

## TVM Examples

### Compound Interest

- n Number of compounding periods / payments<sup>#2</sup>
- I% Annual Interest Rate
- PV Present value (principal)<sup>#1</sup>
- PMT Payment for each instalment period
- FV Future value
- P/Y Instalment periods per year
- C/Y Compound periods per year

<sup>#1</sup> Recommend PV is always entered as a negative amount, so that FV, PMT etc are displayed as positive amounts. See user guide for more...

<sup>#2</sup> Make sure that n = Number of years × P/Y

**B** Find the interest gained when \$2000 is invested at 12% for 2 years with interest paid monthly.

```
Compound Interest:End
n =24
I% =12
PV =-2000
PMT=0
FU =0
P/Y=12
To Store :[EXE]
```

```
Compound Interest:End
FV =2539.469297
[REPT] [AMT] [GRPH]
```

**C** Find the compound interest rate required to double the value of an investment of \$5000 in 10 years if interest is paid daily.

```
Compound Interest:End
n =3650
I% =6.932130002
PV =-5000
PMT=0
FU =10000
P/Y=365
To Store :[EXE]
```

```
Compound Interest:End
I% =6.932130002
[REPT] [AMT] [GRPH]
```

**D** Determine the value of a superannuation plan if \$100 a month is saved for 30 years at an interest rate of 8%, interest paid

- a) monthly
- b) annually.

```
Compound Interest:End
n =360
I% =8
PV =0
PMT=-100
FU =0
P/Y=12
To Store :[EXE]
```

```
Compound Interest:End
FV =149035.9449
[REPT] [AMT] [GRPH]
```

```
Compound Interest:End
n =360
I% =8
PV =0
PMT=-100
FU =0
P/Y=12
To Store :[EXE]
```

```
Compound Interest:End
FV =140855.0587
[REPT] [AMT] [GRPH]
```

**E** Find the monthly repayment needed to repay a loan of \$180000 over 25 years if interest of 7.5% is compounded daily.

```
Compound Interest:End
n =9125
I% =7.5
PV =-180000
PMT=0
FU =0
P/Y=365
To Store :[EXE]
```

```
Compound Interest:End
PMT=1332.844343
[REPT] [AMT] [GRPH]
```

**F** What time could be saved on the life of the loan in E if fortnightly repayments of half the required monthly payments were made?

```
Compound Interest:End
n =9125
I% =7.5
PV =-180000
PMT=666.4221715
FU =0
P/Y=365
To Store :[EXE]
```

```
Compound Interest:End
n =525.229732
[REPT] [AMT] [GRPH]
```

(NB 525 fortnights = 20 years)

(This RUN screen comes from VARS, F6, TVM, not TVM)

```
n=26
20.20114354
[REPT] [AMT] [GRPH]
```

## Amortization

- PM1 First installment of installments 1 through n
- PM2 Second installment of installments 1 through n
- n Number of installments
- I% Interest Rate
- PV Present value (principal)<sup>#1</sup>
- PMT Payment for each installment
- FV Future value
- P/Y Installments per year
- C/Y Compoundings per year

**G** How much interest is saved over the life of loan E by repaying fortnightly rather than monthly?

(\$49800)

```
Amortization:End
PMT=300
n=300
I%=7.5
PV=-180000
PMT=1332.844343
|BAL|INT|PRN|EINT|EPRN|MPD
```

```
Amortization:End
ΣIN=219853.3029
|REPT|MPD|GRPH
```

```
Amortization:End
PMT=325
n=325.229732
I%=7.5
PV=-180000
PMT=666.4221715
|BAL|INT|PRN|EINT|EPRN|MPD
```

```
Amortization:End
ΣIN=170024.4672
|REPT|MPD|GRPH
```

**H** After 12 repayments to loan E, how much interest has been paid in total and how much of the principal has been paid off?

```
Amortization:End
PMT=1
PM2=12
n=300
I%=7.5
PV=-180000
PMT=1332.844343
|BAL|INT|PRN|EINT|EPRN|MPD
```

```
Amortization:End
ΣIN=13454.50141
|REPT|MPD|GRPH
```

```
Amortization:End
ΣPR=2539.630709
|REPT|MPD|GRPH
```

- I** Find for loan E
- the balance remaining after 36 repayments
  - the ratio of interest to principal for the 36<sup>th</sup> repayment.

```
Amortization:End
PMT=36
PM2=12
n=300
I%=7.5
PV=-180000
PMT=1332.844343
|BAL|INT|PRN|EINT|EPRN|MPD
```

```
Amortization:End
BAL=-177460.3693
|REPT|MPD|GRPH
```

```
Amortization:End
INT=1078.423265
|REPT|MPD|GRPH
```

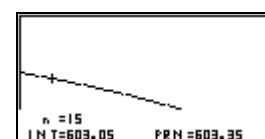
```
Amortization:End
PRN=254.4210777
|REPT|MPD|GRPH
```

- J** A loan of \$100000 is repaid monthly over 10 years at 8% interest, compounded every six months.
- Find the monthly repayment.
  - For which repayment is does the interest part equal the principal repayment part?

```
Compound Interest:End
I%=8
PV=-100000
PMT=0
FV=0
P/Y=12
C/Y=2
|n|I%|PV|PMT|FV|AMT
```

```
Compound Interest:End
PMT=1206.409024
|REPT|AMT|GRPH
```

```
Amortization:End
PMT=1206.409024
n=120
I%=8
PV=-100000
PMT=1206.409024
|BAL|INT|PRN|EINT|EPRN|MPD
```



## Simple Interest

n Number of days interest payable  
 I% Annual Interest Rate  
 PV Present value (principal)<sup>#1</sup>

**A** What is the simple interest and the total amount to be repaid when \$4300 is borrowed for 3 years at 9.5%?

```
Simple Interest:365
n =1095
I% =9.5
PV =-4300
To Store : [EXE]
```

```
Simple Interest:365
SFV=5525.5
[REPT] [GRAPH]
```

## Conversion

n Number of compounding periods per year  
 I% Annual interest rate

**K** Determine the best investment scheme if interest is paid at  
 A: 18% compounded annually  
 B: 17% compounded quarterly  
 C: 16% compounded monthly  
 D: 15% compounded daily

```
Conversion
n =4
I% =17
[EFF] [PFR]
```

```
Conversion
EFF=18.1147825
[REPT]
```

```
Conversion
n =365
I% =15
[EFF] [PFR]
```

```
Conversion
EFF=16.17984431
[REPT]
```

## Days Calculation

d1 Date 1  
 d2 Date 2  
 D Number of days

Casio date syntax is [month]M[day]D[year]Y(DayOfWeek)  
 Eg May 2<sup>nd</sup> 1956 is 05M02D1956Y(WED)

*(When entering a date in TVM, you will be prompted for each in turn)*

**I** How many days elapse from Oct 15<sup>th</sup> 2007 until Dec 31<sup>st</sup> 2007? 77!

```
Days Calculation :365
d1 =10M15D2007Y(MON)
d2 =12M31D2007Y(MON)
D =77
[PRD] [D+] [D-] [D]
```

```
Days Calculation :365
Prd=77
[REPT]
```

