

ALN Problem of the Month

Thank you for participating in the Algebra Learning Network Problem of the month. The goal of the POM is to engage classes in a common problem solving activity that can then be analyzed and discussed among teachers through the Network. The common problem is designed to have both introductory and advanced elements to enable all students to start on it, but only the most advanced students would be able to get a perfect score.

Implementing the POM

You are free to use the POM in any way that helps your instruction. But we encourage teachers to try to use the target method for the purpose of comparing scores across classes. You can upload your students' scores to the ALN database using the Score Report Form (SRF). Here is the target method:

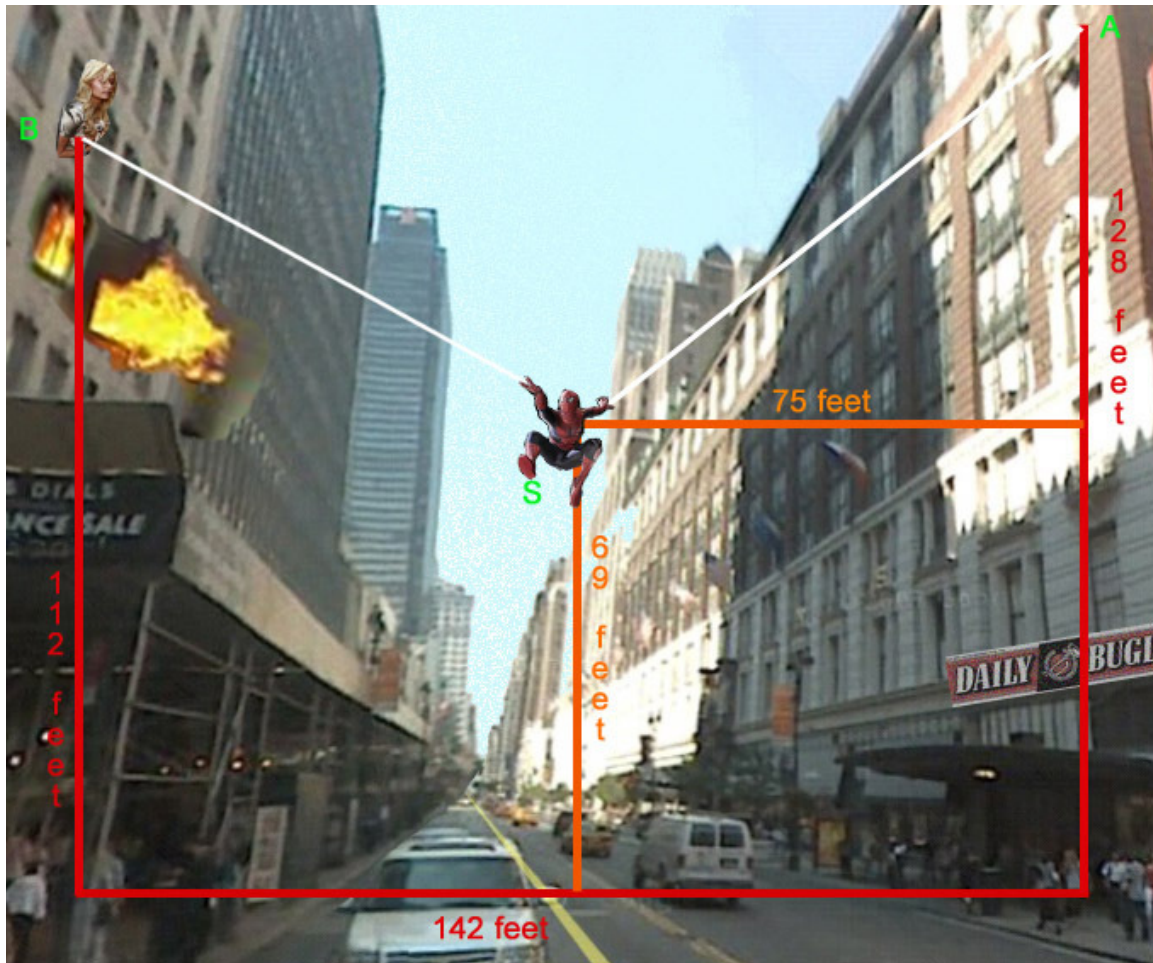
- Set aside a sufficient amount of time for the problem to be completed in a single class period (approximately 30 minutes for a typical class)
- Provide some appropriate warm up activity to review what the students know about the topic of the question. No warm-up questions should be analogous to the POM questions.
- Give the students the questions as written. You can do this by handing out printouts, projecting the question on a computer/overhead or writing the question on the board (as well as any necessary graphics).
- If you wish to use the students' scores for a class grade, it should not count more than a typical homework assignment. Let them know before starting what the stakes of the problem are. Be sure to note on the SRF that students were graded for the POM.
- Let students work the problem at their own pace. How much time you allow students is up to you, but be sure to note the total time on the SRF.
- Collect the students' work and score according to the rubric attached. Record their scores for each of the problem on a spreadsheet (a template is provided).
- Consider photocopying students' work before you return it to the students.
- Remove students' names from the spreadsheet and upload it to the ALN along with the SRF. Upload each class period separately. Note the classID for each class so you can identify it on the POM score chart.

There are a number of options with the POM including the use of pairs or groups to collaborate in solving the problem and the use of calculators or computers in solving problems. You can note your specific options on the SRF. Once we have enough data you will be able to compare your class to other classes who used a similar approach.

ALN Problem of the Month – February 2009

In response to a cry for help, Spiderman swings towards a burning building. At the top of his swing he shoots a webline which sticks to the burning skyscraper. At this moment he is in the intersection of two straight weblines. From the picture below:

1. What are Spiderman's coordinates if you take the Daily Bugle entrance as the origin?
2. Find the equations of the old line (AS) and new line (SB)
3. Show and explain how Spiderman's location is the intersection of lines AS and SB
4. Just then the woman in the window drops her Chihuahua. Thinking quickly, Spiderman grabs both webs with one hand and shoots a third web to catch the dog. If it takes the web 1.3 seconds to reach the dog, and the dog can drop 20.9 feet during that time, what is the equation of the line that Spiderman needs to shoot in order to save the dog? (assume webs travel in a perfectly straight line – no gravity)



Objectives served by this problem.

- Students know how to develop their own coordinate system?
- How to take origin and then calculate coordinates of the end points of a line?
- How to calculate slope and the y -intercept?
- How to calculate equation of lines from coordinates?
- How to calculate point of intersection of two lines?

ALN Problem of the Month – February 2009

Question	Max Points	Score
1 Spiderman Coordinates	5	
2 Line equations	10	
3 Line Intersection	10	
4 New line	5	
total	30	

Scoring rubric:

1 Spiderman Coordinates

- 5 points – problem correctly solved to show coordinates (-75, 69)
- 4 points – using an alternative origin (67, 69)
- 3 points – simple error such as a missed sign
- 2 points – one coordinate is correct (or alternate)
- 1 point - a coordinate is listed

2 Line equations (5 points for each line)

- 5 points – problem correctly solved to line in some appropriate form – with appropriate work
e.g. $y = (59/75)x + 128$ and $y = (-43/67)x + (69 - (43*75)/67)$ or 20.866
- 4 points – simple math error such as a missed sign easily identified from work
- 3 points – work is unclear or missing
- 2 points – some line equations are given
- 1 point - evidence of some correct calculations or notations

3 Line Intersection

- 10 points – A description of how spiderman’s coordinates can be inserted into either equation to produce a true statement. Or putting one coordinate into the equations to solve for the other coordinate. Or solving the simultaneous equations to get the same coordinates
- 9 points – simple math error with a correct explanation
- 8 points – a correct solution with incomplete (or no) explanation
- 7 points – simple math error with incomplete (or no) explanation
- 6 points - a correct explanation but wrong or missing solution
- 1-5 points - partial work or explanation

4 New Line

- 5 points – problem correctly solved to line in some appropriate form – with appropriate work
e.g. $y = (-22.1/67)x + (69 - (22.1*75)/67)$
- 4 points – simple math error such as a missed sign easily identified from work
- 3 points – work is unclear or missing
- 2 points – some line equations are given
- 1 point - evidence of some correct calculations or notations