PMP® Exam Formula Cheat Sheet

For more information about a particular formula, click the formula's name.

PROJECT MANAGEMENT ACADEMY®
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FORMULA NAME	FORMULA

Earned Value (EV)

EV enables the project manager to compute performance indices or burn rates for cost and schedule performance, which provides information on how well the project is doing or performing relative to its original plans.

Also known as BCWP; amount of work actually completed

EV = % of completed work x Budget

Estimate at Completion (EAC)

Estimate at Completion is the expected budget at project end based on variances that occurred.

EAC= **AC + (BAC - EV) / (CPI x SPI)**

Cost and Schedule for an updated budget forecast

AC + BAC - EV	AC + ETC	BAC / CPI
Majority of budget accurate despite some changes	Initial estimates wrong or obsolete	Steady progress aligned to the original estimate

Variance at Completion (VAC)

A projection of the amount of budget deficit or surplus expressed as the difference between the budget at completion and the estimate at completion.

VAC = BAC - EAC

Cost Performance Index (CPI)

The Cost Performance Index (CPI) is a measure of the cost efficiency of budgeted resources, expressed as a ratio of earned value to actual cost.

CPI = EV / AC

Schedule Performance Index (SPI)

The Schedule Performance Index (SPI) is a measure of schedule efficiency, expressed as the ratio of earned value to planned value.

SPI = EV / PV

SPI < 1 = behind schedule, SPI > 1 = ahead of schedule

Cost Variance (CV)

Cost variance (CV) measures project progress against the project's cost baseline. Calculating a CV will help you determine any variance from the project's monetary budget. Cost variance measures the project cost performance.

CV = EV - AC

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FORMULA NAME	FORMULA

Schedule Variance (SV)

Schedule Variance is to determine how ahead of or behind schedule you are. Types of Schedule Variance: **Point-in-time Schedule Variance** and **Cumulative Schedule Variance**

SV = EV - PV

Program Evaluation & Review Technique (PERT)

The PERT approach, or Program Evaluation and Review Technique, is also known as a beta distribution or weighted average. This three-point estimating formula gives more weight to the most likely estimate (**M**).

PERT = (O+(4M)+L) / 3

O = Optimistic | **M** = Most Likely | **L** = Least Likely

Triangular Distribution

The triangular distribution is also known as a simple average. This form of three-point estimating is based on the average of each of the three estimated values. Simply add O+M+L and divide by three to get your three-point estimate (E).

(O+M+L) / 3

O = Optimistic
M = Most Likely
L = Least Likely

Parametric Estimating

Parametric estimating is a simple statistics-based tool used to produce estimates for a project's cost, duration, and effort. It can be used early on in high-level project planning. This formula assumes a linear relationship between the parameters and the cost or time. There are two types of parametric estimating results: **Deterministic Estimates** and **Probabilistic Estimates**

(a_old / p_old) x (p_curr)

a_old = historic amount of cost or time
p_old = historic value of the parameter
p_curr = value of that parameter in your current project

The most likely estimate (highest probability)
Optimistic estimate (best-case scenario)
Least likely estimate (pessimistic scenario)

Expected Monetary Value (EMV)

EMV analysis is one of two techniques used in quantitative risk analysis. This statistical concept considers all possible future outcomes to calculate the likely average outcome.

EMV = Probability x Impact

Free Float

Amount of time that an activity can be delayed without delaying the early start date or any successor or violating a schedule constraint, only calculated on the last activity in an activity sequence.

ES of next Activity - EF of current Activity - 1

EF = Early Finish
ES = Early Start

Total Float

Amount of time that a schedule activity can be delayed or extended from its early start date without delaying the project finishd ate or violating a schedule constraint, calcualted at path level of activities.

(LF - EF) or (LS - ES)

LF = Late Finish
EF = Early Finish
LS = Late Start
ES = Early Start

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Earned Value (EV)

Earned Value Management connects cost and schedule data for a project to answer the question of: "Is the project behind, on, or ahead of schedule?"

Estimate at Completion (EAC)

EAC provides "a more dynamic picture of the project budget" for those engaged in ongoing projects.

Variance at Completion (VAC)

Positive VAC: The project will not fully use all of the planned budget by completion.

0 for VAC: By project completion all of the planned budget will be used.

Negative VAC: The project will exceed the planned budget by completion.

Cost Performance Index (CPI)

The CPI could indicate the initial budget was not aligned with the project outcomes or estimates were too conservative. The CPI is also used to project cost incurrence for the future periods of a project, e.g. in the context of re-estimation of budgets.

Schedule Performance Index (SPI)

SPI < 1 = behind schedule, SPI > 1 = ahead of schedule

Cost Variance (CV)

When dealing with CV, project managers must measure deviations from the cost baseline and determine what kind of corrective action to take. This type of variance analysis requires calculating CV and interpreting it to explain why variances exist and how to fix them.

Schedule Variance (SV)

The amount of project work ahead or behind schedule; SV < 0 = behind schedule, SV > 0 = ahead of schedule

Program Evaluation & Review Technique (PERT)

PERT is a three-point estimating, which is a formula that can help determine the expected scope, schedule, and costs for a project and its components.

Triangular Distribution

Triangular Distribution is a three-point estimating, which is a formula that can help determine the expected scope, schedule, and costs for a project and its components.

Parametric Estimating

Parametric estimating requires project managers to model the project using a set of predefined algorithms. This requires historical data from past projects or public resources. These equations may come from established algorithms or past project models but should be scaled to fit the circumstances of the current project.

Expected Monetary Value (EMV)

Typically, you should assume any option with a positive EMV is worth pursuing. Your project may also require you to choose between multiple options. Calculating and comparing the overall EMV for each potential scenario's outcomes will allow you to select the best option.

Free Float

A value of 0 for VAC indicates that by project completion all of the planned budget will be used.

Total Float

A negative VAC indicates the project will exceed the planned budget by completion.

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