

Dynamic Formula Intelligence Report

AI-assisted benchmark analysis generated from measured SQL Server results on 2026-04-25 22:20:16.

Scope: 1,000,000 records per formula · 11 formulas · 3 execution engines.

Correctness	Verified
Fastest Overall	C# Engine
Most Stable	SQL Dynamic
Performance Gap	38.969s per formula

Executive Summary

This analysis was generated directly from measured benchmark logs over 1,000,000 records and 11 formulas. C# Engine delivered the strongest overall runtime profile, while SQL Dynamic showed the most stable timing behavior. The performance spread between the fastest and slowest engine reached 38.969s per formula, which makes execution architecture a meaningful production decision.

Correctness Verification

- Python vs SQL Dynamic: mismatched_rows = 0
- Python vs C# Engine: mismatched_rows = 0
- C# Engine vs SQL Dynamic: mismatched_rows = 0

Performance Summary

Method	Avg (s)	Best (s)	Worst (s)	Total (s)
C# Engine	22.618	17.634	40.682	248.794
SQL Dynamic	32.547	26.696	37.336	358.013
Python Eval	61.586	55.916	66.066	677.451

Key Findings

- **Fastest Overall:** C# Engine achieved the lowest average runtime at 22.618s per formula, beating Python Eval by 38.969s.
- **Most Stable Runtime:** Runtime variance stayed lowest for SQL Dynamic, with a standard deviation of 2.760s.
- **Closest Race:** C# Engine won this formula by only 7.866s.
- **Largest Advantage:** C# Engine created the widest gap here at 16.333s.

Warnings and Signals

- **Large performance spread:** The slowest engine is more than 2x slower than the fastest one, so architecture choice materially affects latency.
- **Correctness stayed fully aligned:** All 3 validated pairwise comparisons returned mismatched_rows = 0, so the benchmark ranking is safe to trust.

Formula-Level Winners

Formula	Category	Winner	Runtime (s)	Margin (s)
1	Arithmetic	SQL Dynamic	26.696	13.986
2	Arithmetic	C# Engine	18.000	11.519
3	Arithmetic	C# Engine	19.333	14.157
4	Arithmetic	C# Engine	17.634	16.333
5	Arithmetic	C# Engine	18.892	12.953
6	Complex	C# Engine	21.177	10.239
7	Complex	C# Engine	20.918	9.893
8	Complex	C# Engine	19.504	15.210
9	Conditional	C# Engine	23.237	10.570
10	Conditional	C# Engine	26.546	7.866
11	Conditional	C# Engine	22.871	14.465

Scenario Recommendations

- **Best overall production choice:** C# Engine — This engine delivered the strongest benchmark profile on the measured workload.
- **Best for rapid prototyping:** Python Eval — The simplest formula-to-execution path with minimal implementation ceremony.
- **Best for DB-centric deployment:** SQL Dynamic — Keeps execution close to the data and avoids repeated application-side transfer work.

AI-Assisted Interpretation Layer

This report was generated locally from measured benchmark data. It does not replace Python, C#, or SQL execution, and it does not claim live cloud LLM inference. Its value is in dynamic interpretation, ranking, warning detection, and report-quality narrative generation.