

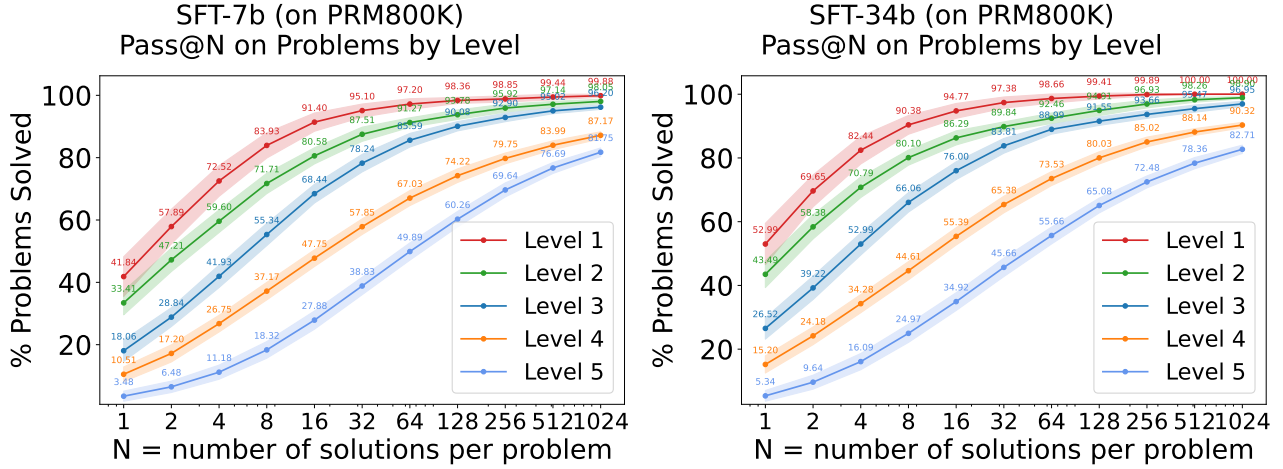


Figure 1. The increase of Pass@N metrics with the number of samples, divided by level. As the number of samples increases, the Pass@N rate tends to improve. However, not all problems will eventually yield a correct solution.

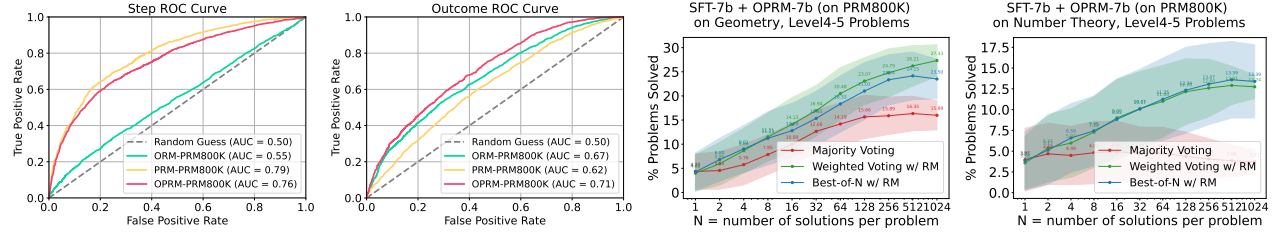


Figure 2. The Step and Outcome ROC Curve (Left) show the ability of discriminate the reasoning step and the whole reasoning solution, illustrating OPRM's effectiveness on identifying both steps and outcomes. The effectiveness of OPRMs' reranking on Level4-5 (hard) part of Geometry and Number Theory problems (Right).

Case Study 1: A robot moving forward at a constant speed takes 2.5 hours to travel 1 kilometer. Moving forward at this same constant speed, it takes the robot 90 seconds to travel the length of a particular hallway. How many meters long is the hallway? **Level: 5 GT: 10**

Voting V.S. Reward: {Answer: 36, Voting times: 139, OPRM reward: 11.3}, {Answer: 10, Voting times: 99, OPRM reward: 23.7}			
Majority Solution:		OPRM Solution:	
Let's call the number of meters in the hallway x.	#Reward	To solve this problem, I need to find the relationship between the robot's speed, distance, and time.	#Reward
We know the robot moved 1 km in 2.5 hours.	0.97	I can use the formula distance = speed * time to write an equation for each case.	0.98
That means it moved x meters in 90 seconds.	0.97	Let s be the robot's speed in meters per hour.	0.98
We can write that as the equation $\frac{1}{2.5} = \frac{x}{90}$.	0.28	Then the first case gives me $1000 = s * 2.5$, or $s = 1000 / 2.5 = 400$ meters per hour.	0.98
To solve for x, we can multiply both sides by 90 to get $36 = x$.	0.11	The second case gives me the length of the hallway = $s * 90 / 3600$, or length = $400 * 90 / 3600 = 10$ meters.	0.98
So the hallway is 36 meters long.	0.07		0.79
# Answer	0.03	# Answer	
36		10	
#Final Reward: 6.7e-5		#Final Reward: 0.74	

Figure 3. Case Study 1. The evaluator can help identify and reduce the confidence of hallucinations caused by misleading information.

Case Study 2: In a regular polygon, the measure of an interior angle is 6.5 times the measure of an exterior angle. How many sides does the polygon have? Level: 4 GT: 15			
Voting V.S. Reward: {Answer: 0, Voting times: 132, OPRM reward: 0.03}, {Answer: 15, Voting times: 94, OPRM reward: 17.3}			
Majority Solution:		OPRM Solution:	
So we know that the measure of an interior angle is 6.5 times the measure of an exterior angle.	#Reward	I know that the sum of the interior angles of any polygon with n sides is (n-2) times 180 degrees, and the sum of the exterior angles is 360 degrees.	#Reward
And we know that the sum of the measures of the interior angles of a polygon is given by the formula (n-2)180, where n is the number of sides.	0.98	I can write an equation relating the interior and exterior angles of a regular polygon: (n-2) * 180 = 6.5 * 360, where n is the number of sides.	0.98
Right. So we can say that $6.5(n-2) = (n-2)180$.	0.89	I can simplify this equation by dividing everything by 180: $n - 2 = 6.5 * 2$, which gives me $n - 2 = 13$.	0.84
And that simplifies to $6.5 = 180$, which is false.	0.22	I can add 2 to both sides to isolate n: $n = 13 + 2$, which gives me $n = 15$.	0.97
So there is no such polygon.	0.12		0.95
# Answer	0.03	# Answer	
0		15	
#Final Reward: 6e-4		#Final Reward: 0.75	

Figure 4. Case Study 2. The evaluator can assist in reducing the confidence of solutions that misuse mathematical theorems or formulas.