Buying a house NAME:

We will investigate some of the math necessary to buy a house. We will use Table 4 on page 823 of your book. It tells us the monthly payment for every $1,000 of credit. Of course, that depends on the interest rate and the length of the loan. So the table is sorted using those values. The formula on page 822 will find nearly the same thing, but we will use the table. It is affixed at the end of this worksheet for easy reference. (If you get this worksheet from the Website, use the table in your book.) The loans we will cover on this worksheet are fixed-rate loans. This means the interest rate is the same throughout the life of the loan.

1. Margaret and Jesse are buying a house. The house costs $90,000 and they will be paying a down payment of $10,000. The bank charges 6% interest. They will get a 25 year loan. How much is their monthly payment? We will follow the steps below.

a.) Use Table 4 to find the monthly payment for each $1000 of their loan. To do this, find 6% on the far left column labeled “Annual Rate (r)”. Follow this line across until you get to the column marked “25” (for the length of the loan). Write down this value.

b.) A down payment is the amount of the house’s cost that you pay up front before you get the loan. Their down payment is $10,000 on their $90,000 house. For how much will their loan be?

c.) For every $1,000 they are loaned, they will pay $6.44301 (value from part a). How much is their monthly payment?

2. The money that is paid to the bank each month goes toward two things, the interest and the principal. Usually, most of the money in the beginning of the loan goes toward interest. As time progresses, more and more of the money paid each month goes toward knocking down the principal. To figure the interest that is owed for a single month, we will use simple interest.

We will use the familiar formula $I = P * r * t$ where *P* is the current principal, *r* is the annual interest rate, and *t* is $1/12$ of a year. Let's find the amortization schedule for Margaret and Jesse's loan for the first few months. This is the table below. The steps are outlined below.

Partial Amortization Schedule (Original loan amount $80,000, interest rate 6%)			
Payment Number	**Interest payment**	**Principal payment**	**Balance of principal**
1			
2			
3			

a.) Find the interest that is due for the first month. Again, we will calculate $I = 80{,}000 * .06 * \left(1/12\right)$. Write this value in the table under "Interest payment" for payment #1.

b.) Subtract this amount from their monthly payment. This tells you how much is going toward the principal. Write this value under "Principal payment" for payment #1. Subtract this amount (principal payment) from the original principal of $80,000 to find the balance of the principal after this payment.

c.) After the first month, the principal is down to $79,884.56. So we figure the interest owed for the second month using this value for *P*. So we calculate $I = 79884.56 * .06 * \left(1/12\right)$. Find this and write it in the table under "Interest payment" for payment #2.

d.) Subtract the interest owed in month #2 from the monthly payment ($515.44) to find the principal payment and the balance of the principal after payment #2. Write these values in the table.

e.) Repeat the process for payment #3. Write the values in the table.

3. There are many other fees involved with buying a house that must be taken into account. In order for a bank to agree to finance your house, they usually require that you get homeowners insurance in case of fire or other damage. There are also property taxes to be paid on the house and land. Often, these costs are added to the monthly payment. The easiest way to deal with insurance and taxes is to find their annual cost, divide that by 12 to find their monthly cost, and add that to the monthly payment needed to cover the loan. Let's say Margaret and Jesse have annual taxes of $2,000 and their insurance will cost them $500 annually. Find the additional monthly payments they will need to make to cover these costs. (Take the total for insurance and taxes and divide by 12.) What is their total monthly payment including the loan, taxes, and insurance?

4. Bob and Becca are buying a house that costs $125,000. They have $20,000 to make a down payment. Their bank will give them a 20 year loan at 8% annual interest.

a.) How much is their monthly payment?

b.) Bob and Becca will also have to pay taxes and insurance that come to $2,000. How much does that add to their monthly payments? What is their monthly payment including the loan, taxes, and insurance?

5. Find the monthly payment needed to pay off the following loans.
a.) $250,500 loan at 6% interest for 30 years

b.) $490,450 loan at 7.5% interest for 20 years

6. Complete the partial amortization schedule for Cathy and Doug's house. They bought it for $100,000. Their 20 year loan has an annual interest rate of 5.5%.

Partial Amortization Schedule (Original loan amount $100,000, interest rate 5.5%)			
Payment Number	**Interest payment**	**Principal payment**	**Balance of principal**
1			
2			
3			

(Hint: Find their monthly payment using Table 4. Then calculate the interest they owe for the first month. Record it in column 2 and subtract that from their monthly payment to figure the principal payment. Use that and the original principal of $100,000 to find the balance of principal at the end of the first month. Then continue to finish the table.)