\[ S = P \left(1 + \frac{r}{m}\right)^{mt} \]

\[ S = P \left(1 + i\right)^n \]

\[ i = \text{int rate per compounding period} \]

\[ i = \frac{r}{m} \]

\[ n = \text{total # compounding periods} \]

\[ n = mt \]
7.3% compounded monthly

**APY (Annual Percentage Yield)**

is the simple interest rate equivalent

Invest $1 for 1 year

\[
S = P \left(1 + \frac{r}{m}\right)^{mt}
\]

\[
S = \left(1 + \frac{0.0755}{12}\right)^{12(1)}
\]

\[
S = 1.0755
\]

\[
S = P + I = 1.0755
\]

\[
-P = -1.0008
\]

\[
I = .0755
\]

Find the simple interest equivalent.

\[
I = Prt
\]

\[
.0755 = 1 \cdot r \cdot (1)
\]

\[
.0755 = r
\]

\[
7.55\%
\]

**APY**
6.2

35

1991

133,675

10 yr later

r = comp annually

\[ S = P \left(1 + \frac{r}{m}\right)^{mt} \]

\[ 133,675 = 10,000 \left(1 + \frac{r}{1}\right)^{10} \]

\[ \frac{133,675}{10,000} = (1+r)^{10} \]

\[ 13.3675 = (1+r)^{10} \]

\[ \sqrt[10]{13.3675} = \sqrt[10]{(1+r)^{10}} \]

\[ 1.296 = 1 + r \]

\[ 0.296 = r \]

29.6% annually

\[ X^2 = 16 \]

\[ X = \pm \sqrt{16} \]

\[ X = \pm 4 \]
6.3 See sheet

Annuity

Annuity Certain

Contingent Annuity We do not study these

Ordinary Annuity payments made @ end period

Annuity due payments made @ beginning of the period

Sinking Fund-
Future Value $S$

Ord ann. Payments END

$300 paid quarterly for 5 years 12% compounded quarterly

\[ N = 20 \]
\[ I = 12 \]
\[ PV = 0 \]
\[ PMT = -300 \]
\[ FV = 8061.112347 \]
\[ P/Y = 4 \]
\[ C/Y = 4 \]
\[ PMT: END BEGIN \]

\[ Future Value \]
\[ $8061.11 \]
\[ in 5 years \]

Done!!

There is a formula:

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

\[ S = 300 \left( \frac{1 + 0.03}{0.03} - 1 \right) \]

\[ i = \text{Rate per period} \]
\[ \frac{i}{n} = \frac{\frac{r}{m}}{n} \]
\[ n = \text{total # periods} \]
\[ n = \frac{m \cdot t}{n} \]
\[ n = 20 \]

\[ S = 8061.11 \]

\[ \frac{300 \cdot \left(1 + 0.03\right)^{20} - 1}{0.03} \]
\[ 8061.112347 \]
12 \% \text{ comp} \text{ annually}\
end period = 5\
Pay off debt $38,000 in 6yr\

Find payment

Sinking Fund

\begin{verbatim}
N=6
I\%=12
PV=0
\text{PMT}=-3696.7715...
FV=30000
P/Y=1
C/Y=1
PMT:ENT BEGIN
\end{verbatim}

$3,696.77 \text{ @ the end of each year for 6yrs.}$
Final FV

Annuity due Beginning

$1500 each mo for 3 yrs

12% comp monthly

$65261.47 in 3 years
800,000 in 30 yrs
end mo.
7.5 % comp monthly

N=360
I%=7.5
PV=0
PMT=-593.71606...
FV=800000
P/Y=12
C/Y=12
PMT:END BEGIN

593.72
per month
Find $PV$

$3000 \text{ end of mo } \text{ payments for 6 yr at } 6\% \text{ comp semiannually}$

$$\begin{array}{c}
N=12 \\
I\%=6 \\
PV=-29862.0198 \\
PMT=3000 \\
FV=0 \\
P/Y=2 \\
P/Y=2 \\
PMT: END \text{ BEGIN}
\end{array}$$

Present Value is $\$29,862.01$
Mortgages

6.5

6

Loan $10,000
10 equal quarterly payments
6% compounded quarterly
Payment?

\[ \text{N=10} \]
\[ \text{I%=6} \]
\[ \text{PV=10000} \]
\[ \text{P/Y=4} \]
\[ \text{C/Y=4} \]
\[ \text{PMT: END BEGIN} \]

1084.34 per month
Tuesday

6.3 Those assigned
6.4 Those assigned
6.5 1, 3, 5

Thursday Test 4 April 27