1. (10 pts) Annual deposits are made into a fund at the beginning of each year for 8 years. The first deposit is $1000, and deposits increase by 5% per year thereafter. If the fund earns 6% effective, find the accumulated value at the end of 8 years.

\[ A.V. = 1000 \times \frac{(1 + 0.05)^8 - (1 + 0.06)^8}{0.05 - 0.06} \times (1 + 0.06) \approx 12337.62 \]

2. (10 pts) At the end of each month payments are made into an annuity for 10 years. At the end of the first month the payment is $10, at the end of the second it is $20. This same pattern ($10, $20, $10, $20, ...) of payment is then repeated again and again for the 10 years. Assuming an effective rate of 2% per month, calculate the present value of this annuity.

\[ P.V. = \begin{array}{cccccc}
& 1 & 2 & 3 & 4 & 11 & 12 \\
0 & 10 & 20 & 10 & 20 & \ldots & 10 & 20 \\
\end{array} \]

The annuity is equivalent to the following

\[ \begin{array}{ccc}
\text{P} & \text{P} & \text{P} \\
0 & 2 & 4 \\
\end{array} \]

where \( P = 20 + 10 \times (1 + 0.02) = 30.2 \)

Let \( j \) be the effective rate of interest for 2-month period.

Then \( 1 + j = (1 + 0.02)^2 \)

Hence \( j = 4.04\% \)

and \( P.V. = P \times A_{12|j} \approx 678.09 \)