



PMP® Exam Prep 6th Edition: Formulas

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Net Present Value (NPV) used for project selection

Year 0 Initial Investment

Year 1 + Cash Flow 1 / (1 + Discount Rate)¹

Year 2 + Cash Flow 2 / (1 + Discount Rate)²

Year 3 + Cash Flow 3 / (1 + Discount Rate)³

(and so on for as many years as cash flow is given)

Always select the project with the highest NPV.

Program Evaluation and Review Technique (PERT)

PERT / Weighted Duration / 3-Point estimate		
Triangular distribution	Beta distribution	Standard Deviation
$[O+ML+P]/3$	$[O+ (4*ML) +P]/6$	$SD = (P-O)/6$
Only use this if the question specifies that all inputs should be weighted equally	Default to this unless question specifies that all inputs are weighted equally	Reserve time

Risk Rating (qualitative risk analysis)

Risk Rating = Probability x Impact

Answer is expressed as a % or decimal

Expected Monetary Value (EMV)

Expected Monetary Value = Probability x Impact
Answer is expressed as a \$ amount

Used during quantitative risk analysis

Communication Channels

Number of communication channels = $n(n-1)/2$

Remember, if you are working with “other” team members, add 1 to count yourself

If the question asks you “how many more” you will need to calculate twice. Once for the original state and once for the new state. Subtract the two values.

Make or Buy Analysis

This is an equation rather than a formula.
Use the equation to find the break-even point.

Cost to Make = Cost to Buy (Lease)

To find the breakeven point, place the cost to make and the cost to buy on either side of the equation. Solve for X, which is the variable (# of days).

e.g. Initial cost to make + (Daily cost to make* X) = Cost to lease + (Daily cost to lease * X)

	Make	Lease	Total Make	Total Lease	
Initial Cost	\$12,000	\$2,000	\$12,000	\$2,000	
Day 1	\$25	\$350	\$12,025	\$2,350	
Day 2	\$25	\$350	\$12,050	\$2,700	
Day 3	\$25	\$350	\$12,075	\$3,050	
...					
Day 31	\$25	\$350	\$12,775	\$12,850	

At day 31 the Lease costs begin to outstrip the Make costs – this is the “breakeven” point

Calculating Float

Float = Late Start - Early Start
(or)
Late Finish - Early Finish

Planned Value (PV)

$PV = \text{Budget at Completion} * \text{Percent of Time Passed}$

Earned Value (EV)

EV = Budget at Completion * Percent of Work Completed

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Actual Cost (AC)

The amount of money spent on approved project work to-date. This number is usually given to you. It may also be presented as

Budget at Completion (BAC) – Money Left = AC

Schedule Variance (SV)

SV = Earned Value (EV) - Planned Value (PV)

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Schedule Performance Index (SPI)

$$\text{SPI} = \text{Earned Value (EV)} / \text{Planned Value (PV)}$$

Cost Variance (CV)

$$CV = \text{Earned Value (EV)} - \text{Actual Cost (AC)}$$
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Cost Performance Index (CPI)

CPI= Earned Value (EV) /Actual Cost (AC)

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Estimate at Completion (EAC)

There are four different formulas based on different scenarios

Scenario #1: Assumes the same rate of spending will continue

$$EAC = BAC / CPI$$

Scenario #2: Assumes you have deviated from the budget due to a one-time incident, but spending would have otherwise been on track with the plan and will continue at the planned rate going forward

$$EAC = AC + (BAC - EV), \text{ or this formula can be formatted as}$$

$$EAC = BAC - CV$$

Scenario #3: Cost performance has been poor and project deadline is firm

$$EAC = AC + \{(BAC - EV) / (CPI \times SPI)\}$$

Scenario #4: Assumes the original budget was flawed. The formula considers actual cost, and reassesses the cost of all remaining work (Estimate to Complete, or ETC).

$$EAC = AC + ETC$$

Estimate to Complete (ETC)

$ETC = \text{Estimate at Completion (EAC)} - \text{Actual Cost (AC)}$

To Complete Performance Index (TCPI)

“work left” / “money left”

$$\text{TCPI} = (\text{BAC}-\text{EV}) / (\text{BAC}-\text{AC})$$

or

$$\text{TCPI} = (\text{BAC}-\text{EV}) / (\text{EAC}-\text{AC})$$

Replace BAC with EAC if budget has been rebaselined

Variance at Completion (VAC)

$VAC = \text{Budget at Completion (BAC)} - \text{Estimate at Completion (EAC)}$

Burn Rate

Burn Rate = $1/\text{Cost Performance Index (CPI)}$

Burn rate < 1 means budget is being utilized slower than planned

Burn rate > 1 means budget is being utilized faster than planned