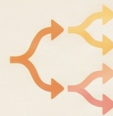


Original Problem



### Stage 1: Forward Sampling

Generate  $m$  reasoning chains (CoT, Temp=0.7)  
Extract candidate answers



$m$  Candidate Answers

### Stage 2a: Backsolve Check (B-score)

Plug answer into original problem  
Verify problem constraints



$B$ -score (0-1)

Verdict (PASS/FAIL)

$B$ -score

### Stage 2b: Falsification Ensemble (F-score)

Run  $k$  adversarial 'refuter' prompts

- Unit Conversion/Quantity Misreads
- Algebraic/Arithmetic Errors
- Constraint Violations

$F$ -score =  $1 - \text{mean}(\text{error\_probability})$

$F$ -score (0-1)

### Stage 3: Anti-Verbosity Regularization (L-score)

$L$ -score =  $\exp(-\lambda \times \text{token\_count} / \text{tokens}_0)$   
Penalize verbose reasoning chains



$L$ -score (0-1)

### Stage 4: Weighted Aggregation

Combined weight:  $w = B^\alpha \times F^\beta \times L$   
Group answers by **value**, sum weights  
Select answer with maximum total weight



Final Answer