

Question #39253, Math, Algebra

Achieve \$225,500 at 8.65% compounded continuously for 8 years, 145 days

Solution

If an amount P_0 is invested in a savings account at interest rate k compounded continuously, then the amount $P(t)$ in the account after t years is given by the exponential function

$$P(t) = P_0 e^{kt}.$$

Because $k = 0.0865$, $t = 8 + 145/365 \approx 8.397260$, $P = \$225,500$, from the formula (1) we obtain the equation for the invested amount

$$225,500 = P_0 e^{0.0865 \cdot 8.397260} \text{ or } 225,500 = P_0 e^{0.726365}.$$

By dividing by $e^{0.726365}$ on both sides of the equation and rounding the answer to the nearest cent we find

$$P_0 = 225,500 e^{-0.726365} = 109066.21.$$

Since the \$109066.21 must be invested to achieve \$225,500.

Answer

\$109066.21