SOLUTIONS MANUAL
Chapter Seven

Answers to Chapter 7 Questions:

1. Mortgage markets are examined separately from bond and stock markets for several reasons. First, mortgages are backed by a specific piece of real property. If the borrower defaults on a mortgage, the financial institution can take ownership of the property. Only mortgage bonds are backed by a specific piece of property that allows the lender to take claim in the event of a default. All other corporate bonds and stocks give the holder a general claim to a borrower's assets. Second, there is no set denomination for primary mortgages. Rather, the size of each mortgage depends on the borrower's needs. Bonds generally have a denomination of $1,000 or a multiple of $1,000 per bond and shares of stock are generally issued in denominations of $1 per share. Third, primary mortgages generally involve a single investor (e.g., a bank or mortgage company). Bond and stock issues, on the other hand, are generally held by many (sometimes thousands of) investors. Finally, because primary mortgage borrowers are often individuals, information on these borrowers is less extensive and unaudited. Bonds and stocks are issued by publicly traded corporations which are subject to extensive rules and regulations regarding information availability and reliability.

2. Four basic categories of mortgages are issued by financial institutions: homes, multifamily dwellings, commercial, and farms. Home mortgages ($10.75 trillion outstanding in 2010) are used to purchase one- to four-family dwellings. Multifamily dwelling mortgages ($0.85 trillion outstanding) are used to finance the purchase of apartment complexes, townhouses, and condominiums. Commercial mortgages ($2.46 trillion outstanding) are used to finance the purchase of real estate for business purposes (e.g., office buildings, shopping malls). Farm mortgages ($0.14 trillion outstanding) are used to finance the purchase of farms. As seen in Figure 7-1, all four areas have experienced tremendous growth due to the historically low mortgage rates in the 1990s and 2000s: single family home mortgages, 210.7 percent growth from 1994 through 2010; commercial business mortgages, 232.4 percent growth; multifamily residential mortgages, 203.6 percent growth; and farm mortgages, 100.0 percent growth.

3. A lien is a public record attached to the title of the property that gives the financial institution the right to sell the property if the mortgage borrower defaults or falls into arrears on his or her payments. The mortgage is secured by the lien. That is, until the loan is paid off, no one can buy the property and obtain clear title to it. If someone tries to purchase the property, the financial institution can file notice of the lien at the public recorder's office to stop the transaction.

4. Federally insured mortgages are originated by financial institutions, but repayment is guaranteed by either the Federal Housing Administration (FHA) or the Veterans Administration (VA). In order to qualify, FHA and VA mortgage loan applicants must meet specific requirements set by these government agencies. Further, the maximum size of the mortgage is limited. FHA or VA mortgages require either a very low or zero down payment. Conventional mortgages are mortgages issued by financial institutions and are not federally insured (but they

generally are required to be privately insured if the borrower's down payment is less than 20 percent of the property's value).

5. A fixed rate mortgage locks in the borrower's interest rate and thus required monthly payments over the life of the mortgage, regardless of how market rates change. In contrast, the interest rate on an adjustable rate mortgage (ARM) is tied to some market interest rate or interest rate index. Thus, the required monthly payments can change over the life of the mortgage. ARMs generally limit the change in the interest rate allowed each year and during the life of the mortgage

Mortgage borrowers generally prefer fixed rate loans to ARMs, particularly when interest rates in the economy are low. In fact if interest rates rise, ARMs may cause borrowers to be unable to meet the promised payments on the mortgage. In contrast, most mortgage lenders prefer ARMs when interest rates are low. When interest rates eventually rise, ARM payments on their mortgage assets will rise. Since deposit rates and other liability rates too will be rising, it will be easier for financial institutions to pay the higher interest rates to their depositors when they issue ARMs. However, higher interest payments mean mortgage borrowers may have trouble making their payments. Thus, default risk increases. As a result, while ARMs reduce a financial institutions interest rate risk, they also increase their default risk.

6. Jumbo mortgages are those mortgages that exceed the conventional mortgage conforming limits. Limits are set by the two government-sponsored enterprises, Fannie Mae and Freddie Mac (discussed below) and are based on the maximum value of any individual mortgage they will purchase from a mortgage lender. In 2010, the general limit was $417,000 for most of the U.S. (the limit is set higher in high cost areas of the country). Because the large size and the inability to sell jumbo mortgages to Fannie Mae or Freddie Mac creates more risk for mortgage lenders, interest rates on jumbo mortgages are generally higher than on conforming mortgages. Typically, the spread in interest rates on jumbo versus conventional mortgages is about 0.25 to 0.50 percent. However, during periods of high economy-wide risk (e.g., during the late 2000s), the spread can be greater than 1.50 percent. Further, to reduce the risk of these loans, lenders will often require a higher down payment on jumbo mortgages than conventional mortgages.

7. Subprime mortgages are mortgages to borrowers that do not qualify for prime mortgages because of weakened credit histories including payment delinquencies, and possibly more severe problems such as charge-offs, judgments, and bankruptcies. Subprime borrowers may also display reduced repayment capacity as measured by credit scores, debt-to-income ratios, or other criteria that may encompass borrowers with incomplete credit histories. Subprime mortgages have a higher rate of default than prime mortgage loans and are thus, riskier loans for the mortgage lender and. As a result, these mortgages have higher interest rates than prime mortgages. The majority of home loans are not subprime mortgages, however their numbers rapidly grew in the mid-2000s. Subprime mortgages accounted for 9 percent of all mortgage originations from 1996 through 2004 and rose to about 21 percent from 2004 through 2006.

It was subprime mortgages and the huge growth in them that was a major instigator of the financial crisis. The low interest rate environment in the early and mid-2000s led to a dramatic increase in the demand for residential mortgages, especially among those who had previously been excluded from participating in the market because of their poor credit ratings, i.e., subprime borrowers. To boost their earnings, FIs began lowering their credit quality cut-off points. In the

subprime market, banks and other mortgage lenders often offered relatively low "teaser" rates on adjustable rate mortgages (ARMs). Eventually, housing prices started to fall and interest rates started to rise. Since many subprime mortgages had floating rates, meeting mortgage payments became impossible for many low income households. The results were a wave of mortgage defaults in the subprime market and foreclosures that only reinforced the downward trend in house prices. As this happened, the poor quality of the collateral and credit quality underlying subprime mortgage pools became apparent. Subprime mortgage-backed securities plummeted in value and the financial crisis began.

8. Option ARMs, also called pick-a-payment or pay-option ARMs, are 15- or 30-year adjustable rate mortgages that offer the borrower several monthly payment options. The four major types of payment options include: minimum payment options, interest only payment, a 15-year fully amortizing payment, and a 30-year fully amortizing payment.

Minimum payment option. The minimum payment is the lowest of the four payment options and carries the most risk. With these option ARMs, the monthly payment is set for 12 months at an initial interest rate. After that, the payment changes annually, and a payment cap limits how much it can increase or decrease each year (generally 7.5 percent). If the minimum payment is continued after the end of the initial interest rate period, which usually holds only for the first 1 to 3 months, it may not be enough to pay all of the interest charged on the loan for the previous month and the unpaid interest will be added to the principal balance. This is called negative amortization, and it means that the amount owed increases and the borrower will be charged additional interest at the rate on the loan on the new, larger principal balance.

The minimum payment on most option arm programs is 1percent fully amortized. Every time the borrower makes the minimum payment, the difference between the minimum payment and the interest-only payment is tacked onto the balance of the loan. A borrower can pay the minimum payment until the loan balance reaches 110 to 115 percent of the original loan balance. This allows the typical borrower to pay the minimum payment for roughly the first five years of the life of the loan. After the loan balance reaches 110 to 115 percent, the borrower loses the minimum payment option, leaving them with the three remaining payment options.

Interest-only payment: An interest-only option ARM requires the borrower to pay only the interest on the loan during the initial period of the loan. During this period, no principal must be repaid. After the interest-only period, the mortgage must amortize so that the mortgage will be paid off by the end of its original term. This means that monthly payments must increase substantially after the initial interest-only period lapses. The length of the interest-only period varies with each mortgage type. The interest-only payment may change every month based on changes in the ARM index used to determine the loan interest rate. After ten years from the start of the loan, the interest-only option typically goes away as well, and the borrower must pay using one of the two remaining payment options.
Interest-only payment option ARMs carry a great deal of payment-shock risk. Not only do the payments have the potential to increase because of an increasing fully indexed interest rate, but the expiration of the interest-only payment means that payments will increase when the mortgage becomes a fully amortizing loan.

30-year fully amortizing payment: With fully amortizing option ARMs, the borrower pays both principal and interest on the loan. By making this payment each month, the borrower is ensured that all interest and principal are fully paid on schedule. The payment is calculated each month based on the prior month's fully indexed rate, loan balance, and remaining loan term.

15-year fully amortizing payment: This option ARM is similar to the 30-year fully amortizing payment option ARM, with a full principal and interest payment, but with a larger amount of principal paid each month. This amount includes all of the interest charged on the loan for the previous month plus principal to pay off the loan based on a 15-year term (instead of a 30 term). The payment amount may change from month to month based on changes in the index value used to determine the fully indexed rate. Choosing the 15- year fully amortizing payment puts the mortgage on an accelerated amortization schedule.

9. The secondary mortgage markets were created by the federal government to help boost U.S. economic activity during the Great Depression. In the 1930s, the government established the Federal National Mortgage Association (Fannie Mae) to buy mortgages from thrifts so that these depository institutions could make more mortgage loans. The government also established the Federal Housing Administration (FHA) and the Veterans Administration (VA) to insure certain mortgage contracts against default risk. This made it easier to sell/securitize the mortgages. Financial institutions originating the mortgages and secondary market buyers did not have to be as concerned with a borrower's credit history or the value of collateral backing the mortgage since they had a federal government guarantee protecting them against default risk.

By the late 1960s, fewer veterans were obtaining guaranteed VA loans. As a result, the secondary market for mortgages declined. To encourage continued expansion in the housing market, the U.S. government created the Government National Mortgage Association (Ginnie Mae or GNMA) and the Federal Home Loan Mortgage Corporation (Freddie Mac or FHLMC), which provided direct or indirect guarantees that allowed for the creation of mortgage-backed securities.

10. A mortgage sale occurs when a financial institution originates a mortgage and sells it with or without recourse to an outside buyer. Mortgage sales usually involve no creation of new types of securities. Securitization of mortgages involves the pooling of a group of mortgages with similar characteristics, the removal of these mortgages from the balance sheet, and the subsequent sale of interests in the pool to secondary market investors. Securitization of mortgages results in the creation of mortgage-backed securities (e.g., government agency securities, collateralized mortgage obligations), which can be traded in secondary mortgage markets.

11. Mortgage-backed securities allow mortgage issuers to separate the credit risk exposure from the lending process itself. That is, FIs can assess the creditworthiness of loan applicants, originate loans, fund loans, and even monitor and service loans without retaining exposure to loss from credit events, such as default or missed payments. This decoupling of the risk from the lending activity allows the market to efficiently transfer risk across counterparties. However, it also loosens the incentives to carefully perform each of the steps of the lending process. This loosening of incentives has been an important factor leading to the global financial crisis of 2008-2009, which has witnessed the aftereffects of poor loan underwriting, shoddy documentation and due diligence, failure to monitor borrower activity, and fraudulent activity on

the part of both lenders and borrowers. Although bank regulators attempt to examine the off balance sheet activities of banks so as to ascertain their safety and soundness, there is far less scrutiny off the balance sheet than there is for their on-balance-sheet activities (i.e., traditional lending and deposit taking). To the extent that counterparty credit risk was not fully disclosed to, or monitored by regulators, the increased use of these innovations transferred risk in ways that were not necessarily scrutinized or understood. It is in this context of increased risk and inadequate regulation that the credit crisis developed.

12.   Pass-through mortgage securities promise payments of principal and interest on pools of mortgages created by financial institutions to secondary market participants (mortgage-backed bondholders) holding an interest in these pools. After a financial institution issues mortgages, they pool them and sell interests in these pools to pass-through security holders. Each pass-through mortgage security represents a fractional ownership share in a mortgage pool. Thus, a 1 percent owner of a pass-through mortgage security issue is entitled to a 1 percent share of the principal and interest payments made over the life of the mortgages underlying the pool of securities. The originating financial institutions (e.g., bank or mortgage company) or a third party servicer receives principal and interest payments from the mortgage holder and passes these payments through to the pass-through security holders.

13. The Government National Mortgage Association (GNMA), or Ginnie Mae, began in 1968 when it split off from the Federal National Mortgage Association (FNMA). GNMA is a government-owned agency with two major functions: sponsoring mortgage-backed securities programs by financial institutions such as banks, thrifts, and mortgage bankers and acting as a guarantor to investors in mortgage-backed securities regarding the timely pass-through of principal and interest payments on their sponsored bonds from the financial institution or servicer to the bondholder. In other words, GNMA provides timing insurance. In acting as a sponsor and payment-timing guarantor, GNMA supports only those pools of mortgage loans whose default or credit risk is insured by one of three government agencies; the Federal Housing Administration (FHA), the Veterans Administration (VA), and the Farmers Home Administration (FMHA). Mortgage loans insured by these agencies target groups that might otherwise be disadvantaged in the housing market such as low-income families, young families, and veterans. As such, the maximum mortgage under the FHA/VA/FMHABGNMA securitization program is capped.

14. Originally created in 1938, the Federal National Mortgage Association (FNMA or Fannie Mae), is the oldest of the three mortgage-backed security-sponsoring agencies. It is now a private corporation owned by shareholders with its common stock traded on the New York Stock Exchange, but in the minds of many investors, it still has implicit government backing that makes it equivalent to a government-owned agency. Indeed, the fact that FNMA has a secured line of credit available from the U.S. Treasury should it need funds in an emergency supports this view. FNMA is a more active agency than GNMA in creating pass-through securities. GNMA merely sponsors such programs and guarantees the timing of payments from financial institution servicers to GNMA investors; FNMA actually helps create pass-throughs by buying and holding mortgages on its balance sheet; it also issues bonds directly to finance those purchases.

Specifically, FNMA creates mortgage-backed securities (MBSs) by purchasing packages of mortgage loans from banks and thrifts; it finances such purchases by selling MBSs to outside investors such as life insurers or pension funds. In addition, FNMA engages in swap transactions by which it swaps MBSs with a bank or thrift for original mortgages. Since FNMA guarantees securities in regard to the full and timely payment of interest and principal, the financial institution receiving the MBSs can then resell them in the capital market or can hold them in its own portfolio. Unlike GNMA, FNMA securitizes conventional mortgage loans as well as FHA/VA insured loans, as long as the conventional loans have acceptable loan-to-value or collateral ratios not normally exceeding 80 percent. Conventional loans with high loan-to-value ratios usually require that the mortgages be insured with private mortgage insurance before they are accepted into FNMA securitization pools.

15. A CMO can be viewed as a multiclass pass-through with a number of different bondholder classes or tranches. Unlike a pass-through which has no guaranteed annual "coupon," each bondholder class has a different guaranteed coupon just as a regular T-bond has, but more importantly, the allocation of any excess cash flows over and above the guaranteed coupon payments due to mortgage prepayments go to retire the principal outstanding of only one class of bondholders, leaving all other classes' prepayment protected for a period of time. That is, CMOs give investors greater control over the "maturity" of the mortgage-backed securities they buy. By comparison, for pass-throughs the mortgage-backed security holder has a highly uncertain maturity date due to the risk of early payments.

CMOs can be created either by packaging and securitizing whole mortgage loans or, more usually, re-securitizing pass-through securities. In the latter case a trust or third-party bank holds the GNMA pass-through as collateral against issues of new CMO securities. The trust normally issues a CMO with three or more different classes.

16. MBBs differ from pass-throughs and CMOs in two key dimensions. First, while pass-throughs and CMOs help financial institutions remove mortgages from their balance sheets, MBBs normally remain on the balance sheet. Second, pass-throughs and CMOs have a direct link between the cash flows on the underlying mortgages and the cash flows on the bond instrument issued. By contrast, the relationship for MBBs is one of collateralization; the cash flows on the mortgages backing the bond are not necessarily directly connected to interest and principal payments on the MBB.

Essentially, a financial institution issues an MBB to reduce risk to the MBB holders, who have a first claim to a segment of the financial institution's mortgage assets. Practically speaking, the financial institution segregates a group of mortgage assets on its balance sheet and pledges this group of assets as collateral against the MBB issue.

Problems:

1. You will make a down payment of 20 percent of the purchase price, or you will make a down payment of $20,000 (.20 x $100,000) at closing and borrow $80,000 through the mortgage.

a. For your mortgage:

$$\$80,000 = PMT\{[1-(1/(1+.0825/12)^{30(12)})]/(.0825/12)\}$$
or $\qquad PMT = \$80,000/\{[1-(1/(1+.0825/12)^{30(12)})]/(.0825/12)\}$
therefore $\qquad PMT = \$80,000/133.1085 = \$601.01$

Thus, your monthly payment is $601.01.

b. The 25th payment of $601.01 is split as follows: $540.88 to interest and $60.13 to principal.
c. The 225th payment of $601.01 is split as follows: $364.31 to interest and $236.71 to principal.
d. The total payments over the life of the mortgage amount to payments of $216,363.60 ($601.01 x 30 x 12): $80,000 to the repayment of principal and $136,363.60 to the payment of interest.

2. You will make a down payment of 20 percent of the purchase price, or you will make a down payment of $35,000 (.20 x $175,000) at closing and borrow $140,000 through the mortgage.

a. For your mortgage: $\$140,000 = PMT\{[1-(1/(1+.0775/12)^{15(12)})]/(.0775/12)\}$
or $\qquad PMT = \$140,000/\{[1-(1/(1+.0775/12)^{15(12)})]/(.0775/12)\}$
therefore $\qquad PMT = \$140,000/106.2388 = \$1,317.$

Thus, your monthly payment is $1,317.79.

b. The 60th payment of $1,317.79 is split as follows: $713.07 to interest and $604.72 to principal.

c. The 180th payment of $1,317.79 is split as follows: $8.46 to interest and $1,309.33 to principal.

d. The total payments over the life of the mortgage amount to payments of $237,201.48 ($1,317.786 x 15 x 12): $140,000 to the repayment of principal and $97,201.48 to the payment of interest.

3. You will make a down payment of 20 percent of the purchase price, or you will make a down payment of $16,000 (.20 x $80,000) at closing and borrow $64,000 through the mortgage.

a. For your mortgage:

$$\$64,000 = PMT\{[1-(1/(1+.08/12)^{15(12)})]/(.08/12)\}$$
or $$PMT = \$64,000/\{[1-(1/(1+.08/12)^{15(12)})]/(.08/12)\}$$
therefore $$PMT = \$64,000/104.6406 = \$611.617$$

Thus, your monthly payment is $611.62.

b. The 127th payment of $611.62 is split as follows: $184.40 to interest and $427.22 to principal.

c. The 159th payment of $611.62 is split as follows: $83.18 to interest and $528.44 to principal.

d. The total payments over the life of the mortgage amount to payments of $110,091.60 ($611.62 x 15 x 12): $62,000 to the repayment of principal and $46,091.60 to the payment of interest.

4. You will make a down payment of 20 percent of the purchase price, or you will make a down payment of $30,000 (.20 x $150,000) at closing and borrow $120,000 through the mortgage.

a. For your mortgage: $$\$120,000 = PMT\{[1-(1/(1+.0525/12)^{15(12)})]/(.0525/12)\}$$
or $$PMT = \$120,000/\{[1-(1/(1+.0525/12)^{15(12)})]/(.0525/12)\}$$
therefore $$PMT = \$120,000/124.3970 = \$964.6$$

Thus, your monthly payment is $964.65.

b. _Amortization Schedule for first 6 payments (months)_

Month	Beginning Loan Balance	Payment	Interest	Principal	Ending Loan Balance
1	$120,000.00	$964.65	$525.00	$439.65	$119,560.35
2	119,560.35	964.65	523.08	441.57	119,118.77
3	119,118.77	964.65	521.14	443.51	118,675.26
4	118,675.26	964.65	519.20	445.45	118,229.81

| 5 | 118,229.81 | 964.65 | 517.25 | 447.40 | 117,782.41 |

| 6 | 117,782.41 | 964.65 | 515.30 | 449.35 | 117,333.06 |

---

5. You will make a down payment of 20 percent of the purchase price, or you will make a down payment of $40,000 (.20 x $200,000) at closing and borrow $160,000 through the mortgage.

a. For your mortgage: $160,000 = PMT$\{[1-(1/(1+.0650/12)^{30(12)})]/(.0650/12)\}$

or PMT = $160,000/\{[1-(1/(1+.0650/12)^{30(12)})]/(.0650/12)\}$

therefore PMT = $160,000/158.2108 = $1,011.31$

Thus, your monthly payment is $1,011.31.

b. Amortization Schedule for first 6 payments (months)

Month	Beginning Loan Balance	Payment	Interest	Principal	Ending Loan Balance
1	$160,000.00	$1,011.31	$866.67	$144.64	$159,855.36
2	159,855.36	1,011.31	865.88	145.43	159,709.93
3	159,709.93	1,011.31	865.10	146.21	159,563.72
4	159,563.72	1,011.31	864.30	147.01	159,416.71
5	159,416.71	1,011.31	863.51	147.80	159,268.91
6	159,268.91	1,011.31	862.71	148.60	159,120.31

6. EXCEL Problem: Payment = $1,245.62
Payment = $1,286.13
Payment = $1,390.52
Payment = $1,521.40

7. EXCEL Problem: Payment = $875.36
Payment = $923.58
Payment = $1,048.82
Payment = $1,206.93

8. You will make a down payment of 20 percent of the purchase price, or you will make a down payment of $23,000 (.20 x $115,000) at closing and borrow $92,000 through the mortgage.

a. If Option 2 is chosen you pay $92,000 x .02 = $1,840 in points and receive $90,160 at closing ($92,000 - $1,840), although the mortgage principal is $92,000. To determine the best option, we first calculate the monthly payments for both options as follows

Option 1: $92,000 = PMT $\{[1-(1/(1+.0900/12)^{30(12)})]/(.0900/12)\}$ => PMT = $740.25

Option 2: $92,000 = PMT $\{[1-(1/(1+.0885/12)^{30(12)})]/(.0885/12)\}$ => PMT = $730.35

In exchange for $1,840 up front, Option 2 reduces your monthly mortgage payments by $9.90. The present value of these savings (evaluated at 8.85 percent) over the 30 years is

$$PV = \$9.90 \ \{[1-(1/(1+.0885/12)^{30(12)})]/(.0885/12)\} = \$1,248.06$$

Option 1 is the better choice. The present value of the monthly savings, $1,248.06, is less than the points paid up front, $1,840.

b.   If Option 1 is chosen you pay $92,000 x .01 = $920 in points and receive $91,080 at closing ($92,000 - $920), although the mortgage principal is $92,000. If Option 2 is chosen you pay $92,000 x .025 = $2,300 in points and receive $89,700 at closing ($92,000 - $2,300). The difference in savings on the points is $1,380.

To determine the best option, we calculate the monthly payments for both options as follows

      Option 1: $92,000 = PMT $\{[1-(1/(1+.1025/12)^{30(12)})]/(.1025/12)\}$ => PMT = $824.413

      Option 2: $92,000 = PMT $\{[1-(1/(1+.1000/12)^{30(12)})]/(.1000/12)\}$ => PMT = $807.366

In exchange for $1,380 up front, Option 2 reduces your monthly mortgage payments by $17.047.

9. You will make a down payment of 20 percent of the purchase price, or you will make a down payment of $39,000 (.20 x $195,000) at closing and borrow $156,000 through the mortgage.

a. If Option 2 is chosen you pay $156,000 x .015 = $2,340 in points and receive $153,660 at closing ($156,000 - $2,340), although the mortgage principal is $156,000. To determine the best option, we first calculate the monthly payments for both options as follows

      Option 1: $156,000 = PMT $\{[1-(1/(1+.0550/12)^{30(12)})]/(.0550/12)\}$ => PMT = $885.75

      Option 2: $156,000 = PMT $\{[1-(1/(1+.0535/12)^{30(12)})]/(.0535/12)\}$ => PMT = $871.13

In exchange for $2,340 up front, Option 2 reduces your monthly mortgage payments by $14.625. The present value of these savings (evaluated at 5.35 percent) over the 30 years is

$$PV = \$14.625 \ \{[1-(1/(1+.0535/12)^{30(12)})]/(.0535/12)\} = \$2,619.11$$

Option 2 is the better choice. The present value of the monthly savings, $2,619.11, is greater than the points paid up front, $2,340.

b.   If Option 1 is chosen you pay $156,000 x .01 = $1,560 in points and receive $154,440 at closing ($156,000 - $1,560), although the mortgage principal is $156,000. If Option 2 is chosen you pay $156,000 x .02 = $3,120 in points and receive $152,880 at closing ($152,880 - $3,120). The difference in savings on the points is $1,560.

To determine the best option, we calculate the monthly payments for both options as follows

Option 1: $\$156{,}000 = PMT \{[1-(1/(1+.0535/12)^{30(12)})]/(.0535/12)\} => PMT = \$871.125$

Option 2: $\$156{,}000 = PMT \{[1-(1/(1+.0525/12)^{30(12)})]/(.0525/12)\} => PMT = \$861.438$

In exchange for $1,560 up front, Option 2 reduces your monthly mortgage payments by $9.687.

10. You will make a down payment of 25 percent of the purchase price, or you will make a down payment of $43,750 (.25 x $175,000) at closing and borrow $131,250 through the mortgage.

a. If Option 2 is chosen you pay $131,250 x .02 = $2,625 in points and receive $128,625 at closing ($131,250 - $2,625), although the mortgage principal is $131,250. To determine the best option, we first calculate the monthly payments for both options as follows

Option 1: $\$131{,}250 = PMT \{[1-(1/(1+.0500/12)^{15(12)})]/(.0500/12)\} => PMT = \$1{,}037.92$

Option 2: $\$131{,}250 = PMT \{[1-(1/(1+.0475/12)^{15(12)})]/(.0475/12)\} => PMT = \$1{,}020.90$

In exchange for $2,625 up front, Option 2 reduces your monthly mortgage payments by $17.012. The present value of these savings (evaluated at 4.75 percent) over the 15 years is

$$PV = \$9.90 \{[1-(1/(1+.0475/12)^{15(12)})]/(.0475/12)\} = \$2{,}187.14$$

Option 1 is the better choice. The present value of the monthly savings, $2,187.14, is less than the points paid up front, $2,625.

b.   If Option 1 is chosen you pay $131,250 x .02 = $2,625 in points and receive $128,625 at closing ($131,250 - $2,625), although the mortgage principal is $131,250. If Option 2 is chosen you pay $131,250 x .03 = $3,937.5 in points and receive $127,312.5 at closing ($131,250 - $3,937.5). The difference in savings on the points is $1,312.5.

To determine the best option, we calculate the monthly payments for both options as follows

Option 1: $\$131{,}250 = PMT \{[1-(1/(1+.0485/12)^{15(12)})]/(.0485/12)\} => PMT = \$1{,}027.69$

Option 2: $\$131{,}250 = PMT \{[1-(1/(1+.0468/12)^{15(12)})]/(.0468/12)\} => PMT = \$1{,}016.17$

In exchange for $1,312.5 up front, Option 2 reduces your monthly mortgage payments by $11.52.