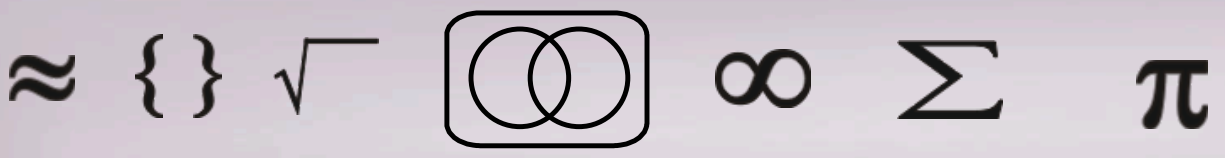

Future Value

Total Return

Math 1030 #9a

Savings Plans and Investments

Investments

Savings Plan Formulas

Annual Return

$$A = P(1+APR)^Y$$

A = Account balance after Y years
P = Principal amount invested
APR = annual percentage rate (as a decimal)
Y = number of years

Savings Plan Formula (regular payments)

Suppose you invest $1000 at the end of each year for 5 years in an account that pays 10% interest compounded annually. What is the value after 5 years (future value)?

Year	amount generated	
1	$1000(1+0.1)^4$	$1464.10
2	$1000(1+0.1)^3$	$1331.00
3	$1000(1+0.1)^2$	$1210.00
4	$1000(1+0.1)^1$	$1100.00
5	$1000(1+0.1)^0$	$1000.00
Total		$6105.10

$$A = PMT \cdot \frac{(1+\frac{APR}{n})^{nY} - 1}{\frac{APR}{n}}$$

A = balance after Y years
APR = annual interest rate
n = number of payment periods per year
Y = number of years
PMT = regular payment amount

$$A = PMT \cdot \frac{(1+\frac{APR}{n})^{nY} - 1}{\frac{APR}{n}}$$

A = balance after Y years
APR = annual interest rate
n = number of payment periods per year
Y = number of years
PMT = regular payment amount

EX 1: Find the savings plan balance after 5 years with an APR of 2.5% with monthly payments of $100.

EX 2: At age 28 you begin saving $50 at the end of each month in an account with an APR of 4%. How much will the balance be when you retire at age 65? How does this compare to the amount invested?

$$A = PMT \cdot \frac{(1+\frac{APR}{n})^{nY} - 1}{\frac{APR}{n}}$$

EX 3: At age 23 when you graduate, you start saving for retirement. Your investment plan pays an APR of 4.5%. You want to have $5 million when you retire in 45 years. How much should you deposit monthly?

$$A = PMT \cdot \frac{(1+\frac{APR}{n})^{nY} - 1}{\frac{APR}{n}}$$