

Name (Last/family name first): _____

Math 210
Theory of Interest

Instructor: Ryan Hubscher
Spring, 2008

In Class Assignment # 1 (max. points = 4)
Thursday February 7, 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. (1 point) An annuity-due pays 100 at the beginning of each year forever. The effective annual rate of interest is 25%. What is the present value of the annuity?

Solution 1:

$$\begin{aligned} d &= \frac{i}{1+i} & 100 \ddot{a}_{\infty} &= 100 \frac{1}{d} \\ &= \frac{.25}{1.25} & &= 500 \\ &= .2 \end{aligned}$$

Solution 2:

$$\begin{aligned} 100 \ddot{a}_{\infty} &= 100(1 + a_{\infty}) \\ &= 100 \left(1 + \frac{1}{i}\right) \\ &= 500 \end{aligned}$$

2. (3 points) Alexander leaves an estate of \$400,000. At the end of each year, interest on the estate is paid to Bert for the first 5 years, to Carl for the second 5 years, and to the Handout Foundation each year thereafter. Find the present value of the payments to Bert, Carl, and the Handout Foundation. The interest rate is such that $v^5 = 1/2$.

$$\begin{aligned} PV_{\text{Bert}} &= 400,000i a_{\overline{5}|} & PV_{\text{Carl}} &= 400,000i a_{\overline{5}|} v^5 & PV_{\text{Handout}} &= 400,000i a_{\infty} v^{10} \\ &= 400,000(1 - v^5) & &= 400,000(1 - v^5)v^5 & &= 400,000i \left(\frac{1}{i}\right) v^{10} \\ &= 200,000 & &= 100,000 & &= 100,000 \end{aligned}$$