

# Week 9 Challenge Homework

## Travelling Waves

**Submission Details** | Submit a digital copy (PDF, jpg, etc.) to Canvas. Include solutions to the metacognitive exercise and each question. Please use the interface to associate each page of your submission with the assignment. It makes grading much easier. Please clearly indicate which question is being solved. If data is needed to complete a problem, be sure to cite the source you've acquired your data from. Typed work will not receive credit. See the course website for further details.

**Group Submissions** | You may submit a group collaboration to Canvas. Add each group member to the submission. Each group member should contribute to the work. Clearly indicate which part of the submission is written by each member (color or labels are preferable).

**Sensemaking** | You will be asked to apply sensemaking in some problems. More information about sensemaking can be found on the BoxSand [Sensemaking](#) page, which is linked on the Canvas homepage.

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### Metacognitive Exercise

Each week will feature a metacognitive exercise, followed by one or two challenge problems to solve. The metacognitive exercise will usually ask you to reflect on your solution to the previous week's challenge problems.

Review your solution to the Week 8 Challenge Homework. If you do not have a copy of it anymore, you can find it on Canvas or Gradescope, under the Week 8 Challenge Homework assignment. Also, review the solution which has been posted to the BoxSand solutions archive ([click here for a link](#)). Solutions are posted a few days after the assignment is due.

- (a) How have these metacognitive exercises benefited you this term? Were there specific prompts or types of prompts that you felt were more helpful? Less helpful? (You don't need to write what you think we want to hear!)
- (b) What has your process been for completing challenge homework assignments this term? Have you worked in a consistent group? Rotating group of classmates? By yourself? If you plan to take PH 203 next term, what changes to this routine will you make in the Spring term?
- (c) What aspects of how you have approached this course do you find most helpful for your learning? Least helpful? If you plan to take PH203, what changes will you make?

### Question 1:

Pictured below are a snapshot and history graph of a travelling wave.

- Predict what you expect to happen to the amplitude of a travelling wave if the angular frequency is doubled.
- What is the period of the wave.
- What is the wavenumber of the wave.
- What is the speed of the wave.
- Write an equation for the displacement of this wave as function of position ( $x$ ) and time ( $t$ ).
- Can you tell if the wave is a transverse or longitudinal wave? Explain.
- Use Covariation (also known as proportional reasoning) Sensemaking to analyze the equation of motion you found in part (e). Make sure to explain why it agrees with or disagrees with your prediction in part (a).

