

Finance Ascension Protocol – Day 1

Topic: Time Value of Money – Reconstructed from First Principles

■ Core Principles of Time Value of Money:

1. Opportunity Cost – ■1 today can be invested, and the lost return is a real cost.
2. Inflation – Future money has less purchasing power.
3. Certainty & Optionality – Immediate money gives flexibility, control, and less risk.

■ Discounting as Time Compression:

Future cashflows must be compressed back to the present. Each time period applies a discount factor that shrinks the future value. For example, a ■5000 cashflow in Year 4 discounted at 10% becomes approximately ■3415 today. This is not just math—it is reversing compounding step by step.

■ General Formula:

$$PV = FV / (1 + r)^n$$

$$\text{Or for multiple cashflows: } PV = \sum [CF_t / (1 + r)^t]$$

■ Finance Thought Tests:

Q1: ■1000 today vs ■1200 in 2 years @ 8% → Present value of ■1200 \approx ■1029.63 → ■1200 is better.

Q2: Why exponential discounting? → Because compounding is multiplicative. Time affects value exponentially.

Q3: If $r = 0$? → $PV = FV$. Time has no cost. All money is equally valuable regardless of when it is received.

■ See Page 2 for handwritten derivation and visual cashflow logic.

(DAY-1)

TIME VALUE OF MONEY - VISUAL DERIVATION

(*) FORWARD COMPOUNDING CHAIN:-

$$[\text{₹}100 \rightarrow \times 1.10 \rightarrow [\text{₹}110] \rightarrow \times 1.10 \rightarrow [\text{₹}121] \\ \rightarrow \times 1.10 \rightarrow [\text{₹}133.1] \rightarrow \times 1.10 \rightarrow [\text{₹}146.41]$$

(I) VALUE GROWING EACH YEAR AT 10%.

(*) DISCOUNTING

$$[146.41] \rightarrow \div 1.10 \rightarrow [133.1] \rightarrow \div 1.10 \rightarrow [121] \\ \rightarrow \div 1.10 \rightarrow [110] \rightarrow \div 1.10 \rightarrow [100]$$

(ii) DISCOUNTING: PULLING THE FUTURE VALUE BACK TO PRESENT USING $(1+r)^n$.

$\Rightarrow \times (1+r)$ (OR) $\div (1+r)$, WHERE $r = 10\%$ per year.

PV is the amount today that grows to a future value after n years
(TIME REDUCES VALUE UNLESS COMPENSATED WITH RETURN).

FORMULA: $PV = \frac{FV}{(1+r)^n}$

$FV = 146.41$

$r = 10\%$

$n = 4$, $PV = \text{₹}100$