Coping with Inflation

In Chapter 3, in the section entitled "Coping with Inflation", I promise to explain the discrepancy between an expected increased rate of return needed to cope with inflation affecting a simple annual interest account, and the true value. The situation is as follows. You have a simple annual interest account earning 5%. You are pursuing an 18-year savings program (for college tuition). The magic number for that kind of lump sum account is \(1.05^{18}\). Thus, if you deposit \(D\) dollars, after 18 years it is worth a target value of \(V = D \times 1.05^{18}\). But the target is increasing because of inflation at an annual rate of 3%, so \(newV = V \times 1.03^{18}\). At the same time, it is your intention to not increase the amount \(D\) of base dollars that you deposit at the inception of the program. The naïve assumption is that an 8% return rate (5+3) would be necessary to achieve the new target amount. In the book, I asserted that the actual rate required is 8.15%. Why is this so?

Indeed, if we combine the above equations, we get

\[
newV = 1.03^{18}V = 1.03^{18}1.05^{18}D = (1.03 \times 1.05)^{18}D.
\]

This says exactly that the new magic number is \((1.03 \times 1.05)^{18}\), meaning that the rate of return you must achieve is \(1.03 \times 1.05 = 1.0815\). End of story.