

The Magic of Compound Interest

Periodic Payments; Annuities

I. Once upon a time there were three friends named Austin, Bubba, and Chris. They were all 21 years old and had just completed an exciting semester in Math 120, learning how mathematics applies to the real world. Austin made a proposal: “Hey guys, I know we’re all going to get jobs, but let’s not slave our entire lives away. That financial planner that spoke to our class said he could find us an annuity plan, paying 12% interest, compounded monthly. Let’s start right now, putting \$200 a month in an annuity. We’ll keep it up for 30 years, and then we’ll meet. We’ll be 51, still young enough to travel and have fun. We’ll take our money and do something fabulous with it!” Bubba and Chris agreed, and Austin drove straight to the financial planner to set up his annuity.

Meanwhile, Bubba and Chris got together. Bubba said, “I’m too young to start worrying about what happens when I’m 51.” Chris agreed, “I know what you mean. Here’s an idea. Why don’t we enjoy our money for a few years? Austin’s going to put away \$200 a month for 30 years. Let’s wait 10 years, until we’re 31 and have bigger incomes. We’ll meet then and set up our annuities. Let’s see, if we put in \$300 a month for 20 years, we’ll put in exactly the same amount as Austin, but we can have more fun now in our 20s.”

Ten years passed. Austin kept socking it away. Bubba and Chris kept in touch. Bubba set up his 20-year plan and looked forward to catching up with Austin. Chris wrote: “Look, man, my kid’s sick, my wife’s pregnant again, and I can’t hardly keep up with my credit card payments. This just isn’t a good time for me. Give me five more years, and then I’ll be ready to start.” Bubba wrote back: “OK, buddy, but since you’ll only have 15 years, I guess you’ll need to put in \$400 a month to catch up with Austin and me.” Chris agreed, and they didn’t tell Austin. In five years, Chris kept his word and started a 15-year annuity.

The day arrived for the three buddies to meet, now all 51 years old. Finish the story...

(Be sure to include: how much each had invested; how much each had in his account. Produce a graph using time as the independent variable, showing each man’s balance as the dependent variable.)

The saga continues...

II. Austin was angry. “You tried to cheat on our agreement , but you cheated yourselves. I’m going to give you another chance. I’m enjoying my job and I’m not ready to retire. And none of us is a millionaire, yet. Let’s meet again in 10 more years. Keep making your payments, and let’s see what happens. I’ll keep putting in \$200 a month, and you guys keep up your \$300 and \$400 payments. Surely by the time we’re all 61, you’ll catch up with me!”

Finish the story, again...

(Again be sure to calculate how much each had invested, and how much each had in his annuity. Extend your graph to include this additional ten-year period. Did they all become millionaires? Did they all have fun with their money?)

In an appendix, answer this question: What did you learn from this activity?