# PROBLEM SET 1

3. You can make your decision by computing either the present value of the $2,000 that you can receive in ten years, or the future value of the $1000 that you can receive now.

Present value: $ 2,000 / $1.08^{10}$=$926.39
Future value: $ 1,000*$1.08^{10}$=$2158.93

Either calculation indicates that you should take the $1,000 now.

4. Since the bond has no interim coupon payments, its present value is simply the present value of the $1,000 that will be received in 25 years. Note: As will be discussed in the next chapter, the present value of the payments associated with a bond is the price of that bond.

PV=$1,000 / $1.1^{25}$=$92.30

12. NPV= -($340,000+$10,000)+($100,000-$10,000) / 1.1
+$90,000 / $1.1^2$+$90,000 / $1.1^3$+$90,000 / $1.1^4$+$100,000 / $1.1^5$
= -$2,619.98

Since the NPV is negative you should not buy it.

If the relevant cost of capital is 9 percent,

NPV=-$350,000+$90,000 / 1.09+$90,000 / $1.09^2$+$90,000 / $1.09^3$
+$90,000 / $1.09^4$+$100,000 / $1.09^5$
= $6,567.93

Since the NPV is positive, you should buy it.

18. Effective annual interest rate of Bank America
= $[1+(0.041 / 4)]^4$-1=0.0416=4.16%
Effective interest rate of Bank USA
=$[1+(0.0405 / 12)]^{12}$-1=0.0413=4.13%
You should deposit your money in Bank America

26. The first cash flow will be generated 2 years from today.
The value at the end of 1 year from today=$200,000 / (0.1-0.05)=$4,000,000
Thus, PV=$4,000,000 / 1.1=$3,636,363.64

32. a. The annuity can be computed by first calculating the PV of the $25,000 which you need in 5 years. The amount is $17,824.65[=$25,000 / $1.07^5$]
Next compute the annuity, which has the same present value.

$17824.65= C $A^{5}_{0.07}$
$17,824.65= C (4.1002)
C=$4,347.26

Thus putting $4,347.26 into the 7% account each year will provide $25,000 five years from today

b. The lump sum payment must be the present value of $25,000, i.e.,
$25,000 / $1.07^{5}$ =$17,824.65
The formula for future value of any annuity can be used to solve the problem (see footnote 14 of the text).

35. The amount of loan is $15,000*0.8=$12,000
C $A^{48}_{0.0067}$ =$12,000
The amount of monthly installment is
C=$12,000 / $A^{48}_{0.0067}$ =$12,000 / 40.96191=$292.96

36. Option one: This cash flow is an annuity due. To value it, you must use the after- tax amounts. The after- tax payment is $160,000(1-0.28)=$115,200. Value all except the first payment using the standard annuity formula, then add back the first payment of $115,2000 to obtain the value of this option.

Value =$115,200+$115,200 $A^{30}_{0.10}$

=$115,200+$115,200(9.4269)
=$1,201,178.88

Option two: This option is valued similarly. You are able to have $446,000 now; this is already on an after-tax basis. You will receive an annuity of $101,055 for each of the next thirty years. Those payments are taxable when you receive them, so your after-tax payment is $72,759.60[=$101,055(1-0.28)].

Value = $446,000+$72,759.60 $A^{30}_{0.10}$

= $446,000+$ 72759.60(9.4269)
= $1,131,897.47
Since option one has higher PV, you should choose it.

37. The amount of loan is $9,000. The monthly payment C is given by solving the equation.
C $A^{60}_{0.008}$ =$9,000
C=$9,000 / 47.5042=$189.46

In October 2000, Susan Chao has 35(=12*5-25) monthly payments left, including the one due in October 2000.
Therefore the balance of the loan on November 1, 2000

$=\$189.46+\$189.46\ A^{34}_{0.008}$

$=\$189.46+\$189.46(29.6651)$

$=\$5,809.81$

Thus the amount of payoff=1.01($5,809.81)=$5,867.91

44. Weekly inflation rate=0.039 / 52=0.00075

Weekly interest rate =0.104 / 52=0.002

$PV = \$5[1/(0.002-0.00075)]\{1-[(1+0.00075)/(1+0.002)]^{52*30}$

$=\$3,429.38$

52 The present value of Ernie's retirement income

$PV=\$300,000\ A^{20}_{0.07} / (1.07)^{30} = \$417,511.54$

The present value of the cabin

$PV = \$350,000/(1.07)^{10} = \$177,922.25$

The present value of his savings

$PV=\$40,000\ A^{10}_{0.07} = \$280,943.26$

In present value terms he must save an additional $313,490.53
In future value terms

$FV=\$313,490.53\ (1.07)^{10} = \$616,683.32$

He must save

$C=\$616.683.32 / A^{20}_{0.07} = \$58,210.54$