Very Interesting...

ID: 12239

Time Required
15–20 minutes

Activity Overview

In this activity, students will explore interest related to consumer loans, credit, and savings accounts.

Topic: Nominal and Effective Interest

- *Nominal Rate*
- *Effective (Annual) Rate*
- *Compounding*

Teacher Preparation and Notes

- *This activity was designed for use with TI-Nspire technology, both CAS and non-CAS versions.*
- *Problem 1 involves developing an understanding of compounding, nominal interest rates and effective interest rates using the formula,* $B = P(1+\frac{r}{n})^{nt}$.
- *Problem 2 introduces the use of calculator commands to find nominal and effective interest rates.*
- *Problem 3 introduces finance solver. The student enters relevant account information to determine the monthly payment for an auto loan.*
- ***To download the student and solution TI-Nspire documents (.tns files) and student worksheet, go to education.ti.com/exchange and enter "12239" in the quick search box.***

Associated Materials

- *VeryInteresting_Student.doc*
- *VeryInteresting.tns*
- *VeryInteresting_soln.tns*

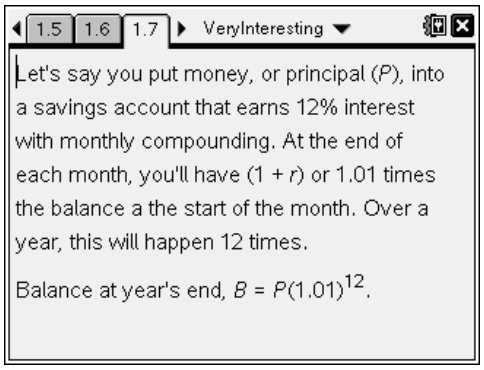
Suggested Related Activities

To download any activity listed, go to education.ti.com/exchange and enter the number in the quick search box.

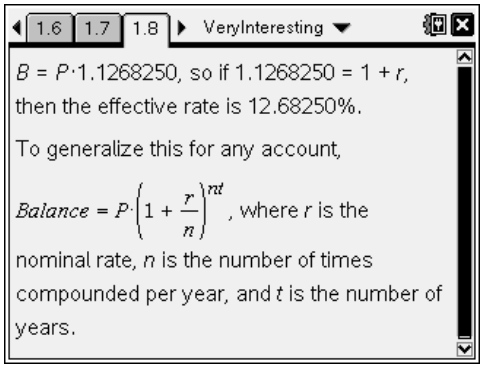
- *Financial Futures (TI-Nspire technology) — 10133*
- *Deposit and Forget It (TI-Nspire technology) — 9635*

Problem 1 – Introducing Compounding

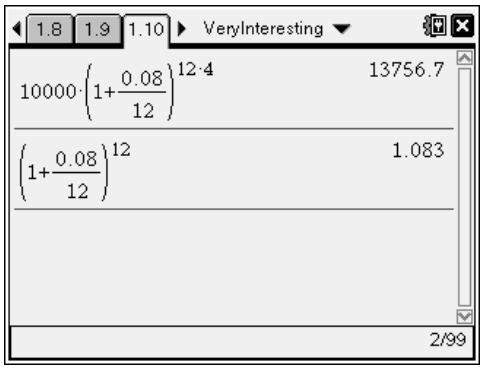
In this problem, students first explore the issue of compounding and the difference between nominal and effective percentage rates.



Ask students about the meaning of the word nominal. Students who have had Latin or have extensive vocabularies may recognize that this term comes from the Latin word for name. The term nominal means "in name only" in this context since a nominal interest rate isn't really "honest" when compounding any number of times other than once per year.



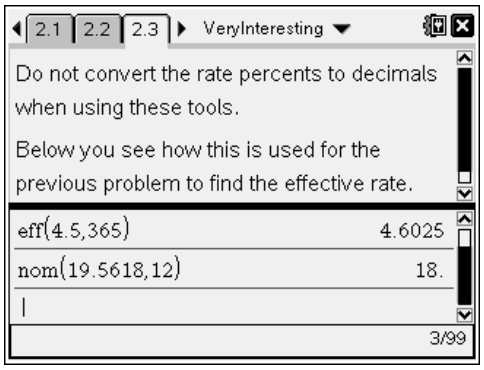
If time allows, take time to discuss the student loan issue with students. Most of them will soon be taking out loans for college and lack the background knowledge of how interest rates and compounding work. There is also a significant issue regarding understanding the loan type. Secured loans do not accrue interest while the student is enrolled in college full time, while unsecured loans accrue interest during college and are usually at a higher rate. If extra time allows, ask students to determine the difference between costs of college education to the student for similar loans of the two types. Students could research these loan types and current rates to make some cost projections.



Problem 2 – Nominal and Effective Rates

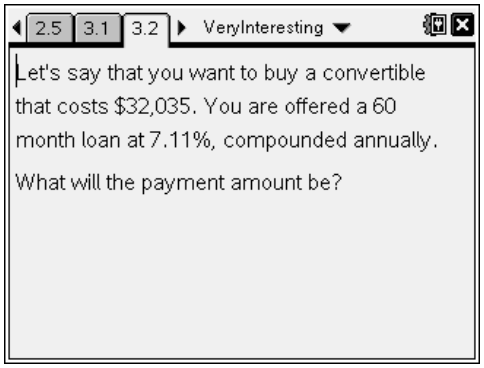
Students learn to use tools available with TI-Nspire technology to convert nominal interest rates to effective (annual) rates and vice versa. A few basic questions are asked to provide the student practice in applying these tools to financial problems.

Consider having each student find an interest rate for a loan or savings account. If the rate is nominal, have the student convert it to effective and vice versa.

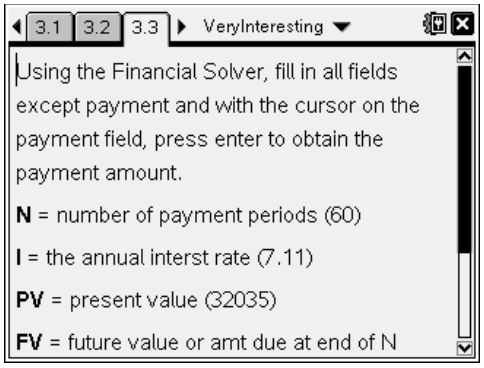


Problem 3 – Finance Solver

Students explore the use of the finance solver for determining the monthly payment for purchasing a convertible.



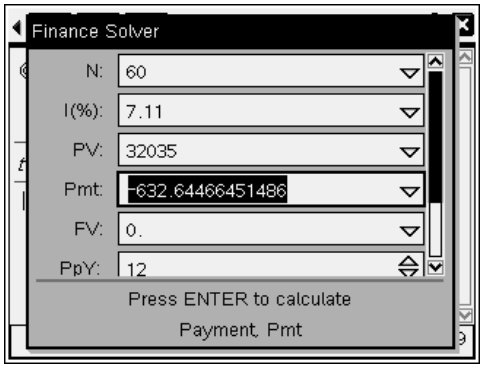
As students follow the steps in using the finance solver, instruct them to leave the payment (**PMT**) space empty. If a number is in that field, it must be deleted. To help students through this, the key details regarding the values to be placed in the solver are provided on page 3.3. Once all necessary values are entered, students should tab to the payment (**PMT**) field and press (enter). The **PMT** field will populate with the monthly payment amount.



Ask students why it might make sense for the amount that appears to appear as a negative quantity.

When would a positive quantity appear in this window?

Sometimes salespeople ask consumers what they want their monthly payments to be rather than what the consumer is willing to pay for an item. Ask students how purchasing items in this way often puts the consumer at a disadvantage. What does the consumer need to understand in such situations?



Student Solutions

1. **a.** Interest is added periodically (daily, monthly, quarterly, annually, etc.) into the original account; future interest calculations include this added amount. This is a benefit to those saving money in bank accounts as the percentage of interest earned is actually slightly higher than the annual nominal percentage rate. This is detrimental to those with credit card and loan debt.

   b. Interest rate stated without the effect of compounding being taken into account.

   c. Interest rate with compounding taken into account. The effective rate is higher than the nominal rate in cases other than annual compounding of interest.

2. $13,756.66
3. 8.30%
4. 4.6025%
5. 18%
6. $632.64