1. (4pts) Jill deposited $500 in an account bearing a simple annual interest rate of 5.4%. If this deposit grows to $575, how long was it in the account?

\[ F = P(1 + rt) \]

\[ 575 = 500(1 + 0.054t) \]

\[ 1.15 = 1 + 0.054t \]

\[ 0.15 = 0.054t \]

\[ t = \frac{0.15}{0.054} \approx 2.78 \text{ yrs} \]

2. (6pts) What is a better deal on a certificate of deposit:
   a) an account earning 3.65%, compounded daily, or
   b) an account earning 3.71%, compounded monthly?

a) \[ \text{APY} = \left(1 + \frac{0.0365}{265}\right)^{265} - 1 = 0.0371724 \] 3.71724% APY

b) \[ \text{APY} = \left(1 + \frac{0.0371}{12}\right)^{12} - 1 = 0.03717374 \] 3.717374% APY

b) is better.

3. (5pts) A family that would like to buy an $18,500 car plans to save for it over 3 years by depositing money every week into an account bearing 6%, compounded weekly. What should be the amount of the deposit?

\[ F = D \frac{(1 + \frac{r}{n})^{nt} - 1}{\frac{r}{n}} \]

\[ 18,500 = D \frac{(1 + \frac{0.06}{52})^{156} - 1}{\frac{0.06}{52}} \]

\[ 18,500 = D \times 170.81 \]

\[ \frac{18,500}{170.81} = D \]

\[ D \approx \$108.30 \text{ weekly} \]
4. (7pts) Today, you buy the stock of Oracle corporation at $20 per share. You hope to sell it in 3 years at $35 per share. What annual compound interest rate would this growth correspond to?

\[ F = P \left(1 + \frac{r}{n}\right)^{nt} \]

\[ 35 = 20 \left(1 + \frac{r}{12}\right)^{3 \cdot 12} \]

\[ 1.75 = \left(1 + \frac{r}{12}\right)^{\frac{1}{12}} \]

\[ 1.75^{\frac{1}{3}} = 1 + \frac{r}{12} \]

\[ r = 1.75^{\frac{1}{3}} - 1 = 0.205071 \]

\[ r = 20.5071\% \]

5. (8pts) Jeremy decides to set up a college fund for his newborn. If he can deposit $200 every month into an account bearing 7.2%, compounded monthly, how long will it take until there is $50,000 in the account?

\[ F = D \frac{(1 + \frac{r}{n})^{nt} - 1}{\frac{r}{n}} \]

\[ 50,000 = 200 \cdot \frac{(1 + \frac{0.072}{12})^{12t} - 1}{\frac{0.072}{12}} \]

\[ 2.5 = \frac{1.006^{12t} - 1}{0.006} \cdot 0.006 \]

\[ 1.5 = 1.006^{12t} - 1 \]

\[ 2.5 = 1.006^{12t} \log \]

\[ \log 2.5 = \log 1.006^{12t} \]

\[ \log 2.5 = 12t \log 1.006 \]

\[ t \approx 12.76 \text{ years} \]