Pre-Calculus 11
Finance

Compound Interest and the TVM Solver

Compound interest is when the interest earned is added to the original amount invested more frequently, and so you earn more interest.

> **Note**: Annually = 1 time per year
> Semi-annually = 2 times per year
> Quarterly = 4 times per year
> Bi-weekly = 26 times per year
> Daily = 365 times per year

TVM SOLVER: You can use this program in a graphing calculator to calculate compound interest.

* To start press: APPS – Finance – TVM Solver

* Enter the following values

   N = total # of payments
   I = annual interest rate (as a percent)
   PV = present value
   PMT = payment each period   Both are entered as negative values
   FV = future value
   PY = # of payments per year
   CY # of compounding periods per year

   BEGIN (Always use BEGIN for investments, and END for loans)

* To finish, highlight the wanted value and press: ALPHA - ENTER

Example 1:   Calculate the future value when $5000 is invested at 6.5% per annum (per year) compounded semi-annually for 8 years.

N =	FV =
I =	PY =
PV =	CY =
PMT =	BEGIN

Example 2: How long will it take $3000 to double if it is invested at 4.5% p.a. (per annum) compounded monthly?

N =	FV =
I =	PY =
PV =	CY =
PMT =	BEGIN

Example 3:How much must be invested at 6.8% p.a. compounded quarterly in order to have $10 000 after 5 years?

N =	FV =
I =	PY =
PV =	CY =
PMT =	BEGIN

1. Use the TVM Solver to calculate the amount (Future Value) of the following investments:
a) $1000 invested at 6% per annum compounded semi-annually for 5 years.
b) $ 800 invested at 4.8% per annum compounded semi-annually for 3 years.
c) $ 600 invested at 8% per annum compounded quarterly for 3 years.
d) $1200 invested at 6.8% per annum compounded quarterly for 10 years.
e) $2500 invested at 12% per annum compounded monthly for 4 years.
f) $10 000 invested at 5.4% per annum compounded monthly for 8 years.

a)   N =   FV =   b)   N =   FV =
     I =   PY =   I =   PY =
     PV =   CY =   PV =   CY =
     PMT =   BEGIN   PMT =   BEGIN

c)   N =   FV =   d)   N =   FV =
     I =   PY =   I =   PY =
     PV =   CY =   PV =   CY =
     PMT =   BEGIN   PMT =   BEGIN

e)   N =   FV =   f)   N =   FV =
     I =   PY =   I =   PY =
     PV =   CY =   PV =   CY =
     PMT =   BEGIN   PMT =   BEGIN

2. Use the TVM Solver to determine the following times. Answer in years.
a) How long will it take an investment of $1 000 to reach $1 200 at 6.5% p.a. compounded monthly?
b) How long will it take for an investment of $5 000 at 5.6% p.a. compounded quarterly to double in value?
c) How long will it take for an investment of $10 000 at 9.5% p.a. compounded semi-annually to triple in value?
d) How long will it take for an investment of $3 000 at 8.2% p.a. compounded annually to reach $5000?

a)   N =   FV =   b)   N =   FV =
     I =   PY =   I =   PY =
     PV =   CY =   PV =   CY =
     PMT =   BEGIN   PMT =   BEGIN

c)   N =   FV =   d)   N =   FV =
     I =   PY =   I =   PY =
     PV =   CY =   PV =   CY =
     PMT =   BEGIN   PMT =   BEGIN

3. Use the TVM Solver to determine the original amount (Present Value) invested.
a) How much must be invested at 3.5% p.a. compounded semi-annually in order to have $5000 after 8 years?
b) How much must be invested at 4.1% p.a. compounded bi-weekly in order to have $2000 after 3 years?

a)   N =   FV =   b)   N =   FV =
     I =   PY =   I =   PY =
     PV =   CY =   PV =   CY =
     PMT =   BEGIN   PMT =   BEGIN

Answers: 1. a) $1343.92   b)$922.34   c)$760.95 d) $2355.15   e) $4030.57   f) $15388.43
             2. a) 2.8 yrs   b) 12.46 yrs   c) 11.84 yrs d) 6.48 yrs
             3. a) $3788.08   b) 1768.70