORT]** is pressed is taken to be the payments following any that have already been amortized. Thus, if you now press 12 **f [AMORT]**, your HP-12C will calculate the amounts applied to interest and to the principal from the second year's payments (that is, the second 12 months):

Keystrokes	Display
12 f [AMORT]	-6,570.72 Portion of second year's payments applied to interest.
x\geqj	-309.48 Portion of second year's payments applied to principal.
R\downarrow R\downarrow	12.00 Number of payments just amortized.
RCL [PV]	49,419.21 Balance remaining after 2 years.
[RCL] [<i>n</i>]	24.00 Total number of payments amortized.

Pressing **RCL [PV]** or **RCL [*n*]** displays the number in the PV or *n* register. When you did so after each of the last two calculations, you may have noticed that *PV* and *n* had been changed from their original values. The calculator does this so that you can easily check the remaining balance and the total number of payments amortized. But because of this, if you want to generate a new amortization schedule from the beginning, you must reset *PV* to its original value and reset *n* to 0.

For example, suppose you now wanted to generate an amortization schedule for each of the first two months:

Keystrokes	Display
50000 [PV]	50,000.00 Resets <i>PV</i> to original value.
0 [<i>n</i>]	0.00 Resets <i>n</i> to zero.

Keystrokes	Display	
1 [f] [AMORT]	-552.08	Portion of first payment applied to interest.
[x≥n]	-21.27	Portion of first payment applied to principal.
1 [f] [AMORT]	-551.85	Portion of second payment applied to interest.
[x≥n]	-21.50	Portion of second payment applied to principal.
[RCL][n]	2.00	Total number of payments amortized.

If you want to generate an amortization schedule but do not already know the monthly payment:

1. Calculate PMT as described on page 53.
2. Press 0 [n] to reset n to zero.
3. Proceed with the amortization procedure listed on page 62, beginning with step 6.

Example: Suppose you obtained a 30-year mortgage instead of a 25-year mortgage for the same principal (\$50,000) and at the same interest rate (13 1/4%) as in the preceding example. Calculate the monthly payment, then calculate the amounts applied to interest and to the principal from the first month's payments. Since the interest rate is not being changed, do not press [f] CLEAR [F1]; to calculate PMT , just enter the new value for n , reset PV , then press [PMT].

Keystrokes	Display	
30 [g] [12x]	360.00	Enters n .
50000 [PV]	50,000.00	Resets PV .
[PMT]	-562.89	Monthly payment.
0 [n]	0.00	Resets n to zero.
1 [f] [AMORT]	-552.08	Portion of first payment applied to interest.
[x≥n]	-10.81	Portion of first payment applied to principal.
[RCL][PV]	49,989.19	Remaining balance.

Section 12

Real Estate and Lending With Fees

Annual Percentage Rate Calculations

Borrowers are usually charged fees in connection with the issuance of a mortgage, which effectively raises the interest rate. The actual amount received by the borrower (PV) is reduced, while the periodic payments remain the same. Given the life or term of the mortgage, the interest rate, the mortgage amount, and the basis of the fee charge (how the fee is calculated), the true Annual Percentage Rate (APR) may be calculated. Information is entered as follows:

1. Press **[g]** **[END]** and **[f]** **CLEAR** **[FIN]**.
2. Calculate and enter the periodic payment amount of the loan.
 - a. Key in the total number of payment periods; press **[n]**.
 - b. Key in the periodic interest rate (as a percentage); press **[i]**.
 - c. Key in the mortgage amount; press **[PV]**.*
 - d. To obtain the periodic payment amount, press **[PMT]**.*
3. Calculate and key in the actual net amount disbursed.*
 - If fees are stated as a percentage of the mortgage amount (points), recall the mortgage amount (**[RCL]** **[PV]**); key in the fee (percentage) rate; press **[%]** **[−]** **[PV]**.
 - If fees are stated as a flat charge, recall the mortgage amount (**[RCL]** **[PV]**); key in the fee amount (flat charge); press **[−]** **[PV]**.
4. Press **[j]** to obtain the interest rate per compounding period.

* Positive for cash received; negative for cash paid out.

5. To obtain the annual nominal percentage rate, key in the number of periods per year, then press \boxed{x} .

Example 1: A borrower is charged 2 points for the issuance of his mortgage. If the mortgage amount is \$60,000 for 30 years and the interest rate is 11½% per year, with monthly payments, what true annual percentage rate is the borrower paying? (One point is equal to 1% of the mortgage amount.)

Keystrokes Display

9 [END]			
[F] CLEAR [FIN]			
30 9 [12x]	360.00	Months (into n).	
11.5 [9] [12÷]	0.96	Percent monthly interest rate (into i).	
60000 [PV]	60,000.00	Loan amount (into PV).	
[PMT]	-594.17	Monthly payment (calculated).	
[RCL] [PV] 2 % [PV]	58,800.00	Actual amount received by borrower (into PV).	
[I]	0.98	Percent monthly interest rate (calculated).	
12 [x]	11.76	Annual percentage rate.	

Example 2: Using the same information as given in example 1, calculate the APR if the mortgage fee is \$150 instead of a percentage.

Keystrokes Display

9 [END]			
[F] CLEAR [FIN]			
30 9 [12x]	360.00	Months (into n).	
11.5 [9] [12÷]	0.96	Percent monthly interest rate (into i).	
60000 [PV]	60,000.00	Loan amount (into PV).	
[PMT]	-594.17	Monthly payment (calculated).	
[RCL] [PV] 150 [PV]	59,850.00	Effective mortgage amount (into PV).	

Keystrokes

Display
 $\boxed{1}$ **0.96** Monthly interest rate
 (calculated).

12 \times **11.53** Annual percentage rate.

Example 3: Again using the information given in example 1, what is the APR if the mortgage fee is stated as 2 points plus \$150?

Keystrokes**Display**

$\boxed{9} \text{ [END]}$
 f [CLEAR FIN]
 $30 \boxed{9} \boxed{12\times}$
 $11.5 \boxed{9} \boxed{12\times}$

360.00
0.96
60,000.00
-594.17

\boxed{PV}
 PMT

$\boxed{RCL} \boxed{PV} 2 \boxed{\%} \boxed{-}$
 $150 \boxed{-} \boxed{PV}$

58,800.00
58,650.00

\boxed{I}

12 \times
11.80

Monthly interest rate
 (calculated).

Percent monthly interest
 rate (into i).
 Loan amount (into PV).
 Monthly payment
 (calculated).

Effective mortgage
 amount (into PV).
 Monthly interest rate
 (calculated).
 Annual percentage rate.

Computing a Loan Balance

- There are **3 methods** to do this with a financial calculator
 1. **Present Value Method**
 2. **Future Value Method**
 3. **Amortization Function Method**



Computing a Loan Balance

- **STEP ONE:** Figure mortgage payment first

What is the future expected loan balance in 8 years of \$100k of a 30 year amortizing loan?

$$\boxed{PV} = \$100,000$$

$$\boxed{FV} = \$0$$

$$\boxed{n} = 30 \times 12 = 360$$

$$\boxed{i} = 7/12 = .58333$$

$$\boxed{CPT} \quad \boxed{PMT} = \boxed{\$665.30}$$

Computing a Loan Balance

Present Value Method

What is the future expected loan balance in 8 years of \$100k of a 30 year amortizing loan?

$$\boxed{\text{PMT}} = \$665.30$$

$$\boxed{n} = (30 \text{ yrs.} - 8 \text{ yrs.} = 22) \quad 22 \times 12 = 264$$

$$\boxed{FV} = \$0$$

$$\boxed{i} = 7/12 = .58333$$

$$\boxed{\text{CPT}} \quad \boxed{\text{PV}} = \$89,491.65$$

Computing a Loan Balance

Future Value Method

PV

= \$100,000

n

= $8 \times 12 = 96$

PMT

= \$665.30

i

= $7/12 = .58333$

CPT

FV

= \$89,491

What is the future expected loan balance in 8 years of \$100k, 30 year amortizing loan?

NOTE: Calculate the payment first, then reload information to change periods

Computing a Loan Balance

Amortization Function Method

- What is the future expected loan balance each year of the \$100k of a 30 year amortizing loan?

n

$$30 \times 12 = 360$$

i

$$7/12 = .58333$$

PV

100,000

PMT

0

(Number of Payments made)

12

AMORT

HP 12-C Keystrokes

- 1) 30 g N
- 2) 7 g I
- 3) 100,000 PV
- 4) PMT 0 n
- 5) 12 f AMORT – PMTint
- 6) X<-> Y – PMTpv

X \longleftrightarrow Y

(check payment $\$665.30 * 12 = \$7,983.60$)

PMT

\$6,967.81

INT

PMT

\$1,015.79

PV

\$7,983.60

Loan Closing Costs

- Statutory
 - Transfer
 - Recording Fees etc.
- Third Party Charges
 - Appraisals
 - Surveys
 - Inspections, etc.



Loan Closing Costs

- Additional Finance Charges
 - Loan Origination Fees
 - Cover origination expenses
 - Loan Discount Fees – “Points”
 - Used to raise the yield on the loan
 - Borrower trade-off: points vs. contract rate
 - 1 Point = 1% of the loan amount



Loan Closing Costs



- Why Points?
 - Sticky mortgage rates
 - Price in the risk of a borrower
 - Early repayment of a loan does not allow recovery of origination costs
 - Earn a profit on loans sold to investors at a yield equal to the loan interest rate.

Loan Fees & Borrowing Costs

- Calculating the effective interest cost
- Example 4-2:
 - \$250,000 home
 - 80% LTV Loan
 - 8% Interest
 - 4 Points
 - 30 Years



Loan Fees & Borrowing Costs

- **Step 1:** Compute **payment** using the face value of the loan.

PV = \$200,000

n = 360

i = 8

PMT = \$1467.53



But, with points paid up front, the borrower actually receives less than the face value.

Loan Fees & Borrowing Costs

- Step 2:

Loan Amount = \$200,000

-Points Paid = (.04 x \$200,000)

Amount Received = \$192,000

- Compute effective interest cost, using the
Amount Received from Step 2 & Payment
from Step 1 = \$1,467.53.

Compute Effective Interest Cost

- Problem assumptions:
 - \$250,000 home
 - 80% LTV Loan
 - 8% Interest
 - 4 Points
 - 30 Years

KEYSTROKES (HP 12C):

- 30 g n
- 8 g I
- \$200,000 PV
- PMT = -1467.52
- RCL PV 4 $\frac{\%}{\text{-}}$ PV (actual amount received by borrower into PV) 192,000.
- I = .70
- 12 x = 8.44 Answer

- Page 141 in HP12C Owners Manual 4-23

Loan Fees & Borrowing Costs

- POSSIBLE SOLUTION FOR OTHER CALCS
- Compute effective interest cost:

PV

= \$192,000

n

= 360

PMT

= \$1467.53

CPT

i

= 8.44%

Loan Fees & Borrowing Costs

- What is the effective cost if we think this loan might be repaid after 8 years?
 - Step 2: Compute Future Loan Balance

HP 12-C Keystrokes

- 1) 30 g N
- 2) 8 g I
- 3) 200,000 PV
- 4) PMT 0 n
- 5) 96 f AMORT – PMTint = \$122,918.14
- 6) X<-> Y – PMTpv = 17,964.74
- 7) CHS ENTER, 200,000 – = \$182,035.40

Loan Fees & Borrowing Costs

- Step 3: Compute effective interest cost.

PV = (\$192,000)

FV = \$182,035.40

PMT = \$1467.53

n = 96

CPT **i** = 8.72%

Other Loan Patterns

- Partially Amortizing
 - Balloon Payment
- Interest Only Loans
- Negative Amortization
- Reverse Annuity Mortgages