Proposed Problem

1. You are writing a short adventure story for your English class. In your story, two submarines on a secret mission need to arrive at a place in the middle of the Atlantic ocean at the same time. They start out at the same time from positions equally distant from the rendezvous point. They travel at different velocities but both go in a straight line. The first submarine travels at an average velocity of 20 km/hr for the first 500 km, 40 km/hr for the next 500 km, 30 km/hr for the next 500 km and 50 km/hr for the final 500 km. In the plot, the second submarine is required to travel at a constant velocity, so the captain needs to determine the magnitude of that velocity.

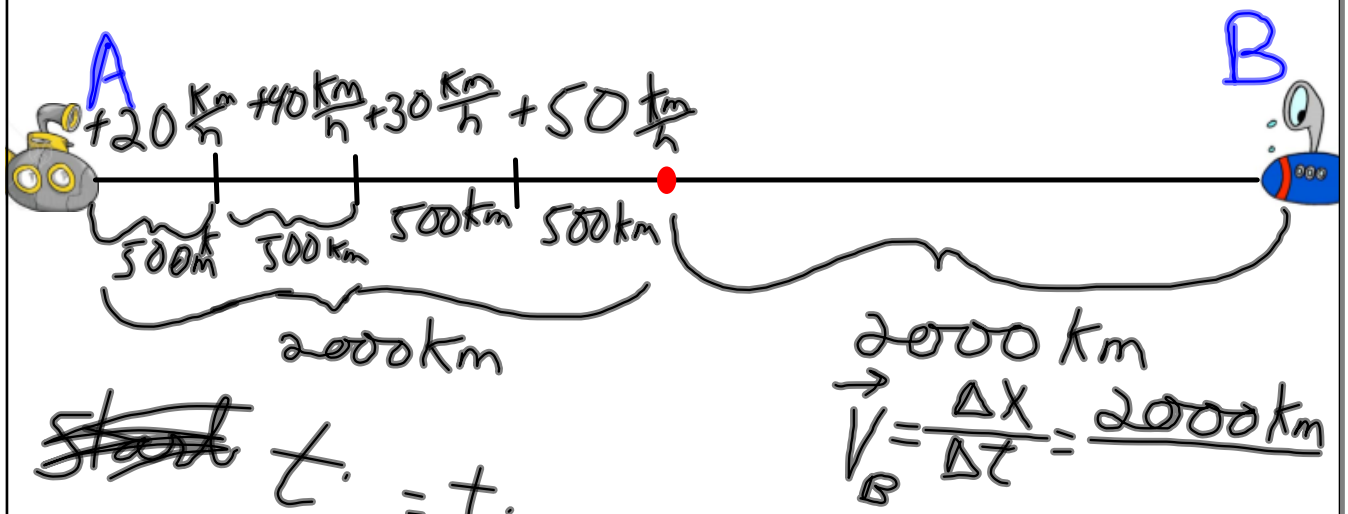
- Create Useful description - sketch, graphs, define quantities, define problem
- Physics Approach - list physics concepts that would apply to this problem
- Specific Application of Physics - use the concepts to model mathematically model the problem
- Mathematical Procedures - use the equations to solve the problem

Aug 5-9:52 AM

Physics Problem Solving Sheet

Useful Description

Picture & Given Information:



Question: What speed does sub B have to travel?

Target Quantiy: V_B

Physics Problem Solving Sheet (cont.)

Physics Approach

Physics Concepts and/or Principles:

Constant velocity

Specific Application of Physics

Assumptions/ Constraints:

ignore friction

Specific Equations:

$\vec{V} = \frac{\Delta X}{\Delta t}$

Mathematical Procedures

Employ specific equations to solve for target quantity.

$\vec{V} = \frac{\Delta X}{\Delta t} = \frac{2000\,km}{64.1\,hr} = 31.25\,\frac{km}{hr}$ ✓

$t_{A,1} = \frac{500\,km}{20\,\frac{km}{hr}} = 25\,h$

$t_{A,2} = \frac{500\,km}{90\,\frac{km}{hr}} = 5.5\,h$

$t_{A,3} = \frac{500\,km}{30\,\frac{km}{hr}} = 16.3\,h$

$t_{A,4} = \frac{500\,km}{50\,\frac{km}{hr}} = 10\,h$