1.6 – SOLVING INVESTMENT PORTFOLIO PROBLEMS

Goal: Analyze, compare, and design investment portfolios that meet specific financial goals.

Example 1: Determining the future value and doubling time of an investment portfolio.

Phyllis started to build an investment portfolio for her retirement. She purchased a $500 Canada Savings Bond (CSB) at the end of each year for 10 years. The first five CSBs earned a fixed rate of 4.2%, compounded annually. The next five CSBs earned a fixed rate of 4.6% compounded annually. Three years ago, she also purchased a $4000 GIC that earned 6%, compounded monthly.

a. What was the value of Phyllis's portfolio 10 years after she started to invest?
b. Phyllis found a savings account that earned 4.90%, compounded semi-annually. She redeemed her portfolio and invested all the money in the savings account. About how long will it take her to double her money?

N = **5**
I% = **4.2**
PV = **0**
PMT = **-500**
FV = **? $2719.01**
P/Y = **1**
C/Y = **1**

$A = P(1+i)^n$

$= 2719.01 (1+0.042)^5 = \$3340.02$

$\$3340.02 + \$2740.83 + \$4786.72 = \$10867.57$

N = **5**
I% = **4.6**
PV = **0**
PMT = **-500**
FV = **? $2740.83**
P/Y = **1**
C/Y = **1**

rate of return = $\dfrac{\text{amount} - \text{investment}}{\text{investment}}$

$= \dfrac{10867.57 - (2500 + 2500 + 4000)}{(9000)}$

$= 20.75\%$

$72/4.9 = 14.69 \approx 15 \text{ years}$

N = **3 × 12**
I% = **6**
PV = **-4000**
PMT = **0**
FV = **? $4786.72**
P/Y = **12**
C/Y = **12**

Example 2: Comparing the rates of return of two investment portfolios.

Jason and Malique are each hoping to buy a house in 10 years. They want their money to grow so they can make a substantial down payment.

Jason's portfolio:	*Malique's portfolio:* **$38 877.37**

- ❀ • A 10-year $2000 GIC that earns 4.2%, compounded semi-annually

- • A savings account that earns 1.8%, compounded weekly, where he saves $55 every week

- • A 5-year $4000 bond that earns 3.9%, compounded quarterly, which he will reinvest in another bond at an interest rate of 4.1%

- • A tax-free savings account (TFSA) that earns 2.2%, compounded monthly, and has a current balance of $5600

- • The purchase. at the end of each year, of a 10-year $500 CSB that earns 3.6%, compounded annually

- • A savings account that earns 1.6%, compounded monthly. where she saves $200 every month

N = **10×2**
I% = **4.2**
PV = **-2000**
PMT = **0**
FV = **? $3030.71**
P/Y = **2**
C/Y = **2**

N =
I% =
PV =
PMT =
FV =
P/Y =
C/Y =

N = **10×52**
I% = **1.8**
PV = **0**
PMT = **-55**
FV = **? $31329.72**
P/Y = **52**
C/Y = **52**

N =
I% =
PV =
PMT =
FV =
P/Y =
C/Y =

N = **5×4**   N = **5×4**
I% = **3.9**   I% = **4.1**
PV = **-4000**   PV = **-4856.65**
PMT = **0**   PMT = **0**
FV = **? $4856.65**   FV = **? $5955.44**
P/Y = **4**   P/Y = **4**
C/Y = **4**   C/Y = **4**

N =
I% =
PV =
PMT =
FV =
P/Y =
C/Y =

3030.71 + 31329.72 + 5955.44 = $40315.87

Example 3: Designing and adjusting an investment portfolio to meet a financial goal.

Stan plays in a band. Next year, he wants to have enough money to buy a new guitar. The new guitar costs $1750, including taxes and shipping. Stan works part time and can afford to save $15 every week. As well, he has $300 left from his summer job. He needs an investment portfolio so that he can save money to buy the guitar in a year.

a. Why might Stan include a GIC and a high-interest savings account in his portfolio?
b. If the GIC earns 5%, compounded annually, and the savings account earns 2.9%, compounded weekly, will he have enough money in a year? If not, how much does he have to save each week?

a. GIC → $300   Savings account → $15/week

N = 1
I% = 5
PV = −300
PMT = 0
FV = ? $315
P/Y = 1
C/Y = 1

need 1750 − 315 = $1435

N = 52
I% = 2.9
PV = 0
PMT = ? $27.21 per week
FV = 1435
P/Y = 52
C/Y = 52

Assignment: p. 65 #2 – 4, 6, 8, 9