1: You want to start saving for a house. You decide that you will wait until you can save $30,000 for a down payment. You want to buy a house in 3 years. You put $d per month into an account yielding 3% compounded monthly. Find $d$.

\[ 30,000 = d \left( \frac{1 + \frac{.03}{12}}{\frac{.03}{12}} \right)^{36} - 1 \]

\[ d = \$797.44 \]

2: You invest in a mutual fund that promises an 8% return on your money. Inflation is 3%: what is the real growth rate of this investment? Explain where your formula comes from (start with $q_{\text{new}}$ and $q_{\text{old}}$ and show how they lead to the formula you need for this problem).

\[ q_{\text{new}} - q_{\text{old}} = \frac{p(1+r)}{m(1+a)} - \frac{p(1+a)}{m(1+a)} = \frac{3+pr-p-pa}{m(1+a)} \]

\[ = \frac{p(r-a)}{m(1+a)} = \sqrt{\frac{r-a}{1+a}} \]

Real growth = \[ \frac{.08 - .03}{1 + .03} = .048543689 \]

4.85%