1.) You wish for $500 in a savings account to grow to $1200 in 8 years. If interest is compounded daily, what should the annual interest rate \( r \) be?

2.) A savings account grew from $1000 to $5200. If the annual interest rate was 3.5\% compounded yearly, how long was the money in this account?

3.) An account with interest compounded continuously earned 5 1/2\% annual interest for 3 years. If the final amount in the account was $12,850, what was the initial amount?

4.) An account with interest compounded continuously earned 12\% annual interest. If the account grew from $2000 to $20,000, how long was the money in the account?

5.) A child inherits $50,000, which is to be deposited in a retirement account. Account A offers an annual rate of 5 3/4\% compounded continuously, and Account B offers an annual rate of 5.8\% compounded once each year. Compare the amount which would be in each account after \( t = 5\) years, \( t = 50\) years, and \( t = 75\) years.
1.) \[ A = P(1 + \frac{r}{n})^{nt} \rightarrow 1200 = 500 \left(1 + \frac{r}{365}\right)^{365 \cdot 8} \rightarrow \]
\[ \frac{12}{5} = \left(1 + \frac{r}{365}\right)^{2920} \rightarrow \left(\frac{12}{5}\right)^{\frac{2920}{2920}} = \left(1 + \frac{r}{365}\right)^{2920} \rightarrow \]
\[ 1 + \frac{r}{365} = \left(\frac{12}{5}\right)^{\frac{2920}{2920}} \rightarrow r = 365 \left[ \left(\frac{12}{5}\right)^{\frac{2920}{2920}} - 1 \right] \]
\[ = 0.10945 \approx 10.945\% \]

2.) \[ A = P\left(1 + \frac{r}{n}\right)^{nt} \rightarrow 5200 = 1000 \left(1 + \frac{0.035}{1}\right)^{t} \rightarrow \]
\[ 5.2 = 1.035^t \rightarrow \ln 5.2 = \ln 1.035^t \rightarrow \]
\[ \ln 5.2 = t \ln 1.035 \rightarrow t = \frac{\ln 5.2}{\ln 1.035} \approx 47.9 \text{ yrs.} \]

3.) \[ A = Pe^{rt} \rightarrow 12,850 = Pe^{\left(0.055\right)\cdot 3} \rightarrow \]
\[ P = \frac{12,850}{e^{0.165}} \approx \$10,895.43 \]

4.) \[ A = Pe^{rt} \rightarrow 20,000 = 2000 e^{0.12t} \rightarrow 10 = e^{0.12t} \rightarrow \]
\[ \ln 10 = \ln e^{0.12t} \rightarrow \ln 10 = 0.12t \rightarrow t = \frac{\ln 10}{0.12} \approx 19.2 \text{ yrs.} \]

5.) Account A: \[ A = Pe^{rt} = 50,000 e^{0.0575t} \]
Account B: \[ A = P\left(1 + \frac{r}{n}\right)^{nt} = 50,000 \left(1 + \frac{0.058}{1}\right)^{t} \]

<table>
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<th></th>
<th>5 yr.</th>
<th>50 yr.</th>
<th>75 yr.</th>
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