

In comprehensive engineering economic studies, analyzing the time value of money under idealized, stable market conditions is rarely sufficient. Real-world macroeconomics introduces **inflation**, which is defined as the continuous increase in the price of goods and services over time, leading to a progressive decline in the purchasing power of a currency. When evaluating long-term capital investments, engineering assets, or equipment replacement cycles, an analyst must factor in both the cost of capital growth (interest rate) and the erosion of currency value (inflation rate) to determine the true monetary requirements of a future transaction.

When a future cost or valuation needs to be simultaneously adjusted for standard interest growth and inflation over multiple compounding periods, the compounding effects act cumulatively on the initial asset base.

An equipment costs ₱28,000 today. If the inflation rate is 11% per year and interest is 17% per year, what will be the appropriate future value of the machine, adjusted for inflation, in 9 years?

To isolate and model the problem variables systematically, we extract the following financial parameters from the text:

- **Present Capital Asset Base (P):** ₱28,000
- **Annual Inflation Rate (f):** 11% = 0.11 per year
- **Nominal Multi-Market Interest Rate (i):** 17% = 0.17 per year
- **Compounding Horizon Duration (n):** 9 years

We first, calculate the compound accumulation due to market interest, and second, compounding that intermediate target further to account for price inflation.

Step 1: Accumulate Future Worth Based on Interest Growth (F_1)

To find the future worth of the capital under standard single-payment compound interest conditions, we deploy the standard compound interest factor formula:

$$F_1 = P(1 + i)^n$$

Substitute the principal $P = ₱28,000$, annual interest rate $i = 0.17$, and time horizon $n = 9$ into the exponential model:

$$F_1 = ₱28,000(1 + 0.17)^9 = ₱115,035.2093$$

This intermediate figure represents what the asset value would grow to in 9 years solely under the influence of a 17% interest accumulation rate, ignoring market price inflation.

Step 2: Adjust the Accumulated Value for Market Inflation (F_{final})

To preserve the economic utility and adjust the value for a market experiencing an annual price inflation rate (f) of 11%, the intermediate future value (F_1) must be compounded again over the same 9-year horizon:

$$F_{final} = F_1(1 + f)^n$$

Substitute $F_1 = ₱115,035.2093$ and $f = 0.11$ into the inflation adjustment equation:

$$F_{final} = ₱115,035.2093(1 + 0.11)^9 = ₱294,264.3130$$

This final product successfully integrates both compounding forces over the 9-year cycle, aligning directly with option A.