STARTER PROBLEMS

7-1 **Bond valuation**
Callaghan Motors' bonds have 10 years remaining to maturity. Interest is paid annually, the bonds have a $1,000 par value, and the coupon interest rate is 8 percent. The bonds have a yield to maturity of 9 percent. What is the current market price of these bonds?

7-2 **Yield to maturity and call**
Thatcher Corporation's bonds will mature in 10 years. The bonds have a face value of $1,000 and an 8 percent coupon rate, paid semiannually. The price of the bonds is $1,100. The bonds are callable in 5 years at a call price of $1,050. What is the yield to maturity? What is the yield to call?

7-3 **Bond valuation**
Nungesser Corporation has issued bonds that have a 9 percent coupon rate, payable semiannually. The bonds mature in 8 years, have a face value of $1,000, and a yield to maturity of 8.5 percent. What is the price of the bonds?

7-4 **Current yield and yield to maturity**
A bond that matures in 10 years sells for $985. The bond has a face value of $1,000 and a 7 percent annual coupon.
a. What is the bond's current yield?
b. What is the bond's yield to maturity (YTM)?
c. Assume that the yield to maturity remains constant for the next 3 years. What will be the price of the bond 3 years from today?

EXAM-TYPE PROBLEMS

The problems included in this section are set up in such a way that they could be converted to multiple-choice exam problems.

7-5 **Bond valuation**
The Garraty Company has two bond issues outstanding. Both bonds pay $100 annual interest plus $1,000 at maturity. Bond L has a maturity of 15 years, and Bond S a maturity of 1 year.
a. What will be the value of each of these bonds when the going rate of interest is (1) 5 percent, (2) 8 percent, and (3) 12 percent? Assume that there is only one more interest payment to be made on Bond S.
b. Why does the longer-term (15-year) bond fluctuate more when interest rates change than does the shorter-term bond (1-year)?

7-6 **Yield to maturity**
The Heymann Company's bonds have 4 years remaining to maturity. Interest is paid annually; the bonds have a $1,000 par value; and the coupon interest rate is 9 percent.
a. What is the yield to maturity at a current market price of (1) $829 or (2) $1,104?
b. Would you pay $829 for one of these bonds if you thought that the appropriate rate of interest was 12 percent—that is, if $k_d = 12\%$? Explain your answer.

7-7 **Yield to call**
Six years ago, The Singleton Company sold a 20-year bond issue with a 14 percent annual coupon rate and a 9 percent call premium. Today, Singleton called the bonds. The bonds originally were sold at their face value of $1,000. Compute the realized rate of return for investors who purchased the bonds when they were issued and who surrender them today in exchange for the call price.

7-8 **Bond yields**
A 10-year, 12 percent semiannual coupon bond, with a par value of $1,000, may be called in 4 years at a call price of $1,060. The bond sells for $1,100. (Assume that the bond has just been issued.)
a. What is the bond's yield to maturity?
b. What is the bond's current yield?
c. What is the bond's capital gain or loss yield?
d. What is the bond's yield to call?

7-9 **Yield to maturity**
You just purchased a bond that matures in 5 years. The bond has a face value of $1,000, an 8 percent annual coupon, and has a current yield of 8.21 percent. What is the bond's yield to maturity (YTM)?

7-10 **Current yield**
A bond that matures in 7 years sells for $1,020. The bond has a face value of $1,000 and a yield to maturity of 10.5883 percent. The bond pays coupons semiannually. What is the bond's current yield?

7-11 **Nominal interest rate**
Lloyd Corporation's 14 percent coupon rate, semiannual payment, $1,000 par value bonds, which mature in 30 years, are callable 5 years from now at a price of $1,050. The bonds sell at a price of $1,353.54, and the yield curve is flat. Assuming that interest rates in the economy

issued, and the bond is now selling at 116.575 percent of par, or $1,165.75. You want to determine both the yield to maturity and the yield to call for this bond.

a. What is the yield to maturity in 2003 for the Racette bond? What is its yield to call?
b. If you bought this bond, which return do you think you would actually earn? Explain your reasoning.
c. Suppose the bond had sold at a discount. Would the yield to maturity or the yield to call have been more relevant?

7-20 Interest rate sensitivity

A bond trader purchased each of the following bonds at a yield to maturity of 8 percent. Immediately after she purchased the bonds interest rates fell to 7 percent. What is the percentage change in the price of each bond after the decline in interest rates? Fill in the following table:

	PRICE @ 8%	PRICE @ 7%	PERCENTAGE CHANGE
10-year, 10% annual coupon	_____	_____	_____
10-year zero	_____	_____	_____
5-year zero	_____	_____	_____
30-year zero	_____	_____	_____
$100 perpetuity	_____	_____	_____

7-21 Bond valuation

An investor has two bonds in his portfolio. Each bond matures in 4 years, has a face value of $1,000, and has a yield to maturity equal to 9.6 percent. One bond, Bond C, pays an annual coupon of 10 percent; the other bond, Bond Z, is a zero coupon bond.

a. Assuming that the yield to maturity of each bond remains at 9.6 percent over the next 4 years, what will be the price of each of the bonds at the following time periods? Fill in the following table:

t	PRICE OF BOND C	PRICE OF BOND Z
0	_____	_____
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____

b. Plot the time path of the prices for each of the two bonds.

SPREADSHEET PROBLEM

7-22 Bond valuation

Rework Problem 7-8 using a spreadsheet model. After completing parts a through d, answer the following related questions.

e. How would the price of the bond be affected by changing interest rates? (Hint: Conduct a sensitivity analysis of price to changes in the yield to maturity, which is also the going market interest rate for the bond. Assume that the bond will be called if and only if the going rate of interest *falls below* the coupon rate. That is an oversimplification, but assume it anyway for purposes of this problem.)
f. Now assume that the date is 10/25/2002. Assume further that our 12 percent, 10-year bond was issued on 7/1/2002, is callable on 7/1/2006 at $1,060, will mature on 6/30/2012, pays interest semiannually (January 1 and July 1), and sells for $1,100. Use your spreadsheet to find (1) the bond's yield to maturity and (2) its yield to call.