471 - In-Class Examples

1. Susan can buy a zero coupon bond that will pay 1000 at the end of 12 years and is currently selling for 624.60. Instead, she purchases a 6% bond with coupons payable semi-annually that will pay 1000 at the end of 10 years. If she pays X she will earn the same annual effective interest rate as the zero coupon bond. Calculate X.

2. Bill buys a 10-year 1000 par value 6% bond with semi-annual coupons. The price assumes a nominal yield of 6%, compounded semi-annually. As Bill receives each coupon payment, he immediately puts the money into an account earning interest at an annual effective rate of i. At the end of 10 years, immediately after Bill receives the final coupon payment and the redemption value of the bond, Bill has earned an annual effective yield of 7% on his investment in the bond. Calculate i.

3. Matt purchased a 20-year par value bond with semiannual coupons at a nominal annual rate of 8% convertible semiannually at a price of 1722.25. The bond can be called at par value X on any coupon date starting at the end of year 15 after the coupon is paid. The price guarantees that Matt will receive a nominal annual rate of interest convertible semiannually of at least 6%. Calculate X.

4. Toby purchased a 20-year par value bond with semiannual coupons at a nominal annual rate of 8% convertible semiannually at a price of 1722.25. The bond can be called at par value 1100 on any coupon date starting at the end of year 15. What is the minimum yield that TobY could receive, expressed as a nominal annual rate of interest convertible semiannually?

5. Don purchases a 1500, 8-year bond with 10% coupon rate for 1200. He reinvests his coupon payments at a nominal rate of 6% convertible monthly. Calculate his nominal annual yield rate convertible semiannually over the 8-year period.

6. You have decided to invest in two bonds. Bond X is an n-year bond with semi-annual coupons, while bond Y is zero-coupon bond, which is redeemable in $n/2$ years. The desired yield rate is the same for both bonds. You also have the following information:

   Bond X

   - Face value is 1000, and same as the redemption value.
   - The ratio of the semi-annual bond rate to the desired semi-annual yield rate, $\frac{r}{i} = 1.03$.
   - The present value of the redemption value is 419.6448.

   Bond Y

   - Redemption value is the same as that of bond X.
   - Price is 647.80.

   What is the price of bond X?