

2.9 Technology: TI-83 Plus Calculator: Analyzing Financial Situations Using the TVM Solver

Specific Expectations

The following expectations are common to the Functions and Relations course and the Functions course.

- FA2.03 solve problems involving the amount and the present value of an ordinary annuity
- OC3.05 use graphing technology effectively (e.g., use appropriate menus and algorithms; set the graph window to display the appropriate section of a curve).

Evidence of Learning

Students should be able to

- manipulate the Finance applications of the TI-83 Plus
- calculate any of the seven variables in the **TVM Solver**

Text Page 168

Time Required Functions and Relations or Functions: 75 min

Materials and Equipment

- TI-83 Plus calculator

Overview

- Learn the meaning of the variables in the **TVM Solver**.
- Calculate the future value of one deposit with the **TVM Solver**.
- Calculate the present value of one deposit with the **TVM Solver**.
- Calculate the future value of an ordinary simple annuity with the **TVM Solver**.
- Calculate the present value of an ordinary simple annuity with the **TVM Solver**.

Using the TVM Solver

For practice, students could return to sections 2.7 and 2.8 and check their answers using the **TVM Solver**.

Management Options

Pairs – Pair a student who is familiar with the technology with a student who is less familiar. Pairs can do parts 1 through 4. During the semester, students should work with a variety of partners.

Teacher Demonstration – Before students begin Practice 2.9, pick a question from the practice and discuss these questions that students should ask themselves before solving each problem: Are there one or more payments (or deposits)? What is the unknown quantity? What is N, I%, PV, PMT, FV, P/Y, C/Y, or PMT?

Students should answer the last question in this way, “N is the total number of payments and equals 8, because ...” to reinforce the meaning of the variables.

Independent Work – Students are particularly attentive to their classmates when they act as teachers. Four pairs of students could present the four parts to the class using the TI-83 Plus and view screen. Each pair must consult with the teacher before their presentation to ensure comprehensive coverage of the topic, which will provide an opportunity for the teacher to assist students who have difficulty with the technology. Provide support during the presentation. Individuals might opt to present the solutions to Practice 2.8 using the view screen. Other individuals might choose to help their classmates during a practice session; this is especially helpful if some students have had little experience with the graphing calculator.

TEACHER INTERVENTION

Example 1, Part 2

PMT = 0, because there is only one deposit, but no payments. **FV** can have any number, because the program will overwrite it. On the **FV** line, students could press **CLEAR** then **ALPHA** **ENTER**.

TEACHER INTERVENTION

Watch that both partners share the effort. Be supportive of technologically timid students.

Additional Example: Functions

Refer to section 2.5, Part 1, text p. 126. Mr. Watts wishes to help pay for his 12-year-old granddaughter's future university expenses. Mr. Watts decides to deposit \$3000 at the end of each year, for seven years, in a savings account that pays interest at 7.5%/a, compounded annually.

- (a) What will be the total value of this investment at the end of seven years?
- (b) Suppose, instead, that Mr. Watts invested the money at the beginning of each year (an annuity due). What will be the total value of this investment at the end of seven years?
- (c) Check that your answers to (a) and (b) agree with the ones you calculated for steps 6 and 10 in section 2.5, Part 1, text page 126.

Remember this problem when you answer question 2 in the *Consolidate Your Understanding* in section 2.12 on text page 190.

N = 7, because there are 7 deposits

I% = 7.5, because the interest rate is 7.5%/a, compounded annually

PV = 0

PMT = -3000, because \$3000 is "paid" annually

P/Y = 1, because there is one annual deposit

C/Y = 1, because there is one interest conversion period per year

In the first screen, **END** is selected, because the deposit is made at the end of the year (an ordinary annuity); in the second screen,

BEGIN is selected, because the deposit is made at the beginning of the year.

```
N=7
I%=7.5
PV=0
PMT=-3000
FV=26361.965
P/Y=1
C/Y=1
PMT:END BEGIN
```

```
N=7
I%=7.5
PV=0
PMT=-3000
FV=28339.1130
P/Y=1
C/Y=1
PMT:END BEGIN
```

- (a) The total future value of Mr. Watts's investment is \$26 361.97, when he makes the deposits at the end of the year.
- (b) The total future value of his investment is \$28 339.11, when he makes the deposits at the beginning of the year.
- (c) The answers do agree.

Questions with a Functions and Relations Focus: a–f

Questions with a Functions Focus: a–f