Future Value with Compound Interest – Annotated Examples

Liberal Arts Mathematics

Introduction

There is a lot going on in the compound interest formula. It looks complicated and has several steps. Once you learn to focus on working one step at a time, it becomes more manageable. Here are two examples shown step-by-step with the corresponding calculator steps.

Examples

The following example is Example 6.41 from *Contemporary Mathematics* by Donna Kirk.

The main tip I suggest to students is to keep your work in your calculator. It is easy to get round-off errors in these problems. I am showing how I type the calculations in the Microsoft Windows calculator. Almost all scientific calculators are similar.

Example

In the following, compute the future value of the investment with the given conditions.

1. Principal is $5,000, annual interest rate is 3.8%, compounded monthly, for 5 years.
2. Principal is $18,500, annual interest rate is 6.25%, compounded quarterly, for 17 years.

Example from *Contemporary Mathematics* by Donna Kirk. Access for free at https://openstax.org/books/contemporary-mathematics/pages/1-introduction
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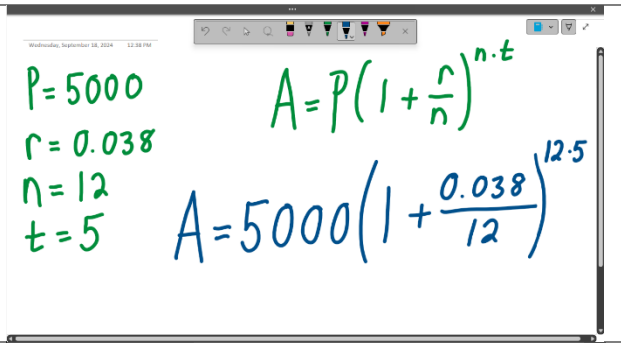
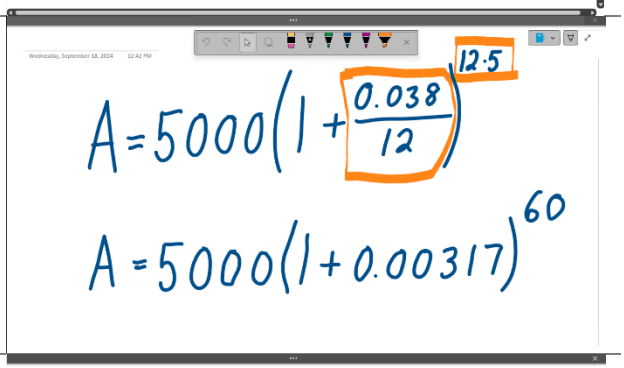
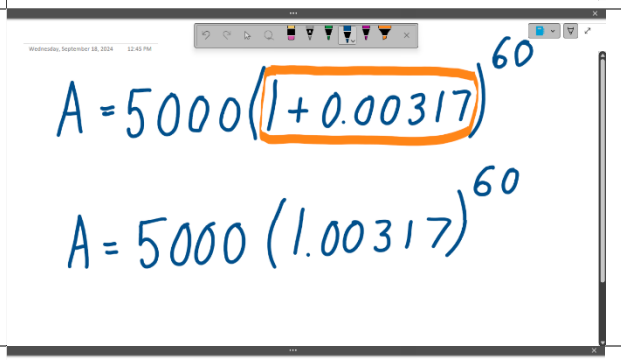
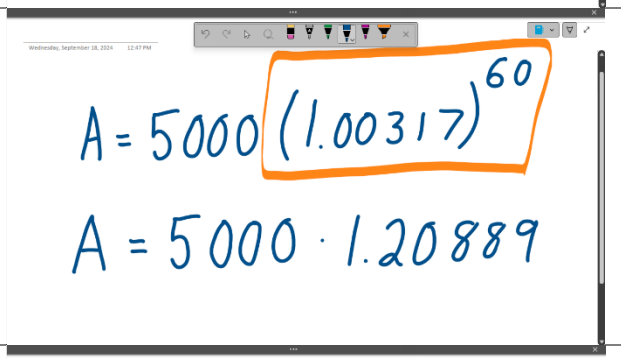
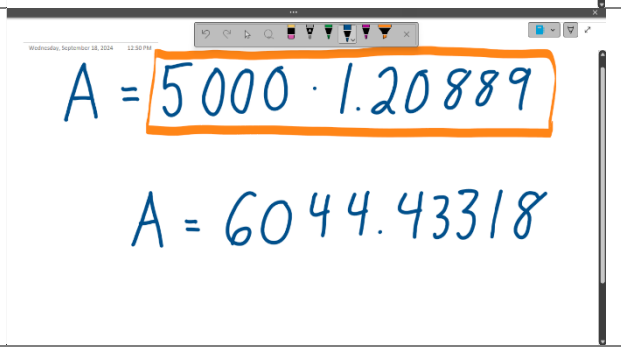
Solution 1

Step	Calculator	Work
Start with the formula $A = P\left(1 + \frac{r}{n}\right)^{n \cdot t}$ **Substitute the known values**		
The first operations are division inside the parentheses and multiplication in the exponent.		
The second operation is addition inside the parentheses		
The third operation is the exponent. **This is where round-off errors start to matter.**		
The fourth and final operation is multiplication. **The future value is $6,044.43**		

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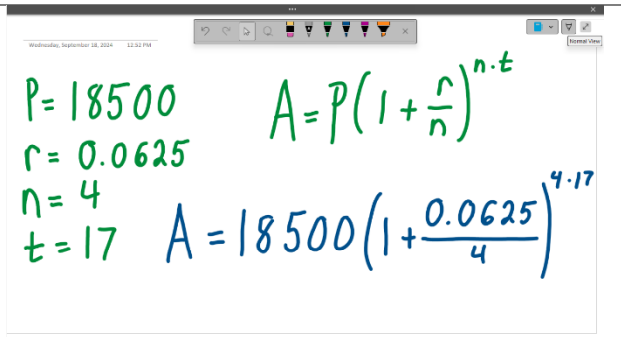
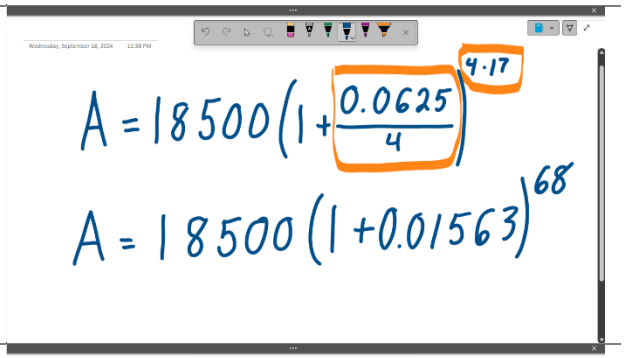
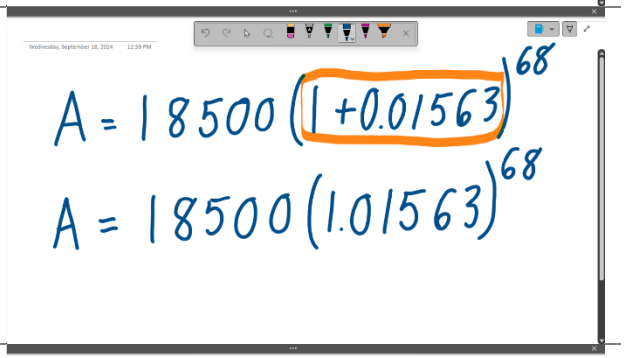
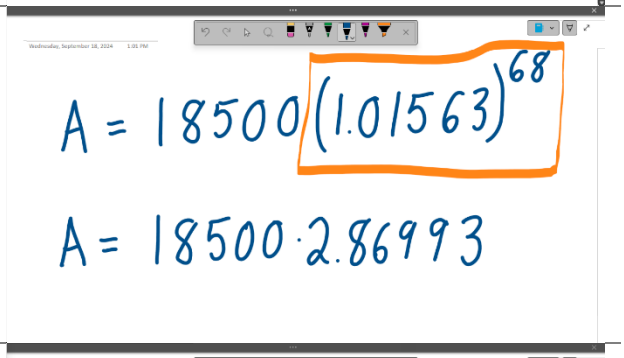
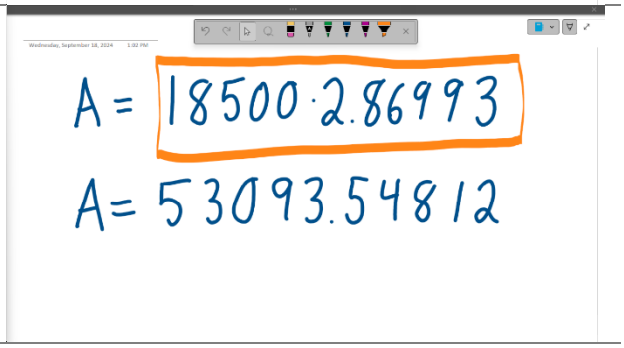
Solution 2

Step	Calculator	Work
Start with the formula $A = P\left(1 + \frac{r}{n}\right)^{n \cdot t}$ **Substitute the known values**		
The first operations are division inside the parentheses and multiplication in the exponent.		
The second operation is addition inside the parentheses		
The third operation is the exponent. **This is where round-off errors start to matter.**		
The fourth and final operation is multiplication. **The future value is $53,093.55**		

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