

Annuities

1 Preface

For the remainder of this paper, the following variables will be as set forth, unless specified otherwise. Fix this

R : Periodic Payment

P : Present Value

S : Future Value

r : Nominal Interest Rate Per Year

t : Term (*Number of Years*)

m : Yearly Payment Periods (*Same as number of times compounded per year*)

As well as...

n : Total Payment Periods

$$m * t \quad (1)$$

i : Interest Rate Per Period

$$\frac{r}{m} \quad (2)$$

2 Future Value "S"

$$S = R \left[\frac{(1+i)^n - 1}{i} \right] \quad (3)$$

3 Present Value "R"

$$P = R \left[\frac{1 - (1+i)^{-n}}{i} \right] \quad (4)$$

4 Amortization Formula

The periodic payment R on a loan of P dollars to be amortized over n periods with interest charged at the rate of i per period.

$$R = \frac{Pi}{1 - (1+i)^{-n}} \quad (5)$$

5 Calculate R when saving up to a value (not paying off)

$$R = \frac{Pi}{(1+i)^n - 1} \quad (6)$$

6 Equity

– Find payment per period for loan using the amortization formula (5)

– Plug that R into present value formula (4) with n = number of periods remaining, save result as *current*.

– Solve for Total – current