

Worksheet 11 - Present and Future Values

1. For each of the following, give an expression that represents the indicated quantity. You do not need to integrate any integrals you get, but you do not otherwise need to simplify or evaluate the expression. You may assume that all the given interest rates are compounded continuously.
 - a) The present value of a deposit of $\$C$, made 5 years from now, if the account earns an interest rate of 3%.
 - b) The present value of an income stream paying C dollars per year for a period of 15 years, at a 2% interest rate.
 - c) The future value at the end of 15 years of an income stream paying $\$C$ per year throughout the years at a 2% interest rate.
 - d) The future value 2 years from now of a series of three $\$500$ deposits, where the first deposit is made now, the second a year from now, and the third two years from now. Assume a 2% interest rate.
 - e) The future value C years from now of a series of three $\$500$ deposits, where the first deposit is made now, the second a year from now, and the third two years from now. Assume a 2% interest rate (and that $C > 2$).
 - f) The future value C years from now of a series of $C + 1$ separate $\$500$ deposits, where the first deposit is made now, the second a year from now, and so on. Assume a 2% interest rate.
 - g) The present value of an income stream paying $\$1000 + 50t$ dollars/year over the next 10 years, if the interest rate is 5%.
 - h) The future value in 10 years of the above income stream. (HINT: while you *can* find this with an integral, you don't need to, thanks to your work in the previous part.)
2. A certain bank account has been offering 5% interest compounded continuously for each of the last 20 years.
 - a) What lump sum amount would need to have been deposited 18 years ago into that account so that the balance today would be $\$63,550$ (the amount of one year of Swarthmore tuition+room/board+fees)?
 - b) At what constant, continuous rate would someone have had to deposited money into that bank account starting 18 years ago so that the balance now would be $\$63,550$?