

Exercise: Earned Value Analysis

What Earned Value Analysis Does

Earned value analysis evaluates actual project performance against scope/scheduled work and cost performance through PV, EV, and AC. That is what separates it from a status report: a schedule report tells you whether you are late, a cost report tells you what you have spent, and EVA tells you both at once, in the same units — CV/SV are expressed in monetary units, while CPI/SPI are dimensionless ratios.

It also looks forward. The first eight values below describe where the project stands today; the last three — EAC, ETC, and VAC — forecast where it will finish if current performance holds. Work through all eleven, then read the interpretation column, because knowing what a number means matters more on the exam than producing it.

Exercise

You have a project to build a new fence. The fence will form a square. Each side is to take one day to build, and \$1,000 has been budgeted per side. The sides were planned to be completed one after the other; however, circumstances changed on the project, and work on the sides was able to proceed in parallel. Assume therefore that the sides have a finish-to-finish relationship instead of a finish-to-start relationship, so more than one side can be worked on at the same time. Today is the end of day 3.

Using the information in the project status chart, calculate the following to three decimal places. Interpretation is important on the exam. Can you interpret what each answer means?

1. PV =	5. CV =	9. EAC =			
2. EV =	6. CPI =	10. ETC =			
3. AC =	7. SV =	11. VAC =			
4. BAC =	8. SPI =				
Project Status Chart					
Activity	Day 1	Day 2	Day 3	Day 4	Status, End of Day 3
Side 1	S → F				Complete, spent \$1,000

Side 2		S → F, PF			Complete, spent \$900
Side 3		S →	PS → PF		50% done, spent \$600
Side 4			S →	PS → PF	75% done, spent \$600

Key: S = actual start, F = actual finish, PS = planned start, PF = planned finish

Answer

	What Is:	Calculation	Answer	Interpretation of the Answer
1.	PV	\$1,000 + \$1,000 + \$1,000	\$3,000	We should have done \$3,000 worth of work.
2.	EV	Complete, complete, half done, and 75% done; or \$1,000 + \$1,000 + \$500 + \$750	\$3,250	We have actually completed \$3,250 worth of work.
3.	AC	\$1,000 + \$900 + \$600 + \$600	\$3,100	We have actually spent \$3,100.
4.	BAC	\$1,000 + \$1,000 + \$1,000 + \$1,000	\$4,000	Our project budget is \$4,000.
5.	CV	\$3,250 – \$3,100	\$150	We are under budget by \$150.
6.	CPI	\$3,250 ÷ \$3,100	1.048	We are getting about \$1.05 worth of work out of every dollar we put into the project.
7.	SV	\$3,250 – \$3,000	\$250	We are ahead of schedule.
8.	SPI	\$3,250 ÷ \$3,000	1.083	We are progressing at about 108 percent of the rate

	What Is:	Calculation	Answer	Interpretation of the Answer
				planned.
9.	EAC	$\$4,000 \div 1.048$	\$3,817	We currently estimate that the total project will cost \$3,817.
10.	ETC	$\$3,817 - \$3,100$	\$717	We expect the remaining work to cost \$717.
11.	VAC	$\$4,000 - \$3,817$	\$183	We currently expect to be \$183 under budget when the project is completed.

In this example, you are looking for the value of the work that has been done. The finish-to-finish relationship allowed the team to work on more than one side at the same time. In this case, work is being done on both sides 3 and 4 at the same time. Since the value of each side is \$1,000, we look at how much of each side is complete and apply that percent to the value. Here sides 1 and 2 are completed, so each receives a value of \$1,000. It doesn't matter what it cost, just the value. Side 3 is 50 percent done and receives a value of \$500 (50 percent of \$1,000). Side 4 is 75 percent done and receives a value of \$750 (75 percent of \$1,000). The earned value to date is \$3,250.

Did you select the correct EAC formula? Here side 2 came in under budget (\$900) and sides 3 and 4 are running at or below plan, so the trend is favorable, and nothing in the question says it will change. With a trend and no information that it will not continue, $BAC \div CPI$ is the most appropriate formula. If the question had said the savings were a one-time event, $AC + (BAC - EV)$ would be the better choice. Notice also how this project compares with Exercise 7.3: same fence, same budget, but working the sides in parallel with better cost control moved it from over budget and behind schedule to under budget and ahead of schedule.

How This Shows Up on the Exam

Few exam questions ask you to grind through all eleven values. What they ask is what a number means. The Prep book notes that people often miss questions that require only interpreting earned value terms, with no calculation at all. A positive CV is under budget, a negative SV is behind schedule, and an index above 1.0 is good for CPI and SPI — though the reverse is true for TCPI, which is the reversal most often missed.

The judgment call in this exercise is question 9. The Prep book says plainly that exam questions may require you to determine which EAC formula is appropriate, and the wording of the scenario is what decides it. A favorable trend with nothing to suggest it will change points to $BAC \div CPI$. A one-time event points to $AC + (BAC - EV)$. A fundamentally flawed original estimate points to a bottom-up re-estimate. Read for that signal before reaching for a formula.

One last habit worth carrying in: check whether the project is late, over budget, or both before you calculate anything. Here it is ahead and under — the opposite of the version in the book — and noticing that first will often tell you which answer choices to eliminate.