Solutions - Interest Rate Exercises

1. \( r_{a, 365} = 0.0416 \) annual rate compounded daily two year term

\[
R = \frac{r_{a, 365}}{365} = \frac{0.0416}{365} = 0.000114
\]

\[
(1 + r) = (1 + R)^{365}
\]

\[
= (1.000114)^{365}
\]

\[
= 1.04247
\]

\[
\Rightarrow r = 4.25\%
\]
2. \( R_{a, 365} = .0440 \)

\[
\text{Value of} \quad 25000 \text{ in } 3 \text{ years} \\
= 25000 \times \left( 1 + \frac{R_{a, 365}}{365} \right)^{1095} \\
= 25000 \times \left( 1 + \frac{.0440}{365} \right)^{1095} \\
= 25000 \times 1.1411 \\
= $28527.48
\]
3. Value of \( \$15000 \) in 2 years
\[
\frac{15000 \times \left(1 + \frac{0.416}{365}\right)^{730}}{2 \text{ years}} = 16301.31
\]

Value of \( \$15000 \) in 5 years
\[
\frac{15000 \times \left(1 + \frac{0.443}{365}\right)^{1825}}{5 \text{ years}} = 19192.77
\]

\[ r = \text{annual yield required at time 2 to have same ending value} \]

\[ 16301.31 \times (1 + r)^3 = 19192.77 \]

\[ (1 + r)^3 = 1.17738 \]

\[ 1 + r = 1.0559 \]

\[ \Rightarrow \text{annual yield needed} = 5.59\% \text{ (3-year)} \]
4. \( r_{a,12} = 0.06 \)

\[ R = \frac{r_{a,12}}{12} = \frac{0.06}{12} \]

\[ = 0.005 \]

\[ (1+r) = (1+R)^{12} = (1.005)^{12} \]

\[ = 1.06168 \]

\[ r = 6.17\% \]

Use annuity to get payment

\[ PV = C \left[ \frac{1}{R} - \frac{1}{R(R+R)^{120}} \right] \]

\[ 100000 = C \left[ \frac{1}{0.005} - \frac{1}{0.005 (1.005)^{120}} \right] \]

\[ \Rightarrow C = 1110.21 \]

Monthly payment is $1110.21