Introduction to EVM

Earned Value Management (EVM) is a project management technique for measuring project performance and progress in an objective manner. It integrates scope, schedule, and cost baselines to forecast future performance and identify variances.

- **PMP & CAPM:** These certifications test these formulas in-depth. You will be expected to calculate, interpret, and make decisions based on these values for predictive (waterfall) projects.
- **PMI-ACP:** While the PMI-ACP focuses on Agile, the *concept* of EVM is still relevant. It is adapted to fit an iterative lifecycle. The focus is less on memorizing formulas and more on understanding how to measure delivered value against plans in an Agile context. A separate section for the Agile adaptation is included below.

Key Acronyms

First, let's define the fundamental inputs for all the formulas:

- **PV (Planned Value):** The authorized budget assigned to the work scheduled to be completed. "Where should we be?"
- **EV (Earned Value):** The value of the work actually completed. "What did we actually get done?"
- **AC (Actual Cost):** The total cost actually incurred for the work performed. "How much did we actually spend?"
- **BAC (Budget at Completion):** The total budget for the entire project. "What was the total project budget?"

EVM Formulas for PMP & CAPM (Predictive Projects)

This table covers the core formulas you must know for the PMP and CAPM exams.

Formula	Definition of the Formula	When to Use
VARIANCE ANALYSIS	**Tells you if you are ahead or behind your plan.**	
CV = EV - AC	**Cost Variance:** Measures the project's budget performance. • **Positive (> 0):** Under budget (Good) • **Negative (< 0):** Over budget (Bad) • **Zero (= 0):** On budget	To answer the question: *"Are we over or under budget right now?"*

SV = EV - PV	**Schedule Variance:** Measures the project's schedule performance in monetary terms. • **Positive (> 0):** Ahead of schedule (Good) • **Negative (< 0):** Behind schedule (Bad) • **Zero (= 0):** On schedule	To answer the question: *"Are we ahead of or behind schedule right now?"*
PERFORMANCE INDICES	**Tell you the efficiency of your project's performance.**	
CPI = EV / AC	**Cost Performance Index:** Measures the cost efficiency for the work completed. • **Greater than 1 (> 1):** Earning more than you're spending (Excellent) • **Less than 1 (< 1):** Spending more than you're earning (Poor) • **Equal to 1 (= 1):** On budget	To answer: *"How efficiently are we using our money?"* or *"For every $1 we spend, how much value are we earning?"*
SPI = EV / PV	**Schedule Performance Index:** Measures schedule efficiency. • **Greater than 1 (> 1):** Progressing faster than planned (Excellent) • **Less than 1 (< 1):** Progressing slower than planned (Poor) • **Equal to 1 (= 1):** On schedule	To answer: *"How efficiently are we progressing through the schedule?"*
FORECASTING	**Helps you predict the future state of the project based on current performance.**	
EAC (Multiple Forms)	**Estimate at Completion:** The new forecasted total cost of the project. 1. **EAC = BAC / CPI** 2. **EAC = AC + (BAC - EV)** 3. **EAC = AC + New ETC**	To answer: *"Based on our performance so far, what do we now expect the total project to cost?"* 1. Use when **current cost performance is expected to continue** for the rest of the project. (Most common formula) 2. Use when **future work will be accomplished at the original planned rate** (i.e., you expect performance to improve). 3. Use when the original budget is no longer valid

	4. **EAC = AC + (BAC - EV) / (CPI * SPI)**	and you have a **new bottom-up estimate** for the remaining work. 4. Use when you believe **both cost and schedule performance will impact** the remaining work.
ETC = EAC - AC	**Estimate to Complete:** The forecasted cost to finish the remaining project work.	To answer: *"How much more money do we need to finish the project?"*
VAC = BAC - EAC	**Variance at Completion:** The projected budget surplus or deficit at the end of the project. • **Positive (> 0):** Projected to be under budget (Good) • **Negative (< 0):** Projected to be over budget (Bad)	To answer: *"At the end of the project, will we be over or under budget, and by how much?"*
TCPI (Multiple Forms)	**To-Complete Performance Index:** The cost performance that must be achieved on the remaining work to meet a specific management goal (either the BAC or the EAC). 1. **TCPI = (BAC - EV) / (BAC - AC)** 2. **TCPI = (BAC - EV) / (EAC - AC)**	To answer: *"How efficiently must we use our remaining resources to meet our goal?"* 1. Use when your goal is to complete the project **within the original budget (BAC)**. 2. 2. Use when the original budget is no longer achievable and your goal is to complete the project **within the new forecast (EAC)**.

EVM for Agile (PMI-ACP Context)

In Agile, EVM is adapted. Instead of measuring the percentage complete of large tasks, value is "earned" when a user story or feature is fully **completed and accepted**.

Agile Term	Traditional EVM Equivalent	Definition in an Agile Context	When to Use
Planned Value (PV)	PV	The planned value of stories/features scheduled for completion in an iteration or release. This is often based on the number of story points planned.	At the beginning of an iteration or release, to set the baseline for what you plan to accomplish.
Earned Value (EV)	EV	The value of stories/features that have been **fully completed and accepted** during an iteration or release. A story that is 90% done earns 0 value.	At the end of an iteration (or during it) to measure how much value has actually been delivered.
Actual Cost (AC)	AC	The actual cost of the team for the duration of the iteration. This is often a fixed cost based on team salaries over time (e.g., a 2-week sprint cost).	To track the actual money spent during an iteration.

While you can technically calculate CPI and SPI in an Agile context using these adapted values, it is less common. Agile practitioners typically rely more on **Velocity**, **Burndown Charts**, and **Burnup Charts** to track progress and forecast completion. The key takeaway for the PMI-ACP is understanding the *principle* of measuring delivered value against a plan.