

General

$$n = mt \quad i = \frac{r}{m}$$

Simple Interest

$$I = Prt$$

$$S = P + I = P + Prt = P(1 + rt)$$

Periodic Compound Interest

$$S = P(1 + i)^n = P \left(1 + \frac{r}{m}\right)^{mt}$$

$$APY = \left(1 + \frac{r}{m}\right)^m - 1 = (1 + i)^m - 1$$

Continuous Compound Interest

$$S = Pe^{rt}$$

$$APY = e^r - 1$$

Future Value of an Ordinary Annuity

$$S = R \cdot \left[\frac{(1 + i)^n - 1}{i} \right]$$

Present Value of an Ordinary Annuity

$$A = R \cdot \left[\frac{1 - (1 + i)^{-n}}{i} \right]$$

Amortization Formula

$$R = A \cdot \left[\frac{i}{1 - (1 + i)^{-n}} \right]$$

Time Value of Money (TVM) Solver

Press [APPS] and select [1: Finance], then [1: TVM Solver]. You should see a screen with the following inputs.

N = Number of compounding periods

I = Annual interest rate as a percent

PV = Present value

PMT = Payment amount

FV = Future value

P/Y = Payments per year

C/Y = Compounding periods per year

$PMT : END \quad BEGIN$ = When payments are made in the compounding period

Notes:

- Since we are doing ordinary annuities, the PMT option should always have END highlighted for payments being made at the end of the compounding period.
- For our problems, we will always consider the number of payments per year and the number of compounding periods per year to be the same.
- A general rule is to put a “-” in front of amounts that are leaving our possession.

Redo the following examples from class using the TVM Solver.

Ex [6.3] Suppose you graduate at age 22 and get your first job. You decide to invest \$200 at the end of each month in a retirement plan that earns 8% compounded monthly. How much will you have if you retire (early) at age 65?

Ex [6.3] Suppose you want \$12000 for a down payment on a home in 3 years. How much must you invest at the end of each quarter in an account that earns 4% interest compounded quarterly?

Ex [6.4] After you retire, you want to receive \$2000 at the end of each month for 25 years. What lump sum must you invest in an annuity that pays 7% compounded monthly?

Ex [6.5] Sally buys a home for \$180,000 and makes a down payment of \$36,000. She takes out a loan for the remaining amount and amortizes it with monthly payments over the next 30 years. If the interest rate is 4.8% compounded monthly, find the size of the monthly payments.