

# APSU Math Problem of the Week

## Problem #2: Ants on a Log

Submission Deadline: 9/10/2021 by 12pm to  
Dr. Brad Fox in MMCS 109 or by email to [foxb@apsu.edu](mailto:foxb@apsu.edu)

Ninety-nine ants are dropped randomly along a log, with each ant facing one end or the other. The log is 1 meter long from end to end. Each ant travels either toward the left or the right end with a constant speed of 1 meter per minute. When two ants meet, they bounce off each other and reverse directions, keeping their speed intact. When an ant reaches an end of the log, it falls off. At some point, all of the ninety-nine ants will fall off.

Over all the possible initial configurations, what is the longest amount of time you would need to wait to guarantee that the log will have no ants? Provide justification for your answer.



Feel free to take this printout, or find each Problem of the Week by scanning this:

Complete the problem each week for a chance to win a prize



Rules:

1. Any APSU student can submit a solution individually, or work can be done in a small group of 2 or 3 students.
2. Solutions must be justified when appropriate to be considered correct.
3. Submissions can be made to Dr. Brad Fox (MMCS 109) or electronically to [foxb@apsu.edu](mailto:foxb@apsu.edu)
4. Problems will be posted each Friday afternoon with submissions due by the following Friday at 12pm. Solutions and the weekly winner will be posted once the deadline has passed.
5. One correct submission (whether submitted individually or as a group) will be randomly chosen to win a prize such as gift cards, Galois Math Club t-shirts, and APSU CoSTEM swag, in addition to receiving the glory of having their success published on this webpage.
6. Faculty and other non-students can submit solutions, but are not eligible for prizes.