



Algebra PoW Sample

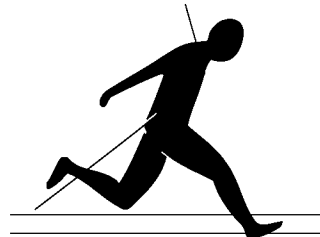
The Math Forum's Problems of the Week provide non-routine constructed response problems. The Algebra problems target concepts typically learned in an Algebra I class. Memberships and mentoring options are available at the individual, class, school, and district levels.

Marathon Mitch

My nephew Mitch loves to run. Recently he participated in the Midtown Mini-Marathon, a road race in a small Kansas town near where he lives.

During the race, he paced himself in the following way:

- He ran the first 50% of the distance at his normal running speed.
- For the next third of the distance he increased his speed by 25%.
- For the final 3 km of the race he again increased his speed, this time by 20%.



Given that he finished the race in 1 hour and 19 minutes, what is his normal running speed in kilometers per hour?

Extra: Mitch will run this same race again next year, and wants to train for it so he can better his time. If he will use the same pacing strategy, by what percent must Mitch increase his normal speed in order to finish the race in exactly 1 hour and 15 minutes?

Learn more about the Problems of the Week at <http://mathforum.org/>

The Algebra Problem of the Week Scoring Rubric

A full-page version of this file is available to the public via the Teacher Documents section of the Problems of the Week pages. Problem-specific scoring rubrics, as well as "Expected Solution" documents, are available to Teacher Members who choose to mentor their students' work using our online environment.

For each category, choose the level that *best describes* your work

| | Novice | Apprentice | Practitioner | Expert |
|------------------------|--|--|--|---|
| Problem Solving | | | | |
| Interpretation | I do not understand much of the problem. | I don't understand all of the math concepts in the problem. I didn't attempt to solve all of the parts. | I understand all of the math concepts in the problem. I attempted to solve all parts of the main problem. | I understand the Extra question and solved it correctly (and am at least a Practitioner in Strategy). |
| Strategy | I do not know how to set up the problem. | I picked an incorrect strategy. My strategy relied on luck to get the right answer. I used guess and check exclusively, with no algebraic techniques. | I used a sound strategy and solved the problem with skill, not luck. I used algebraic techniques, including variables, expressions, and equations. | I used two separate strategies or an unusual or sophisticated strategy. |
| Accuracy | I think I made many errors. | My work is mostly accurate, with a few errors, such as calculation mistakes or using incorrect units. | My work is accurate and contains no arithmetic mistakes. I used appropriate units. I left things in exact form if required. | [not possible for most problems] |
| Communication | | | | |
| Completeness | I didn't write much, if anything, about how I found my answer. | I didn't define my variables. I didn't explain where my expressions or equations came from. I showed my work, but didn't explain it. I explained what I did without showing any of the actual work. | I defined my variables. I explained all of the steps taken to solve the problem. I stated any equations and formulas used and explained where most of those equations came from. | I added useful extensions and further explanation of some of the ideas involved. |
| Clarity | My explanation is very difficult to read and follow. | My explanation isn't entirely unclear, but another student wouldn't be able to follow it easily. My explanation is long and written entirely in one paragraph. My explanation has many spelling, grammar, and typing errors. | I explained all of the steps in such a way that another student would understand. I made an effort to check my formatting, grammar, spelling, and typing, though there may still be a few small mistakes. | My answer is very readable and it looks good! My organization makes my ideas especially clear. |
| Reflection | These items are reflective: | I showed how I checked my own answer. I explained why my answer is reasonable. I suggested a hint that I would give to another solver. | I connected the problem to another problem or experience. I explained where I'm stuck. I summarized my process. | I explained why I think the problem is easy or difficult. <i>I revised</i> and improved my work. |
| | I did nothing reflective. | I did one reflective thing. | I did two reflective things. | I did three or more reflective things or I did a great job with two of them. |

Teacher Support for *Marathon Mitch*

Each Current Problem of the Week (and consequently many in the library) includes a list of topics, pointers to related resources, and NCTM Standards correlation. This table is adapted from the full online Teacher Support page for this problem that includes links for all of the resources. These pages are available to members at <http://mathforum.org/pow/support/>.

| | | | |
|---|---|--|---|
| Topics distance, rate, time rational equations | NCTM Standards – 6-8 Algebra Reasoning and Proof Problem Solving Communication | Problems Library AlgPoW: Donald Duck's Trip AlgPoW: Rational Equations PrealgPoW: Distance Formula | Ask Dr. Math Distance, Rate, Time FAQ Rational Equations |
| Teacher2Teacher Algebra Help FAQ | Math Tools Algebra: Site Map Algebra: Rational Equations | Other Resources Solving Linear Equations | and more! |