

Solutions - Interest Rate Exercises

1. $r_{a,365} = .0109$ annual rate
compounded daily
two year term

$$R = \frac{r_{a,365}}{365} = \frac{.0109}{365} = .00002986$$

$$\begin{aligned}(1+r) &= (1+R)^{365} \\ &= (1.00002986)^{365} \\ &= 1.010959\end{aligned}$$

$$\Rightarrow r = \underline{\underline{1.10\%}}$$

$$2. \quad r_{a,365} = .0134$$

days in
3 years

$$\text{Value of } \$25000 \text{ in } 3 \text{ years} = 25000 \times \left(1 + \frac{r_{a,365}}{365}\right)^{1095}$$

$$= 25000 \times \left(1 + \frac{.0134}{365}\right)^{1095}$$

$$= 25000 \times 1.04102$$

$$= \underline{\underline{\$26025.45}}$$

3. Value of \$15000 in 2 years = $15000 \times \left(1 + \frac{0.0109}{365}\right)^{730}$

$$= 15330.59$$

Value of \$15000 in 5 years = $15000 \times \left(1 + \frac{0.0183}{365}\right)^{1825}$

$$= 16437.21$$

r = annual yield required at time 2 to have same ending value <This is the forward rate $f_{3,2}$ >

$$15330.59 \times (1+r)^3 = 16437.2$$

$$(1+r)^3 = 1.07218$$

$$1+r = 1.0235$$

→ annual yield needed = 2.35% (3-year rate).

$$4. \quad r_{a,12} = .06 \quad R = \frac{r_{a,12}}{12} = \frac{.06}{12}$$

$$= .005$$

$$(1+r) = (1+R)^{12} = (1.005)^{12}$$
$$= 1.06168$$

$$r = \underline{6.17\%}$$

use annuity to get payment

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

$$100000 = C \left[\frac{1}{.005} - \frac{1}{.005(1.005)^{120}} \right]$$

$$\Rightarrow C = 1110.21$$

monthly payment is \$1110.21