PROBLEM SET 5

CHP 8, #4

The machine should be bought if the present value of profits is greater than the cost of a machine. The formula for the present value, given the depreciation rate of 10% and an interest rate equal to r is given by:

$$10,000[1 + \frac{0.9}{(1+r)} + \frac{0.9}{(1+r)^2} + \ldots$$

a) 70,000: buy
b) 55,000: buy
c) 46,000: do not buy

CHP 8, #5

a) Human wealth is the present discounted value of expected future labor income (after taxes). In this problem:

$$V(Y_{Lt}^e - T_t^e) = 0.6(\$50,000)[1 + 1.05 + (1.05)^2] = \$94,575$$

b) Summing human wealth and non human wealth gives total wealth of $19,457.5
c) To consume an equal amount in each of the ten next years, yearly consumption should be : $19,457.5
d) Now, human wealth becomes:

$$V(Y_{Lt}^e - T_t^e) = 0.6(\$70,000) + 0.6(\$50,000)(1.05)$$
$$+0.6(50,000)(1.05)^2 = \$106,575$$

Total human wealth becomes $206,575
Consumption each year will be now $20,657.58
Current consumption rises by $1,200

CHP 8, #7

Since the salary is frozen in nominal terms, the nominal interest rate should be used. The nominal interest rate is 8 percent. Thus the approximate present discounted value of the 3-year salary is:

$$\$40,000[1 + 1/1.08 + 1/(1.08)^2] = \$111,322$$

Alternatively we can find the real salary each year using the real interest rate:

$$\$40,000 + [\$40,000/(1.05)]/(1.03) + [\$40,000/(1.05)^2/(1.03)^2 = \$111,184$$

CHP 9, #1

A discount bound offers just one payment maturity. The general formula relating discount bond's price (&P), face value ($F) and yield (i) is :

$$\$P = \$F/(1+i)^n$$

a) 11.8 percent
b) 5,4 percent
c) 3.6 percent
d) Comparing the answers to a and b we see that the price of a bond decreases by $100, the yield to maturity drops from 11.8 percent to 5.4 percent.

CHP 9, #5

The formula for solving the problem is:

$$\$Q_t = \$D^e_{t+1}/(1+i_{1t}) + \$Q^e_{t+1}/(1+i_{1t})$$

a) With i(1t)=0.05 , $Q(t)=$1,407.62
b) With i(1t)=0.10, $Q(t)=$1,000.00

CHP 9, #6

Use equation (9.10) in text, substituting a constant real interest rate r. The price of the stock will be equal to the present value of all future real dividend payments The first dividend payment has a present value of $100/(1+r), the second dividend payment has a present value of $\$100(1.03)/(1+r)^2$ and the third a present value of
$\$100(1.03)^2/(1+r)^3$, and so on...
When r=0.5, the price of the stock will be $5,000
When r=0.10, the price of the stock will be $1,429