

Task. Achieve \$225,500 at 8.45% compounded continuously for 8 years, 145 days.

Solution. Recall that amount A after time t compounded continuously with principal amount P and annual interest rate r is given by the following formula:

$$A = Pe^{rt}.$$

We have that the resulting amount $A = \$225,500$ and the rate $r = 0.0845$. Moreover, assume that each year has 365 days. Then 8 years and 145 days is equal to

$$t = 8 \frac{145}{365} \approx 8.39726 \text{ years.}$$

Our aim is to find the principal amount P . From the formula $A = Pe^{rt}$ we obtain

$$\begin{aligned} P &= A/e^{rt} = Ae^{-rt} = 225500 * e^{-0.0845*8.39726} = 225500 * e^{-0.70957} = \\ &= 225500 * 0.491856 = 110913.528 \approx \$110,913.53 \end{aligned}$$

Answer. The principal amount should be \$110,913.53