1. Suppose that money is deposited daily into a saving account at an annual rate of $1000. If the account pays 5% interest compounded continuously, estimate the balance in the account at the end of 3 years.

Answer: $3236.68

2. Suppose that money is deposited daily into a saving account at an annual rate of $2000. If the account pays 6% interest compounded continuously, approximately how much will be in the account at the end of 2 years?

Answer: $4249.90

3. Suppose that money is deposited steadily into a saving account at the rate of $16000 per year. Determine the balance at the end of 4 years if the account pays 8% interest compounded continuously.

Answer: $75426

4. Suppose that money is deposited steadily into a saving account at the rate of $14000 per year. Determine the balance at the end of 6 years if the account pays 4.5% interest compounded continuously.

Answer: $96433

5. An investment pays 10% interest compounded continuously. If money is invested steadily at the rate of $5000 per year, how much time is required until the value of investment reaches $140000?

Answer: $10 \ln 3.8 \approx 13.35$ years

6. A savings account pays 4.25% interest compounded continuously. At what rate per year must money be deposited steadily into account to accumulate a balance of $100000 after 10 years?

Answer: $\frac{42500}{e^{4.25\times10}} \approx $8025.07

7. Suppose that money is to be deposited daily for 5 years into a saving account at an annual rate of $1000 and the account pays 4% interest compounded continuously. Let the interval from 0 to 5 be divided into daily subintervals of duration $\Delta t = \frac{1}{365}$ years. Let $t_1, \ldots, t_n$ be points chosen from the subintervals.
(a) Show that the present value of a daily deposit at time $t_i$ is $1000\Delta t e^{-0.04t_i}$.

(b) Find the Riemann sum corresponding to the sum of the present values of all the deposits.

**Answer:** Riemann sum $= 1000[e^{-0.04t_1} + e^{-0.04t_2} + \cdots + e^{-0.04t_n}]\Delta t$

(c) What is the function and interval corresponding to the Riemann sum in part (b)?

**Answer:** $f(t) = 1000e^{-0.04t}$, $0 \leq t \leq 5$

(d) Give the definite integral that approximates the Riemann sum in part (b).

**Answer:** $\int_0^5 1000e^{-0.04t} dt$

(e) Evaluate the definite integral in part (d). This number is the present value of continuous income stream.

**Answer:** $\$4531.73$