$I = A - P$ $P = PMT \times N$

7. a) Jayne plans to retire in 35 years, when she is 55, and hopes to have $1 000 000 saved. For each investment option below, how much does she need to invest at the end of each month to reach her goal?

i) 14.6% compounded monthly ↑ MPP

ii) 6.9% compounded monthly

b) Compare the rates of return for options i) and ii). Which option should she choose?

a) i)

N=420
I%=14.6
PV=0
PMT=-76.213284…
FV=1000000
P/Y=12
C/Y=12
PMT:END BEGIN

$76.21/month

$P = 76.21 \times 420$

$P = 32008.20$

$I = 1000000 - 32008.20$

$\$967991.80$

b) $ROR = \frac{\$ earn}{\$ invest} \times 100\%$

$ROR = \frac{967991.80}{32008.20} \times 100$

$ROR = 3024\%$

6. Jayne's investment portfolio is described below.

- When Jayne was born, 40 years ago, her parents opened a trust account for her. They invested $500 at the end of each year into the trust account until she was 20. Since then, there have been no more deposits, but the account has continued to earn interest at an average annual rate of 5%, compounded annually.
- 10 years ago, Jayne purchased a 10-year $10 000 GIC that earned 4.4%, compounded semi-annually.
- 5 years ago, she started buying a 5-year $1000 CSB at the beginning of each year. The first two CSBs earned 4.7%, compounded annually; the next two CSBs earned 4.8%, compounded annually; and the last CSB earned 4.9%, compounded annually.

How much is Jayne's investment portfolio worth now? What is her rate of return?

APP

Formula

Formula

#1

#2

#1

Up to 20 yrs

```
N=20
I%=5
PV=0
PMT=-500
FV=16532.97705
P/Y=1
C/Y=1
PMT:END BEGIN
```

Next 20 years

$A = 16532.98\left(1+\frac{0.05}{1}\right)^{20}$

$A =$

```
16532.98(1+0.05)
^20
        43866.91789
```

#2

```
10000(1+.044/2)^
20
        15453.18187
```

#3

```
1000(1+0.047)^5+
1000(1+0.047)^4+
1000(1+0.048)^3+
1000(1+0.048)^2+
1000(1+0.049)^1
        5758.155621
```

Worth in total...

```
43866.92+15453.1
8+5758.15
        65078.25
```

Principal

```
500*20+10000+100
0*5
          25000
```

$I = 65078.25 - 25000$

$I = 40078.25$

$ROR = \frac{40078.25}{25000} \times 100\%$

$= 160\%$

HOMEWORK...

PRACTICE QUESTIONS...

p. 509:

Formulas...#1, 2a, 3, 4, 6, 7a

TVM-Solver...#8, 9, 10

p. 506: Self Test

p. 483: Mid-Chp Review

- **Simple Interest**

$$I = \Pr t \qquad A = P + \Pr t$$
$$A = P + I \qquad A = P(1 + rt)$$

- **Compound Interest**

$$A = P\left(1 + \frac{r}{n}\right)^{nt} \qquad I = A - P$$

- **Rate of Return**

$$ROR = \frac{earn}{invested} \times 100\%$$

- **Rule of 72**

$$doubling\ time = \frac{72}{rate}$$

- **Present Value**

$$P = \frac{A}{\left(1 + \frac{r}{n}\right)^{nt}}$$

- **Regular Payments (TVM-Solver)**