HOMEWORK???

p. 468: **Rule of 72...**

#3 (only estimate the doubling time)

#5a & #8

Compound Interest (Future Value)

#10 & #12

p. 478: **Compound Interest (Present Value)**

#4, #6, #7, & #9

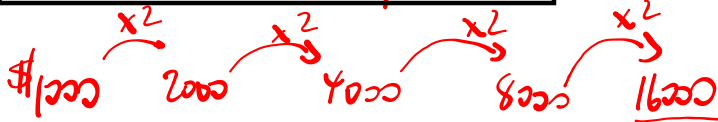8. Estimate how long it would take for $1000 to grow to $16 000 at each interest rate, compounded annually.

   a) 6%   b) 12%

Handwritten notes:

$$t = \frac{I}{P \cdot r}$$ (crossed out)

Doubling Time $\Rightarrow \frac{72}{Rate}$

$1000 \xrightarrow{\times 2} 2000 \xrightarrow{\times 2} 4000 \xrightarrow{\times 2} 8000 \xrightarrow{\times 2} 16000$

$$\frac{72}{6} = 12 \text{ years}$$

Total time $\Rightarrow 12 \times 4$

48 years

10. Solomon bought a $40 000 corporate bond (an investment in the form of a loan to a company that earns interest). The bond earns 4.8%, compounded semi-annually. After 4 years, the interest rate changed to 6%, compounded annually. Determine the value of Solomon's investment after 6 years.

Handwritten:

4 yrs →

```
40000(1+0.048/2)
^8
        48357.03278
Ans(1+0.06/1)^2
        54333.96204
```

6 yrs → $54 333.96

7. Sasha predicts that she will need $24 000 to remodel her carpentry workshop in 6 years. She has found three investment options to consider:

   A. 4.80%, compounded annually

   B. 4.75%, compounded semi-annually

   C. 4.70%, compounded quarterly

   a) Compare the rates of return for these three options. Which option should she choose? Why?

   b) How much interest will she earn?

Handwritten: p.478

$$RoR = \frac{earn}{invest} \times 100\%$$

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

A
```
)^6
        18115.21721
24000-18115.22
        5884.78
5884.78/18115.22
*100
        32.48528033
```

B
```
2)^12
        18108.57451
24000-18108.57
        5891.43
Ans/18108.57*100
        32.53393283
```
(b)

Choose

C
```
)^24
        18132.35145
24000-18132.35
        5867.65
5867.65/18132.35
*100
        32.36011879
```

8.5 Investments Involving Regular Payments

GOAL

Determine the future value of an investment that earns compound interest involving regular payments.
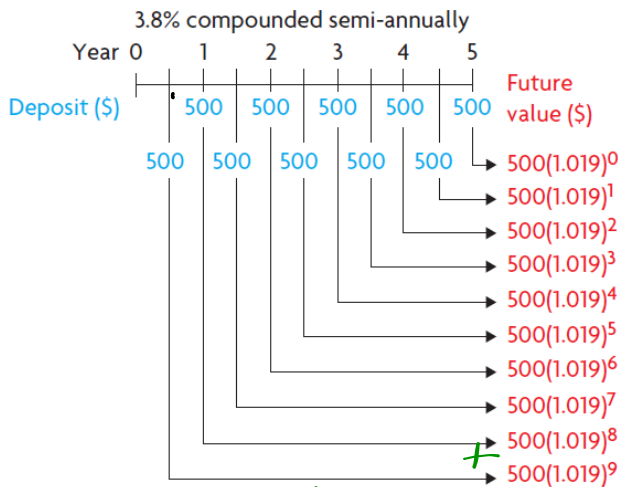
EXAMPLE 1
p. 485

Determining the future value of an investment involving regular deposits

Darva is saving for a trip to Australia in 5 years. She plans to work on a student visa while she is there, so she needs only enough money for a return flight and her expenses until she finds a job. She deposits $500 into her savings account at the end of each 6-month period from what she earns as a server. The account earns 3.8%, compounded semi-annually. How much money will be in the account at the end of 5 years? How much of this money will be earned interest?

SOLUTION BY HAND...

I drew a timeline to show the future value of each of the $500 deposits that I made at the end of each 6-month period for 5 years.

$$500\left(1 + \frac{0.038}{2}\right)^{10}$$

3.8% compounded semi-annually

Year 0   1   2   3   4   5

Deposit ($)   500   500   500   500   500   Future value ($)

500   500   500   500   500 → $500(1.019)^0$
                              → $500(1.019)^1$
                              → $500(1.019)^2$
                              → $500(1.019)^3$
                              → $500(1.019)^4$
                              → $500(1.019)^5$
                              → $500(1.019)^6$
                              → $500(1.019)^7$
                              → $500(1.019)^8$
                              → $500(1.019)^9$

I could see that I needed to do 10 calculations and then determine the sum.

By Hand

```
019)^7+500(1.019
)^6+500(1.019)^5
+500(1.019)^4+50
0(1.019)^3+500(1
.019)^2+500(1.01
9)^1+500
        5449.896878
```

App   A = P + I

```
N=10
I%=3.8
PV=0
PMT=-500
■FV=5449.896878
P/Y=2
C/Y=2
PMT:END BEGIN
```

Notes - TVM Solver.pdf

INSTRUCTIONS on using the TVM-Solver...

1.) On the TI-83, press 2nd, then FINANCE, then select 1:TVM Solver. On the TI-83 plus and TI-84, press APPS, then 1:FINANCE, then 1:TVM Solver. You should see the screen below:

```
N=■
I%=0
PV=0
PMT=0
FV=0
P/Y=1
C/Y=1
PMT:END BEGIN
```

2.) Now, suppose you are taking out a 5-year loan on $25000 at 6% annual interest compounded monthly and you want to know the monthly payment. Fill in the values on the TVM Solver screen as shown:

```
N=60
I%=6
PV=25000
PMT=■
FV=0
P/Y=12
C/Y=12
PMT:END BEGIN
```

3.) Now, move the cursor to PMT, press the green ALPHA key, then ENTER. Your payment will show up as a negative number:

```
N=60
I%=6
PV=25000
■PMT=-483.32003...
FV=0
P/Y=12
C/Y=12
PMT:END BEGIN
```

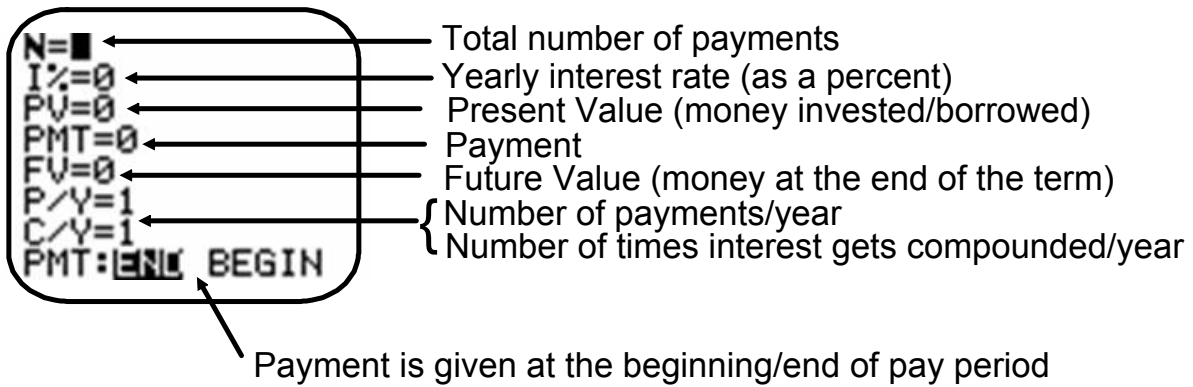NOTE: a **negative** number means that the money is coming 'out of your pocket'

4.) Suppose you know you can afford a $250 per month payment on a 60 month loan at 6% annual interest compounded monthly. Fill out the TVM Solver screen as shown:

```
N=60
I%=6
PV=0
PMT=-250
FV=0
P/Y=12
C/Y=12
PMT:END BEGIN
```

5.) To find how much you can afford to borrow, move the cursor to PV, press the green ALPHA key, then ENTER. The amount you can afford to borrow is shown:

```
N=60
I%=6
■PV=12931.39019
PMT=-250
FV=0
P/Y=12
C/Y=12
PMT:END BEGIN
```

SOLUTION WITH TI-84 (Finance APP)...

```
N=█ ◄─────────────── Total number of payments
I%=0 ◄────────────── Yearly interest rate (as a percent)
PV=0 ◄────────────── Present Value (money invested/borrowed)
PMT=0 ◄───────────── Payment
FV=0 ◄────────────── Future Value (money at the end of the term)
P/Y=1          ⎰ Number of payments/year
C/Y=1          ⎱ Number of times interest gets compounded/year
PMT:END BEGIN
```

Payment is given at the beginning/end of pay period

Attachments

Notes - TVM Solver.pdf