Chapters 6 and 7 Review

Student Text Pages
468 to 469

Suggested Timing
60–75 min

Tools
- grid paper
- graphing calculator with TVM Solver application

Related Resources
- G–1 Grid Paper

Using the Chapters 6 and 7 Review

Each question reviews different skills and concepts. Students might work independently to complete the Chapters 6 and 7 Review, then in pairs to compare solutions. Alternatively, the Chapters 6 and 7 Review could be assigned for reinforcing skills and concepts in preparation for a specific chapter Practice Test.

This is an opportunity for students to assess themselves by completing selected questions and checking their answers against the answers in the back of the student textbook. They can then revisit any questions with which they had difficulty.

Task

Student Text Page
470

Suggested Timing
75 min

Tools
- graphing calculator with TVM Solver application

Related Resources
- BLM 7–11 Task: Loans and Annuities Due Rubric

Ongoing Assessment

Use **BLM 7–11 Task: Loans and Annuities Due Rubric** to assess student achievement.

Loans and Annuities Due

Teaching Suggestions

- Students should review Sections 7.4 and 7.5 on annuities.
- Some students may wish to use the TVM Solver on a graphing calculator.
- A spreadsheet may also be useful.
- Time line diagrams may help to organize information and plan solutions.

Hints for Evaluating a Response

Student responses are being assessed for the level of mathematical understanding they represent. As you assess each response, consider the following questions:

- Does the student demonstrate understanding of how to calculate the present value of a simple, ordinary annuity?
- Can the student make adjustments to his or her calculations based on the various loan repayment scenarios?
- Is there evidence of logical reasoning in the calculations?
- Does the student identify factors that account for different present values for each scenario in question 1?
- Does the student demonstrate understanding of which scenario represents an ordinary annuity due?
- Is the student able to develop a formula for an ordinary annuity due?
- Is the student able to apply his or her formula to solve problems?

Level 3 Sample Response

a) i) number of payments, $n = 2 \times 12$
$= 24$

rate per compounding period, $i = 0.06 \div 12$
$= 0.005$

regular withdrawal, $R = 50$

$$PV = R\left[\frac{1 - (1 + i)^{-n}}{i}\right]$$
$$= 50\left[\frac{1 - (1.005)^{-24}}{0.005}\right]$$
$$\doteq 1128.14$$

The value of Ali's loan is \$1128.14.

ii) This loan is the same as Ali's but with an extra payment at the beginning.

$PV = 1128.14 + 50$
$= 1178.14$

The value of Ken's loan is \$1178.14.

iii) This loan is the same as Ken's with one fewer payment at the end, so $n = 23$.

$$PV = R\left[\frac{1 - (1 + i)^{-n}}{i}\right] + 50$$
$$= 50\left[\frac{1 - (1.005)^{-23}}{0.005}\right] + 50$$
$$\doteq 1183.78$$

The value of Maria's loan is \$1183.78.

iv) Ken's loan was for a greater amount than Ali's because he made an additional payment. This payment did not have interest added. Maria's loan was paid off earlier so it included less interest and greater principal. The loan was for a greater amount.

b) i) Maria's loan would be an annuity due, since she makes payments at the beginning of each month.

ii) $$PV = R + R\left[\frac{1 - (1 + i)^{-(n-1)}}{i}\right]$$
$$= R + R\left[\frac{1 - (1 + i)^{1-n}}{i}\right]$$

iii) $$PV = R + R\left[\frac{1 - (1 + i)^{1-n}}{i}\right]$$
$$= 200 + 200\left[\frac{1 - (1.0175)^{1-8}}{0.0175}\right]$$
$$\doteq 1506.93$$

The present value of this loan is \$1506.93.

iv) $$15\,000 = R + R\left[\frac{1 - (1.0025)^{1-36}}{0.0025}\right]$$
$$15\,000 = R(1 + 33.472\,431\,26)$$
$$R \doteq 435.13$$

The monthly payment would be \$435.13.

Level 3 Notes

Look for the following:

- Calculations of present value for the given scenarios are generally correct, with one or two minor errors
- Logical problem solving strategies are evident, including time line diagrams that are generally correct, but may contain one or two minor errors

- Solutions are mostly complete and justified
- Correct form and mathematical conventions are applied in most cases
- Factors that account for different present values are explained reasonably well
- A correct formula for amount of an ordinary annuity due is developed
- Ordinary annuity due problems are solved with one or two minor errors present

What Distinguishes Level 2

- Calculations of present value for the given scenarios may contain a significant error or several minor errors
- Logical problem solving strategies are applied, but not consistently
- Solutions are somewhat complete and/or not consistently justified
- Use of correct form and mathematical conventions is evident, but not in all cases
- Factors that account for different present values are explained, but with some errors or inconsistencies
- A formula for amount of an ordinary annuity due is developed, but contains a minor error
- Ordinary annuity due problems are solved with a major error present

What Distinguishes Level 4

- Calculations of present value for the given scenarios are completely correct
- Logical problem solving strategies are evident and clearly explained, including time line diagrams that are completely correct
- Solutions are complete and thoroughly justified
- Correct form and mathematical conventions are applied in all cases
- Factors that account for different present values are clearly explained
- A correct, simplified formula for amount of an ordinary annuity due is developed
- Ordinary annuity due problems are solved with no errors present

Course Review

Student Text Pages
471 to 477

Suggested Timing
75–150 min

Tools
- grid paper
- graphing calculator with TVM Solver application

Related Resources
- G–1 Grid Paper

Using the Course Review

Each question reviews different skills and concepts. Students might work independently to complete the Course Review, then in pairs to compare solutions. Alternatively, the Course Review could be assigned for reinforcing skills and concepts in preparation for a final examination.

This is an opportunity for students to assess themselves by completing selected questions and checking their answers against the answers in the back of the student textbook. They can then revisit any questions with which they had difficulty.