RE 310 – Principles of Real Estate

How Do You Finance Real Estate?

Practice Homework Problems – Solutions

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1) Explain briefly the difference between the primary mortgage market and the secondary mortgage market.

   In the primary mortgage market, new loans are originated and funds are disbursed to property owners. In the secondary mortgage market, existing loans are traded among investors, but no new funds are disbursed to borrowers.

2) George borrowed $400,000 from Acme Life Insurance Company to purchase a small office building downtown. In this transaction, who is the *mortgagor* and who is the *mortgagee*?

   George will own the office building, so he is the mortgagor; Acme is the mortgagee.

3) Explain what it means to purchase a property subject to an existing mortgage. How does this differ from assuming a mortgage?

   When you purchase a property subject to an existing mortgage, the original owner of the property is still personally responsible for the note. Nevertheless, if that borrower defaults on his or her loan, the lender may still foreclose upon the property, even though the original borrower no longer owns it.

   When you assume a mortgage, not only are you accepting the lender's existing lien on the property, but you are also personally assuming responsibility for the note. In this case, the original owner no longer has any personal responsibility for the loan. If you default, the lender may foreclose on your property. In addition, it may go after your personal assets to help recover its losses.

4) Explain briefly a borrower's *equitable* and *statutory redemption rights*. When can each right be exercised?

   The equitable right of redemption can be exercised up to the date of the foreclosure sale. It allows the borrower or other interested party to reinstate the mortgage upon paying the amount in default, plus all accumulated interest and costs.

   The statutory redemption right is applicable after the property has been sold at auction, and allows the borrower to redeem his property for a period of time specified under state law. In Kansas, this is typically 12 months, depending upon the particular circumstances.

5) George is purchasing Harold's property using a *contract for deed*. Explain briefly what this means.

   A contract for deed can be thought of as "rent-to-own." The buyer makes monthly payments to the seller, and once a sufficient number of payments have been made the seller transfers the title. If the buyer goes into default, however, the seller may simply evict the buyer from the property. The payments are treated as rent, and the buyer has no equity interest in the property.

6) What is the monthly payment on a $120,000, 30-year, fixed-rate mortgage at 5.50 percent interest?

   P/Y = 12, N = 360, I = 5.5, PV = 120,000, FV = 0 $\Rightarrow$ PMT = – $681.35

7) Consider a $1,200,000, five-year balloon mortgage amortized over 20 years at 6.25 percent interest.

   a) What is the required monthly payment on this mortgage?

      N = 240, I = 6.25, PV = 1,200,000, FV = 0 $\Rightarrow$ PMT = – $8,771.14

   b) What is the annual debt service on this mortgage?

      ADS = PMT $\times$ 12 = $105,254

   c) What will be the balloon payment at the end of the fifth year?

      N = 60 $\Rightarrow$ FV = – $1,022,965

8) Consider a $1.2 million mortgage with a 20-year term, monthly payments, and a 7.25% interest rate.

   a) What is the required monthly payment on this mortgage?

      In your financial calculator enter PV = $1,200,000, N = 20 $\times$ 12 = 240, I/Y = 7.25%, FV = 0, and solve for PMT = – $9,484.51.

   b) What is the annual debt service?

      Annual debt service is simply 12 times the monthly payment or $113,814.

9) George is purchasing a property for $450,000. The professional appraisal on this property valued it at $430,000. Suppose that George has $90,000 available for a down payment and intends to obtain a mortgage for the rest of the funds he needs.

   a) If George is able to borrow all the rest of the fund he needs, what will be his loan-to-value (LTV) ratio?

      LTV = (450,000 – 90,000) / 430,000 = 83.72%

   b) If the lender requires a maximum LTV ratio of 80 percent, what is the most George be able to borrow against this property?

      Loan = 430,000 $\times$ 0.80 = $344,000

10) Consider a $150,000, 7.5%, fixed-rate mortgage.

a) What is the monthly payment on this mortgage is the term of the loan is 30 years?

PV = $150,000, I = 7.50, N = 360, FV = 0 $\Rightarrow$ PMT = – $1,048.82.

b) How does the monthly payment change if the term of the mortgage is 15 years?

PV = $150,000, I = 7.50, N = 180, FV = 0 $\Rightarrow$ PMT = – $1,390.52.

c) For each of these terms (15 and 30 years), what will be the outstanding principal balance at the end of 10 years?

For a 30-year term, leave the numbers from part (a) entered into your calculator. Change N = 120 and solve for FV = – $130,192.48.

For a 15-year term, leave the numbers from part (a) entered into your calculator. Change N = 120 and solve for FV = – $69,394.26.

11) Marilyn wants to purchase a $125,000 house and has $15,000 for a down payment. Her mortgage company is offering her a 7.5%, 30-year fixed-rate mortgage with monthly payments and 2 points.

a) What is Marilyn's loan-to-value (LTV) ratio? Given this LTV ratio, will she typically be required to purchase mortgage insurance? Why?

LTV = ($125,000 – $15,000) / $125,000 = $110,000 / $125,000 = 88%. Based on this LTV ratio, she will probably be required to obtain mortgage insurances. Lenders typically required mortgage insurance on loans with a LTV greater than 80%.

b) What will be the required monthly payment on this mortgage?

PV = $110,000, N = 360, I = 7.5, FV = 0 $\Rightarrow$ PMT = – $769.14.

c) What principal balance will be remaining on this loan at the end of 5 years?

In the amortization worksheet, enter P2 = 60. The balance due at the end of 5 years is $104,079.18.

12) You have just applied for a $100,000 30-year loan with an 8.5% interest rate and monthly payments. Annual property taxes are expected to be $2,000 per year. Hazard insurance will cost $400 per year. Your monthly car payment is $400, which will continue for three years. Your monthly gross income is $5,000.

a) Calculate the monthly payment of principal and interest (PI).

PV = $100,000, N = 360, I = 8.5, FV = 0 $\Rightarrow$ PMT = – $768.91.

b) Calculate monthly PITI (principal, interest, taxes, and insurance).

PITI = $769 + ($2,000 / 12) + ($400 / 12) = $969.

c) Calculate the housing expense (front-end) ratio.

FER = $969 / $5,000 = 19.38%.

d) Calculate the debt (back-end) ratio.

BER = ($969 + $400) / $5,000 = 27.38%.

13) You have just applied for a $100,000, 30-year loan with an 8.5 percent interest rate and monthly payments. Annual property taxes are expected to be $2,000 per year. Hazard insurance will cost $400 per year. Your monthly car payment is $400, which will continue for three years, and your minimum monthly payment on your credit cards is $150. Your monthly gross income is $4,000.

a) Calculate the monthly payment of principal and interest (PI).

PV = 100,000, N = 360, I = 8.5, FV = 0 $\Rightarrow$ PMT = – $768.91

b) Calculate monthly PITI (principal, interest, taxes, and insurance).

PITI = 769 + (2,000 / 12) + ($400 / 12) = $969

c) Calculate the housing expense (front-end) ratio. Do you meet the standard conventional mortgage underwriting guideline for this ratio?

FER = 969 / $4,000 = 24.23%

Lenders typically require the front-end ratio to be less than 28 percent, so you satisfy this requirement.

d) Calculate the debt (back-end) ratio.

BER = (969 + 400 + 150) / $4,000 = 37.98%

You appear to be slightly above the maximum 36 percent back-end ratio lenders generally require.

14) Consider a $225,000 mortgage.

a) If the lender charges two points to originate this loan, how much must the borrower pay in up-front costs?

Cost = 225,000 × 0.02 = $4,500

b) Suppose instead that the lender charges 1.5 points and $1,500 in miscellaneous loan charges. How much must the borrower pay in this case?

Cost = 225,000 × 0.015 + 1,500 = $4,875

15) Jane is looking for an 80% LTV mortgage to purchase a $180,000 home. She has been offered a 15-year, fixed rate loan at 7.75% interest with 2 discount points and $1,500 in other miscellaneous closing costs. How much will Jane pay for this loan at closing? How large will Jane's monthly payments be? Under what circumstances might Jane prefer a loan with an 8.25% interest rate and 1 discount point?

With an 80% LTV ratio, Jane's loan will be for 0.08×180,000 = $144,000. Since each point is 1% of the loan amount, her 2 discount points will cost her $2,880. When added to the other closing costs, Jane must pay $4,380 at closing.

If Jane anticipates being in the house for only a few years, then paying fewer discount points with a higher rate will be beneficial.

16) City mortgage offers a 1-year ARM indexed to the 1-year constant maturity treasury security with a 2% margin. This loan has caps of 2% per year and 6% lifetime.

Using this information, complete the empty cells in the following table:

Year	1-year Treasury Rate	Fully-Indexed (Composite) Mortgage Rate	Contract Mortgage Rate
0	5.50%	***7.50%***	5.75%
1	6.00%	***8.00%***	***7.75%***
2	5.75%	***7.75%***	***7.75%***
3	3.50%	***5.50%***	***5.75%***

17) City mortgage offers a one-year ARM indexed to the one-year constant maturity treasury security with a 3 percent margin. This loan has caps of 2 percent per year and 4 percent lifetime.

Using this information, complete the empty cells in the following table:

Year	1-year Treasury Rate	Fully-Indexed Mortgage Rate	Contract Mortgage Rate
0	4.50%	***7.50%***	5.25%
1	5.00%	***8.00%***	***7.25%***
2	4.50%	***7.50%***	***7.50%***
3	6.75%	***9.75%***	***9.25%***

18) Consider a $300,000, one-year ARM with an initial interest rate of 4.00 percent and payments amortized over 30 years. The ARM is indexed to the one-year constant maturity treasury security with a 2.5 percent margin and 2-6 caps (2 percent per year and 6 percent lifetime).

a) What is the initial monthly payment on this mortgage?

N = 360, I = 4, PV = 300,000, FV = 0 $\Rightarrow$ PMT = – $1,432.25

b) If the one-year treasury security rate is 3.75 percent at the first adjustment date, what will be the new contract rate on the mortgage?

The new fully-indexed rate will be 3.75 + 2.50 = 6.25 percent.

The most the rate can be over the life of the loan is 4.00 + 6.00 = 10.00 percent, so this cap is not binding.

The most the rate can be this year is 4.00 + 2.00 = 6.00 percent, so this cap is binding.

The new contract rate is therefore 6.00 percent.

c) What will be the new monthly payment on this mortgage?

First, calculate the balance outstanding on this mortgage: N = 12 $\Rightarrow$ FV = – \$294,716.89. Press the [+/–] key and enter this as the new PV.

Next, enter the number of payments remaining on the mortgage, the new interest rate, and reset the FV to solve for the new monthly payment: N = 360 – 12 = 348, I = 6.00, FV = 0 $\Rightarrow$ – \$1,788.95.

19) Consider a commercial property worth \$3.4 million which generates annual net operating income (NOI) of \$350,000. Financing is available with a 75 percent LTV ratio at 6.75 percent amortized over 15 years.

a) How large can the mortgage loan be on this property based on the lender's LTV ratio guideline?

Loan = 3,400,000 $\times$ 0.75 = \$2,550,000

b) What is the required annual debt service on this mortgage?

N = 180, I = 6.75, PV = 2,550,000, FV = 0 $\Rightarrow$ PMT = – \$22,565

ADS = 22,565 $\times$ 12 = \$270,782

c) What is the debt coverage ratio (DCR) on this loan? If the lender requires a minimum DCR of 1.25, does this loan meet this underwriting guideline?

DCR = NOI / ADS = 350,000 / 270,782 = 1.29

This loan meets this underwriting guideline.