1. Find the present value of an $8000 payment to be made in 5 years.

4% compounded continuously

Recall that in this case,

\[ P = \frac{8000}{e^{0.04 \times 5}} = 6,549.84. \]

2. 4000 dollars is invested in a bank account at an interest rate of 8% per year, compounded continuously. Meanwhile, 20000 dollars is invested in a bank account at an interest rate of 3 percent compounded annually. When will the two accounts have the same balance?

We want to find \( t \) such that:

Account 1

\[ 4000e^{0.08t} = 4000 \]

Account 2

\[ 20000(1 + 0.03)^t = 20000(1.03)^t \]

Indeed,

\[ \frac{4000e^{0.08t}}{4000} = \frac{20000(1.03)^t}{4000} \]

\[ e^{0.08t} = 5(1.03)^t \]

\[ \ln(e^{0.08t}) = \ln(5(1.03)^t) \]

\[ 0.08t = \ln(5) + t \ln(1.03) \]

\[ t = \frac{\ln(5)}{0.08 - \ln(1.03)} \]