

Drill Problems #1¹

1. **Amortization Schedule:** Suppose that you have invested in a 30 year mortgage within a contract loan amount of \$100,000 at 9% interest. There are 12 payments per year e.g. you receive constant/fixed monthly payments of principal and interest. The lender retains the right to service the mortgage. The lender's service fee is .005 with the fee based on the outstanding mortgage balance.

- a. Show the first 15 months of the amortization schedule

Month	Beg. Balance	Debt Service	Net Interest	Service Fee	Principal	Ending Balance
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- b. On the same graph, show the interest payments, principal payments, and debt service for the first 15 months.
- c. Graph the outstanding (ending) loan balance for the first 15 months.

2. **Graduated Payment Mortgage (GPM):** Mr. Qualify is applying for a \$100,000 GPM loan for 25 years at an interest rate of 9%. Payments would be designed so as to graduate at the rate of 7.5% for 3 years beginning with payments in the second year.

- a. What would monthly payments be for Mr. Qualify in each of the first 5 years of the loan?
- b. What would the loan balance be on the GPM at the end of year 3?
- c. If the lender charged 4 points at origination, what would be the effective interest cost on this loan after 5 years?

Note: 1 point is equal to 1% of the loan amount so if the loan amount is \$60,000 and the lender charges 2 points up front, the lender is effectively lending the borrower \$58,800 ($\$60,000 * .98$). The debt service is based on the *contract loan amount* and NOT the effective loan amount.

3. **Price Level Adjusted Mortgage (PLAM):** A price level adjusted mortgage is made with the following terms: amount = \$95,000, initial interest rate = 4%, term = 30 years, points = 6% and payments are to be adjusted at the beginning of each year. Assuming inflation is expected to increase at the rate of 6% per year for the next 5 years:

- a. Compute the payments at the beginning of each year
- b. What would the loan balance be at the end of the 5th year?
- c. What would be the yield to the lender on such a mortgage?

¹ All drill problems in this problem set are from Brueggemen and Fisher, *Real Estate Finance*, 9th Edition.

4. **Adjustable Rate Mortgage (ARM):** Assume that a lender offers Mr. Murdoch a 30-year, \$75,000 adjustable rate mortgage with the following terms:

Initial interest rate = 10.5%

Index = 1-year Treasuries (1 year CMT)

Payments are adjusted each year

Discount points = 2%

Margin = 2%

Interest rate cap = 2% annually; 5% lifetime

Negative amortization = Yes

Based on estimated forward rates computed from the yield curve on U.S. Treasury bills, the index to which the ARM is tied is forecasted to be as follows: end of year (EOY) 1 = 10%, EOY2 = 8%, EOY3 = 12%; EOY4 = 14%. Compute the payments, loan balances, and yield for the restricted ARM for the five-year period.