PMP Exam Formula Cheat Sheet
Mastering Key Calculations

Welcome to your PMP Exam Formula Cheat Sheet! This compact guide is designed to assist aspiring Project Management Professionals in their study and review process by summarizing the critical mathematical formulas required for the PMP® exam. Understanding and applying these formulas correctly is essential for passing the exam and for practical project management.

This cheat sheet covers a range of topics, from Time and Cost Management to Risk and Quality Management, each critical to project success and essential for the exam. These formulas will help you perform necessary calculations, evaluate project performance, and make informed decisions.

We recommend using this cheat sheet as a supplementary tool alongside your PMP study materials. Regularly review these formulas, practice applying them in different scenarios, and ensure you understand the context in which each formula is used. By integrating these calculations into your study routine, you'll enhance your problem-solving skills and increase your readiness for the exam.

Remember, while memorizing formulas is important, understanding their application and how they relate to real-world project management scenarios is crucial for your success both on the exam and in your professional career. Let's dive into the formulas that will empower your project management journey and help pave your way to PMP certification.

Duration Estimation for Activities & Projects

To estimate the Duration of a Specific Activity (EDA), it's essential first to ascertain the Optimistic (O), Most Probable (M), and Pessimistic (P) duration estimates.

- PERT Triangular Estimation Formula:

$$EDA = (O + M + P) / 3$$

- PERT Beta Estimation Formula:

$$EDA = (O + 4M + P) / 6$$

- Standard Deviation (SD) for Activity Duration:

$$SD = (P - O) / 6$$

- Activity Duration Variance:

$$Variance = [(P - O) / 6]^2$$

- Duration Range for an Activity:

$$Duration\ Range = EDA \pm SD$$

Float (Slack) Calculation for Activities

The Float (or Slack) for an activity assesses the allowable delay duration for the activity without extending the overall project completion time. Activities positioned on the critical path possess zero float (slack).

To determine an activity's Float (Slack), it is necessary to establish the Late Start (LS) and Early Start (ES) or Late Finish (LF) and Early Finish (EF) parameters first.

- Total Float Calculation:

$$\textbf{Total Float} = \textbf{LS} - \textbf{ES}$$

$$\textbf{Total Float} = \textbf{LF} - \textbf{EF}$$

Formulas for Earned Value Management

Understanding Key Terms in Earned Value Analysis:

- **EV (Earned Value)**
- **PV (Planned Value)**
- **AC (Actual Cost)**
- **CV (Cost Variance)**
- **SV (Schedule Variance)**
- **CPI (Cost Performance Index)**
- **SPI (Schedule Performance Index)**
- **BAC (Budget at Completion)**

- **ETC (Estimate to Complete)**
- **EAC (Estimate at Completion)**
- **VAC (Variance at Completion)**
- **TCPI (To-Complete Performance Index)**

Essential Calculations:

- **Cost Variance (CV)**: This measures the cost efficiency of the project work performed up to a certain point.
  CV = EV - AC

- **Schedule Variance (SV)**: This calculates the schedule efficiency, indicating if you are ahead or behind the planned schedule.
  SV = EV – PV

- **Cost Performance Index (CPI)**: This ratio indicates the cost efficiency and financial effectiveness of the project.
  CPI = EV / AC

- **Schedule Performance Index (SPI)**: This index measures the efficiency of time utilized in the project.
  SPI = EV / PV

- **Budget at Completion (BAC)**: Identified during the budget formulation phase, BAC encompasses the total planned budget, including reserves.

- **Estimate to Complete (ETC)**: Assesses the anticipated costs to finish all remaining project tasks.
  ETC = EAC - AC or **ETC = Re-estimate of Remaining Work**

- **Estimate at Completion (EAC)**: Provides a forecast for the project's total cost based on current performance.
    - Approach 1 (assuming future work at planned rate): **EAC = AC + (BAC - EV)**
    - Approach 2 (assuming current cost trends continue): **EAC = BAC / CPI**
    - Approach 3 (integrating both cost and schedule performance): **EAC = AC + (BAC - EV) / (CPI * SPI)**
- **Variance at Completion (VAC)**: Predicts the project's budget surplus or deficit at completion.
  VAC = BAC – EAC
- **To-Complete Performance Index (TCPI)**: Estimates performance required to complete the project within its original or revised budget.
    - If EAC is unchanged: **TCPI = (BAC - EV) / (BAC - AC)**
    - If EAC is revised: **TCPI = (BAC - EV) / (EAC - AC)**

Present Value Calculation

The concept of the time value of money indicates that the value of money today differs from the same amount in the future due to its potential earning capacity. This discrepancy is quantified using the Present Value (PV) formula. Key terms used in this formula include:

- PV (Present Value)
- FV (Future Value)
- r (Interest Rate)
- n (Number of Time Periods)

The formula to calculate Present Value is:

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

In this equation, you are discounting the future value to determine its worth at present, considering the specified rate of interest over a set number of periods.

Communication Channels Calculation

In a scenario where there are N participants or stakeholders, the total communication channels among them can be calculated using the following formula:

$$\text{Total Communication Channels} = \frac{N(N-1)}{2}$$

This formula is derived to understand the complexity of communications within a group and to plan the communication management strategy accordingly. It reflects the total possible connections between stakeholders in the given environment.

Expected Monetary Value Analysis

The Expected Monetary Value (EMV) for any given risk (either an opportunity or a threat) is determined using the formula:

$$\text{EMV} = \text{Probability} \times \text{Impact}$$

This calculation helps in the quantitative risk analysis by estimating the potential impact, in monetary terms, of an event occurring.

Point of Total Assumption for Contracts

In Fixed Price Incentive Fee (FPIF) Contracts, the Point of Total Assumption (PTA) marks the cost threshold above which the contractor assumes full financial responsibility, typically viewed as resulting from poor management. The PTA is computed using the formula:

$$\mathbf{PTA} = \frac{\mathbf{(Ceiling\ Price - Target\ Price)}}{\mathbf{Buyer's\ Share\ Ratio}} + \mathbf{Target\ Cost}$$