

Name (Surname, Given Name): _____

Math 210
Theory of Interest

Instructor: Ryan Hubscher
Spring, 2008

In Class Assignment # 3 (max. points = 4)
Thursday March 28, 2008

This assignment is open note/open book, and you may work together in groups of no more than 4. However, each student must hand in his/her own answer sheet. No credit will be given without supporting work.

1. Joan borrows 8000 at an effective annual interest rate $i_0 = .05$. She she will repay this loan with eight annual payments of amounts 1400, 1350, 1300, ..., 1050 with the first payment one year after the loan. Determine the book value and market value of the remaining loan payments just after the 3rd payment if the market rate of interest at that time is 7%.

Solution 1: Using the formula $(Da)_{\overline{n}|} = \frac{n-a\overline{n}|}{i}$

$$BV_3 = 1000a_{\overline{5}|.05} + 50(Da)_{\overline{5}|.05} = \mathbf{5000}$$

$$MV_3 = 1000a_{\overline{5}|.07} + 50(Da)_{\overline{5}|.07} = \mathbf{4742.91}$$

Solution 2: Using the P - Q formula $PV = Pa_{\overline{n}|} + Q\frac{a_{\overline{n}|} - nv^n}{i}$

$$BV_3 = 1250a_{\overline{5}|.05} - 50\frac{a_{\overline{5}|.05} - 5v_{.05}^5}{.05} = \mathbf{5000}$$

$$MV_3 = 1250a_{\overline{5}|.07} - 50\frac{a_{\overline{5}|.07} - 5v_{.07}^5}{.07} = \mathbf{4742.91}$$

2. A 10-year \$100,000 loan requires amortization payments of \$3,700 at the end of each quarter. What is the **effective annual** interest rate charged by this loan?

We can use a financial calculator to solve the following equation, $3700a_{\overline{40}|j} = 100000$. To solve this problem with the BA II PLUS TVM functions, tell the calculator that $N = 40$, $PV = 100000$, and $PMT = -3700$. Then tell the calculator to compute I/Y .

<i>Keystrokes</i>	<i>Display</i>
$\boxed{2ND} \boxed{[CLR TVM]}$	
40 \boxed{N}	N= 40
100000 \boxed{PV}	PV= 100,000
3700 $\boxed{+ -} \boxed{PMT}$	PMT= -3,700
$\boxed{CPT} \boxed{I/Y}$	I/Y= 2.06907

$$j = .0206907 \text{ per quarter}$$

$$i = (1.0206907)^4 - 1 = \mathbf{8.537\%}$$