

Solutions Chapter 3

Exercise 3.1

a. PV of withdrawals = $\$4,000 * (1 - 1/1.06^6) / 0.06 = \$19,669.30$.
FV = $(\$20,000 - \$19,669.30) * 1.06^6 = \$469.11$.

b. PV at end year 2 of withdrawals = $\$4,000 * (1 - 1/1.06^6) / 0.06 = \$19,669.30$.
PV today = $\$19,669.30 / 1.06^2 = \$17,505.61$.
FV = $(\$20,000 - \$17,505.61) * 1.06^8 = \$3,975.68$.

Or $\$20,000 * 1.06^2 = \$22,472 = \text{FV one year before first withdrawal}$.
 $(\$22,472 - \$19,669.30) * 1.06^6 = \$3,975.68$.

Exercise 3.2

PV of 20 withdrawals = $\$12,000 * (1 - 1/1.06^{20}) / 0.06 = \$137,639.05$. This is the amount the fund must hold one year before the first withdrawal. Using [4] we set the FV of the 15 deposits equal to this amount.

$$D * \{(1.06)^{15} - 1\} / 0.06 = \$137,639.05.$$
$$D = \$137,639.05 / 23.276 = \$5,913.35.$$

Exercise 3.3

a. $\$25 * (1.015)^5 = \26.932m .
b. $\text{PV} = \$26.932 / (0.06 - 0.015) = \598.49m .