Question 01: Compute and explain $2 + 4 + \ldots + 198 + 200 = \underline{10100}$

Solution: The sum is based on an arithmetic sequence where

\[ S_n = \frac{n}{2} (a_1 + a_n) \]

Where
- \( S_n \) = Sum of Series
- \( n \) = number of terms
- \( a_1 \) = first term in series
- \( a_n \) = last term in series

Now \( n \) can be calculated using

\[ a_n = a_1 + (n-1)d \]

Where \( d \) = difference between consecutive terms.

\[ 200 = 2 + (n-1)2 \]

\[ n = 100 \]

Therefore

\[ S_n = \frac{100}{2} (2+200) = 10100 \]

Question 02: Find the return \( A \) for the deposit \( P = $1000 \) invested for one year at 5\% compounded quarterly?

Solution:

\[ A = P(1 + i)^n \]

\[ = 1000 (1 + 0.05)^4 \]

\[ = 1050.945 \]

Question 03: Suppose you deposit $10 at the end of each month into a saving account that pays 3\% interest compounded monthly. Find the amount \( A \) that will be in the account after 10 years?
Solution

\[ A = \frac{a \left( \frac{(1+i)^n - 1}{i} \right)}{12} \]

\[ = \frac{10 \left[ (1 + 0.03 \cdot 12)^2 - 1 \right]}{(0.03 \cdot 12)} \]

\[ A = 12,664 \]

**Question 4:** If a new car costs $20,000 and loses value at the rate of 10% per year, what is its value after 5 years?

**Solution**

\[ A = P(1 - r)^n \]

\[ = 20,000(1 - 0.10)^5 \]

\[ = 11,809.8 \]

**Value after 5 yrs = 11,809.8**

**Question 5:** A small bucket of fresh roses will cost $8.95 on February 22, 2011 (a year from now). If the next year inflation rate is 5%, what is a fair value of the bucket on February 22, 2010 (today)?

**Solution:** Let \( A \) be present cost after a year.

\( P \) be present cost (today).

\( r \) be inflation rate.

\( n \) be time period.

Then

\[ A = P(1+r)^n \]

\[ 8.95 = P(1+0.05)^1 \]

\[ p = \frac{8.95}{1.05} = 8.52 \]

**Fair value \( V \) of bucket = $8.52**