

Finding Values of Annuities Using the Table Function

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CALCULATORS: Casio: *fx-9750G Plus* • Casio: *CFX-9850G Series*

Teaching Notes/Lesson Plan

Objective

The students will be able to compare retirement plans for two job positions using the Annuity Theorem.

Engage

Discuss with students what exactly is an annuity and why it is an important investment. Be sure to include what is meant by APR (Annual Percentage Rate) and how it can change. Show how this is different from a simple interest account.

Explore

1. Using the calculator, model how to put a formula into the Table Function.
2. Demonstrate how to set the range and increments.

Explain

Students will enter the formula for calculating the value of an annuity into the Table Function and determine the value of the annuity at different points of time. They will then compare the two plans to determine which job offers the best retirement plan.

Elaborate

Students will discuss the final results of each plan and write about which plan they would want to have and why giving the reasons for their decision.

Evaluate

The student will be able to put a formula into the Table Function of a graphing calculator and find values for the formula at different increments.

Extension

1. Students can research local banks to find out their rates and payment plans for individual annuity plans.
2. Students can set a goal for themselves as to how much money they feel they would like to retire with and how much they would need to save for working periods of 30, 35, 40, and 45 years.

Finding Values of Annuities Using the Table Function

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Student Worksheet: Comparing Retirement Plans

Objectives

Given two different retirement plans, the student will be able to calculate the final value for each plan and determine which plan seems to be the best.

Introduction

An annuity is a form of investment where a specified amount of money is deposited at regular intervals which can be annually, quarterly, monthly, or daily. These accounts earn interest similar to a savings account, however early withdrawal from these accounts can result in a substantial penalty. You will be given two plans in which you will determine the starting value, interval values, and final values. Thus you will use x to stand for the number of deposit periods. You will then decide which plan would be the best option for a retirement plans.

Materials

- a. Annuity Plans b. Formula for Amount of an Annuity: $A = P \frac{(1 + i)^n - 1}{i}$ c. Graphing Calculator

Annuity Plans:

Plan A offers a 30 year annuity with payments of \$50 per month at a rate of 1% monthly.

- After 30 years, how much would you have deposited into this account? _____
- What is the amount of each deposit? _____
What is the interest to be used in the formula? _____
What will be used to represent the number of deposit periods? _____
Write the formula to be entered into the Table Function. _____
- What would be the value of the annuity after 10 years? _____ After 15 years? _____
- What would be the final value of the annuity? _____

Plan B offers a 25 year annuity with payments of \$80 per month at a rate of 12% per year.

- After 25 years, how much would you have deposited into this account? _____
- What is the amount of each deposit? _____
What is the interest to be used in the formula? _____
What will be used to represent the number of deposit periods? _____
Write the formula to be entered into the Table Function. _____
- What would be the value of the annuity after 10 years? _____ After 15 years? _____
- What would be the final value of the annuity? _____

Problems

- Which plan will have the larger final value? _____
- Which plan required the largest total deposit? _____
- Which plan would you want? Why? _____

- If Plan B were extended for another 5 years, would this change your choice? Why? _____

Calculator Notes: Finding Values of Annuities Using the Table Function

1. Turn on the calculator, go to the TABLE Menu and press **EXE**. The screen should look like the one on the right.

2. Using the formulas you wrote for Question 2 of both plans, enter Plan A's formula into **Y1:** and Plan B's formula into **Y2:**. The screen should look like the one on the right.

3. To set the range for the functions, press **F5**. The screen should look similar to the one on the right.

4. Enter 0 for Start and press **EXE**, enter 30 for End and press **EXE**, and enter 5 for pitch and press **EXE**. The screen will look like the one on the right.

5. To see the values for the tables press **EXE** and then **F6**. The screen will look like the one on the right. Use the **Up** and **Down Arrow** keys to scroll through the values.

```
Table Func :Y=
Y1:
Y2:
Y3:
Y4:
Y5:
Y6:
SEL DEL TYPE RANGE TABL
```

```
Table Func :Y=
Y1:(50((1+.01)^(12X))
Y2:(80((1+.01)^(12X))
Y3:
Y4:
Y5:
Y6:
SEL DEL TYPE RANGE TABL
```

```
Table Range
X
Start:1
End :15
Pitch:1
```

```
Table Range
X
Start:0
End :30
Pitch:5
```

N	Y1	Y2
0	0	0
5	4083.4	6533.5
10	11501	18403
15	24979	39966

FORM DEL ROW B:CON G:PLT