APPENDIX

Solutions to End of Chapter Questions

CHAPTER 10

1. The discounting is the reverse process of compounding. In compounding, we seek the future value of a lump-sum, whereas in discounting we seek the present value of a lump-sum.
2. Larger.
3. Smaller.
4. Continuous compounding. The greater the frequency of compounding, the greater the future value for a given annual percentage rate.
5. In an ordinary annuity, the first cash flow occurs one period from today (that is, end-of-period cash flows). In an annuity due, the first cash flow occurs today (that is, beginning-of-the-period cash flows).
6. In an ordinary annuity, the first cash flow occurs one period from today (that is, end-of-period cash flows). In a deferred annuity, the first cash flow occurs beyond one period from today.
7. This is a perpetuity. We calculate the present value by dividing the periodic cash flow by the discount rate.
8. The geometric average is most appropriate because it considers compounding. The arithmetic average does not.
9. A deferred annuity can be solved by first solving for the present value of an ordinary annuity, and then discounting this the present. The discounting in the second step may be a lump-sum or an annuity, depending on the nature of the problem.
10. The annuity due will have the higher present value, relative to the ordinary annuity, because each cash flow is received sooner than that of the ordinary cash flow.
11. In general, the investment with compound interest produces a greater value than the investment with the same interest rate but with simple interest. The only exception is in the case of annual compounding and

you are comparing the value of a one-year investment; in this case, the value would be the same.

12.

a. As long as interest is compounded no more than a single time, at the end of the year, the EAR is equivalent to the APR.

b. EAR and APR diverge as the frequency of compounding increases. The more frequent the compounding, the more EAR exceeds the APR.

13. For compound interest, $i = 0.04 \div 4 = 0.01$ or 1%; $N = 10 \times 4 = 40$

a. Balance in the account = FV = $\$1,000\ (1 + {}^{0.04}/_{4})^{40} = \$1,000\ (1 + 0.01)^{40} = \$1,488.86$.

b. Interest on interest = $FV_{compound} - FV_{simple}$
$= \$1,488.86 - [\$1,000 + (10 \times 0.04 \times \$1,000)]$
$= \$1,488.86 - 1,400 = \$88.86$.

14. $PV = \$10,000 \div (1 + 0.06)^5 = \$10,000 \div 1.3382 = \$10,000 \times 0.747258 = \$7,472.58$

15. PV = \$10,000; $i = 3\% \div 12 = 0.0025$ or 0.25%

a. N = 24; PMT = \$429.81 per month

b. N = 36; PMT = \$290.81 per month