

Notes on first essay

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Most of you realized that there were many mistakes in the original draft and attempted to correct them. But both conceptually and stylistically there were many problems. I will describe some of those that occurred in many papers below.

1 Conceptual problems

In discussing compound interest several crucial points were often omitted.

The interest rate r or i is the percentage assessed *for* a particular period.

The variables n and t represent the number of periods or years; they do not represent the length of a period.

In considering the development of continuous interest, there was often confusion between n and t . As I defined them, n is the number of times an interest rate of r is compounded each year and t is the number of years the money is invested.

This is somewhat confusing because in the continuous compound interest formula, n denotes the number of periods the money is invested. (Thus, the meaning of n differs in the two contexts.) This emphasizes the importance of clearly defining the variables in each context that you consider.

Interest is computed continuously if the amount after t years is given by the formula $A = Pe^{it}$. This formula is obtained from the formula for compound interest by allowing the number of periods per year to become infinite; that is the periods become infinitely small.

There were several confusions arising from inadequate understanding of the function concept. I will expand on these in class. But here are two places to check in your essay.

1. The formula $A = P(1 + i)^n$ explains how to compute the function $A(n)$. Here $A(n)$ denotes the amount after n periods when P dollars are invested at an interest rate of r per period.
2. e^x is function. e is a number.

In particular, there are two ways to justify the implication from the equation

$$2 = e^{it}$$

to the equation

$$\ln 2 = it.$$

In either case the first step is to apply the function \ln to each side of the equation. The left hand side becomes $\ln(2)$. But there are two good explanations of why the right hand side becomes it .

1. The functions $\ln(x)$ and e^x are inverse to each other. That is, $\ln(e^x) = x$. In particular, $\ln(e^{it}) = it$.
2. The rules for manipulating logarithms imply that $\ln(e^{it}) = it \ln(e)$. But $\ln(e) = 1$ so $\ln(e^{it}) = it$.

Either of these explanations is correct; the first is rather more fundamental. But some students mixed the two and this is not correct.

While compound interest in terms of bank accounts or mortgages are two simple examples of the power of earning money through investment by leaving the earnings with the company invested in, they are not the only ones. The stock market also depends on a kind of compounding. But, one whose return is not so clearly defined and predictable.

2 Citations

I don't think anything in my class notes or lecture is more than common knowledge. Some notions may be new to you but they occur in many textbooks and don't need to be cited.

Be careful of internet sources. The Benjamin Franklin story is basically correct and I found part of Franklin's will - a clearly sound source- in my first try on Google. The Einstein story is most likely hokum and snopes tells us that. Anything you find on the internet that sounds to good to be true should be tested on snopes.

Cite internet sources by the title, author and date if possible. Always give the URL.

3 Some notes on the comments

Here is some further explanation for the abbreviations in the corrections.

Use fewer words.

INC Write complete sentences. There were several causes of incomplete sentences. Often they arose as run-on sentences. They also arose because there was no major verb in the sentence. Rather, two relative clauses were awkwardly spliced together.

RED Redundant: Repeating the same idea twice is row doesn't explain it. Make sure your 'explanation' really adds information.

4 Dicta on Style

PROOFREAD

(I printed the first draft of this note and found about 20 mistakes. These included trivial typos and leaving out periods. But also it also included more subtle points. In the last sentence of Section ?? I replaced, "But, one that is not so clearly defined and predictable." by "But, one whose return is not so clearly defined and predictable." This makes much clearer what is not predictable.)

Choose an imaginative title; this is a newspaper article.

Compound interest is *not* $A = P(1 + i)^n$. Compound interest is computed with the formula $A = P(1 + i)^n$.

Treat equations as parts of sentences rather than separate sentences. There is a possible exception if you write a series of equations that are deduced from each other. But, even then, it is best if you have a series of sentences.

Since A is twice P ,

$$2P = Pe^{it}.$$

Hence, dividing both sides of the equation by P ,

$$2 = e^{it}.$$

Look up the word accrue. With an explanation of its meaning (since obviously it is unfamiliar), it may be useful in your essay.

If a sentence begins with 'if', then usually there is a 'then' later in the sentence. The sentence will have two clauses. If you want to state the hypothesis in one sentence and the conclusion in a second, replace 'if' by 'suppose'. (Note that I didn't need to actually write 'then' in the second sentence; I did have two clauses.)

'Then' and 'than' are very different words. This is an easy typo to make and a spell-checker won't catch it.

Be very careful that pronouns have antecedents.

Employ words, especially verbs, that have meaning. Avoid colorless verbs such as 'is' and 'used'.

Discover the difference between 'principle' and 'principal'.

Check that subject and verb agree in number.