



Formulae to Remember

Communications	How many people in a communications network; n=number of people	$= n(n-1)/2$
PERT	Weighted average of three estimates (Optimistic, Realistic & Pessimistic)	$= (O+(4 \times R)+P)/6$
Standard Deviation (SD)	A PMBOK® Guide heuristic for calculating standard deviation from the mean 1SD either side of the mean \approx 68% 2SD either side of the mean \approx 95% 3SD either side of the mean \approx 99.7%	$= (P-O)/6$
Variance	The standard deviation squared	$= ((P-O)/6)^2$
Planned Value (PV)	How much you planned to spend on what you planned to have achieved. The total PV for the project is the Budget at Completion (BAC)	Time % complete X BAC
Earned Value (EV)	The value of the work performed expressed in dollars	$= PV \times \% \text{ complete}$
Actual Cost (AC)	How much you actually spent on what you actually achieved	
Budget at Completion (BAC)	How much you originally planned for the project to cost and the total Planned Value (PV) for the project	
Cost Variance (CV)	The difference between what you have earned and what it cost at a certain point in time. Positive is good; negative is bad	$= EV - AC$



Cost Performance Index (CPI)	Cost Variance expressed as an index; above 1 is good, below 1 is bad	$= EV/AC$
Schedule Variance (SV)	The difference between what you have earned and what you planned to have achieved at a certain point in time. Positive is good; negative is bad	$= EV - PV$
Schedule Performance Index (SPI)	Schedule Variance expressed as an index; above 1 is good, below 1 is bad	$= EV/PV$
Estimate at Completion (EAC)	How much the project is forecast to cost at completion.	$= AC + ETC$ $= AC + (BAC - EV)$ $= BAC/CPI^c$ $= AC + [(BAC - EV)/(CPI^c \times SPI^c)]$
Estimate To Complete (ETC)	How much more money will it cost to finish the project	$= EAC - AC$
Variance at Completion (VAC)	Difference between what you thought the project would cost and what it actually ends up costing. Positive is good; negative is bad	$= BAC - EAC$
To Complete Performance Index (TCPI)	The rate at which you have to go to achieve the desired outcome of either BAC or EAC ; above 1 is bad, below 1 is good	$= (BAC - EV)/(BAC - AC)$ $= (BAC - EV)/(EAC - AC)$
Point of Total Assumption (PTA)	The point in a form of a fixed price contract that the seller assumes total responsibility for all cost increases	$= Target\ cost + ((Ceiling\ price - Target\ price)/buyers\ \% \ share\ of\ cost\ overrun)$

Net Present Value (NPV)



NPV allows calculating the accurate value of the project.

If NPV calculation > 0, then accept the project: If NPV calculation < 0, then reject the project.

NPV equals the sum of the initial cash outlay (expressed as a negative number) plus all calculated Present Values

The formula is **$NPV = -C_0 + PV_1 + PV_2 + PV_3 \dots etc$**

C_0 = Initial Cash Outlay

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

FV = future value,

r = discount rate,

n = time period

Example: If your project will cost \$100 000, and generate \$50 000 in income in the first year, \$37 000 income in the 2nd year, and \$43 000 income in the 3rd year, and the discount rate is 10% then the formula for NPV would look like this:

$$\begin{aligned} NPV &= -\$100\,000 + ((\$50\,000 / (1 + .1)^1) + ((\$37\,000 / (1 + .1)^2) + ((\$43\,000 / (1 + .1)^3) \\ &= \$8\,339.59 \end{aligned}$$