



Current Geometry PoW

The Math Forum's PoWs provide non-routine constructed response problems. The Geometry problems target concepts typically learned in a high school geometry class. Memberships and mentoring options are available at the individual, class, school, and district levels.

Leaning Ladder - posted April 7, 2008

A 15 foot ladder is leaning against a wall. As the base of the ladder is moved closer to the wall, the top of the ladder slides up the wall.

Are there any conditions under which moving the base one foot closer to the wall would result in the top of the ladder also sliding up the wall one foot? How do you know?



Learn more about the PoWs in Booth 2425 or at http://mathforum.org/problems_puzzles_landing.html
Get the Problem Packet and more at <http://mathforum.org/workshops/nctm2008/handouts.html>

Geometry Problem of the Week Scoring Rubric for Leaning Ladder

For each category, choose the level that *best describes* the student's work

	Novice	Apprentice	Practitioner	Expert
Problem Solving				
Interpretation	doesn't seem to understand the problem	doesn't understand that there is a right triangle doesn't understand what is happening when the ladder moves	understands that the ladder forms a right triangle with the floor and the wall understands what happens when the base of the ladder moves attempts to answer the question	since there is no Extra, there is no way to be an Expert in Interpretation
Strategy	has no ideas that will lead them toward a successful solution	has a strategy that somehow relies on luck tries only whole numbers of feet for the distance that the base is from the wall without understanding the idea of continuity	has a strategy that relies on sound reasoning, not luck calculates how far the height moves for several different starting base distances and invokes (though probably doesn't use the exact language of) the idea of continuity to conclude that if there are slides that are too low and too high, there must be one between them that is correct	finds the exact instance when the conditions are met using algebraic techniques or finds a very good approximation using a spreadsheet
Accuracy	has made many errors	has made several mistakes or misstatements, or has used vocabulary incorrectly	makes no mistakes of consequence and uses largely correct vocabulary and notation	[generally not possible]
Communication				
Completeness	has written almost nothing that tells you how they found their answer	shows work without explanation, or gives an explanation without showing any work gives results without showing calculations	shows and explains the steps taken and why they are reasonable steps, which might include: <ul style="list-style-type: none"> • how related bases and heights are calculated • what any numbers resulting from calculations represent • why the next "guess" or position for the base was chosen 	includes additional helpful information, doesn't just add more for the sake of adding more
Clarity	explanation lacks clarity and organization	explanation is difficult to follow length warrants separation into more paragraphs lots of spelling errors/typos	explains the steps that they <i>do</i> explain so that another student would understand (needn't be complete to be clear) makes an effort to check their formatting, spelling, and typing (a few errors are okay)	answer is clearly written and well-organized formats things exceptionally clearly
Reflection	<i>The items to the right are considered reflective, and could be in the solution or their comment:</i> does nothing reflective	checks their answer (not the same as viewing our "answer check") reflects on the reasonableness of their answer does one reflective thing	connects the problem to prior knowledge or experience explains where they're stuck summarizes the process they used does two reflective things	comments on and explains the ease or difficulty of the problem revising their answer and improving anything does three or more reflective things or great job with two