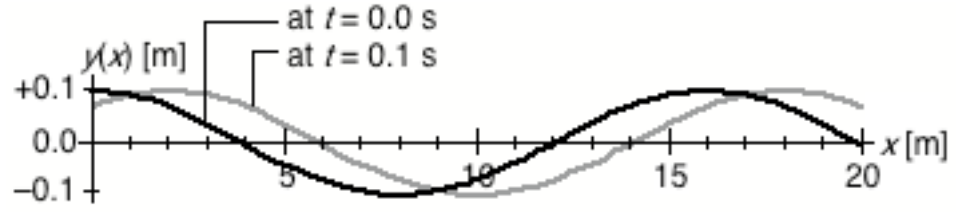


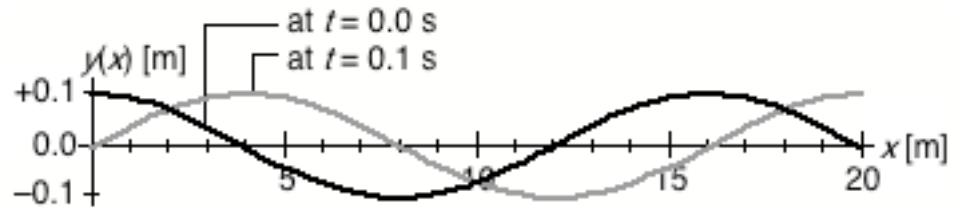
I certify by my signature that I will abide by the code of academic conduct of the University of California. Signature _____

No books nor notes. Calculators OK. Show all your work below. Answers alone do not receive credit!

1. [50%] A source located somewhere produces transverse waves that travel to the right along a very long rope. The $y(x)$ graphs for two very slightly different times is shown below, similar to letting time "run" on the Graphing Calculator program.



One or more things about the system change and the $y(x)$ graphs for the two times are reproduced (see below).



Decide which one of the following statements below must be true. Credit is assigned for the completeness and clarity of your justifications, and not necessarily for finding the correct choice below.

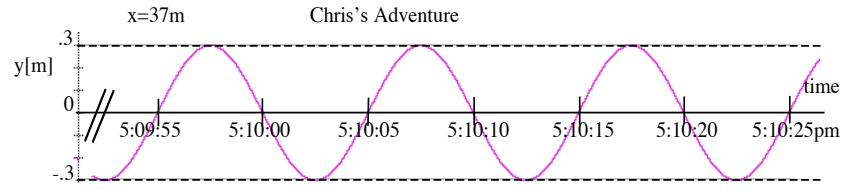
Choose and defend one statement only.

- (A) Only properties of the source were changed (while properties of the medium remained constant).
- (B) Only properties of the medium were changed (while properties of the source remained constant).
- (C) Both the properties of the source and the medium were changed.
- (D) Both the properties of the source and the medium remained constant.

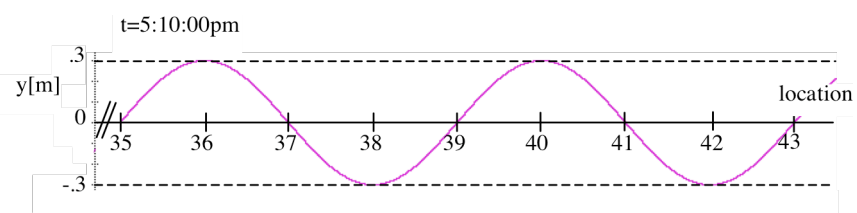
Rubric Codes: _____ **Student ID:** _____

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A large storm hit Davis and caused severe harmonic waves in Putah Creek (It could happen!). Two ducks (they mate for life!) were in the water during the storm. The duck known as Chris was located 37m from

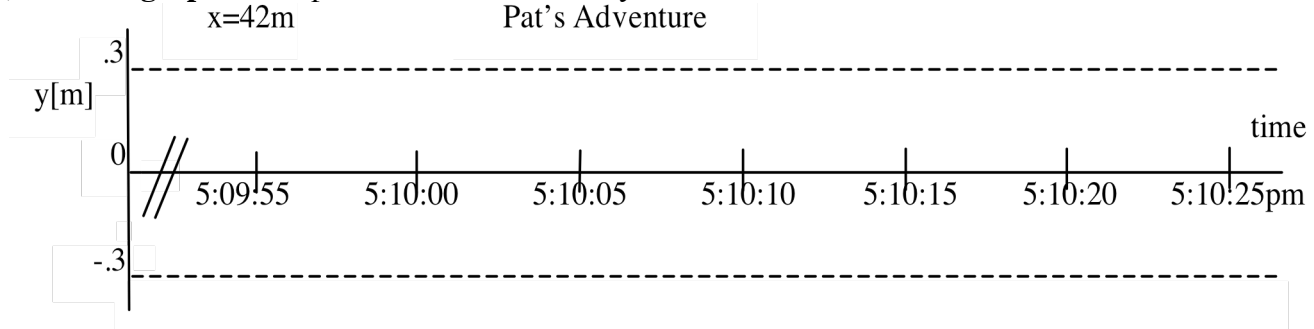


the bridge. The first graph on the right shows the oscillations that Chris endured around dinner time. Meanwhile, Chris's mate, Pat, was located 42m from the bridge.

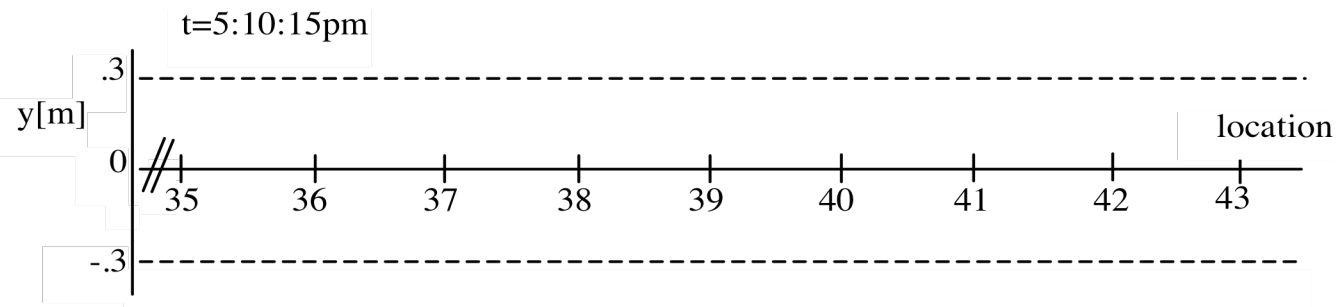


During this time, Leslie was taking pictures of the waves for the Aggie. Leslie took a picture at 5:10:00 PM and again at 5:10:15PM. The second graph on the right represents the wave shape in Leslie's first photo.

1) Draw a **graph** that represents *Pat's oscillatory ride*



2) Draw another **graph** to represent *Leslie's second photo*.



3) Write the wave **equation** for this phenomenon. Assume that the initial phase (φ) is 0. **Indicate** the following values (**A**, **y₀**, **λ** , & **T**) on the *top two graphs*.

Rubric Codes: 9

Student ID: _____

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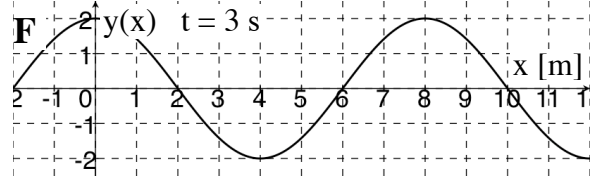
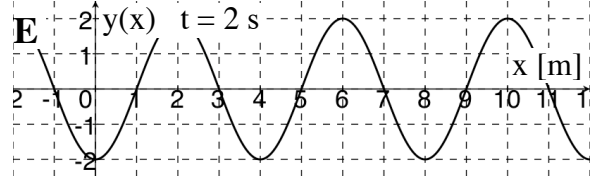
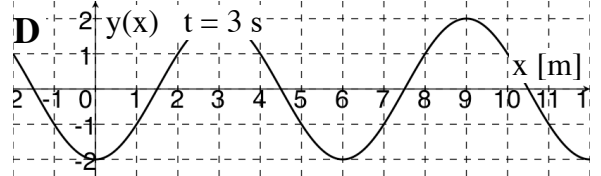
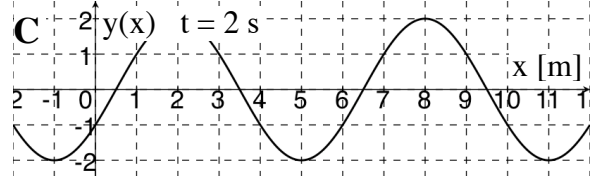
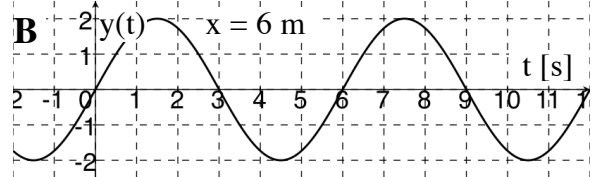
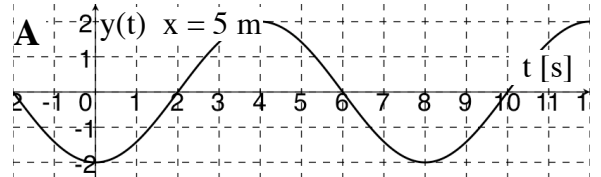
Signature _____

1. There are three different waves shown here. Each wave has two graphical representations among the group of six graphs. Your task is to determine which graphs are pairs of the same wave. Determine the pairing and briefly explain how you know that they are representative of the same wave. Include arrows, circles, highlights, etc. on the graphs to indicate the features that you are using in your explanation.

1st pair: ____ & ____ because:

2nd pair: ____ & ____ because:

3rd pair: ____ & ____ because:



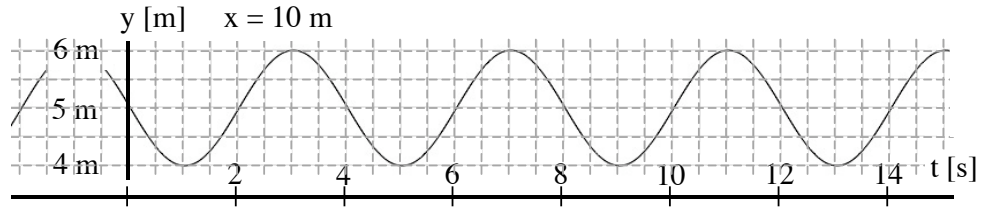
Rubric Codes: **9**

Student ID: _____

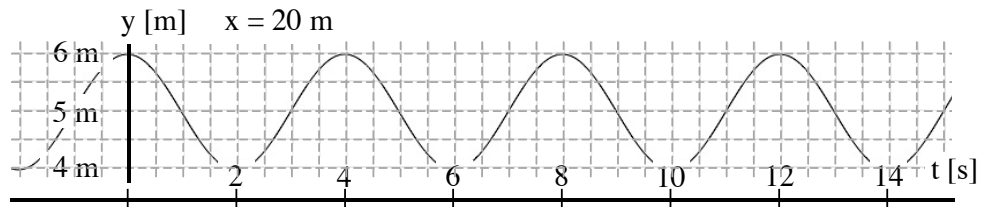
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Signature _____

These graphs represent a wave traveling with speed, $v = 2$ m/s. Use these graphs for problems 1 & 2.



1. Explain how you determine the direction that the wave travels (toward positive or negative x). Try to stay away from pronouns (such as "it") and jargon. Indicate on the graphs the features that you are using in your explanation.



2. What is the equation for this wave? Show how you determined the value of each term. Either show the calculations or indicate the values on the graphs.