NAME _____ **PHYSICS QUIZ #34 D**
PERIOD _____ DATE _____ **RELATIVITY - LENGTH/TIME/VELOCITY**

A rocket, which has a rest length of 38.0 m and a diameter of 9.60 m, is moving away from the Earth with a velocity of 0.999c as measured by an observer sitting at rest on the Earth. The rocket is heading toward Omicron Aquilae, located approximately 63.3 light years from the Earth. The rocket is on its way toward Omicron Aquilae and it encounters a second rocket traveling more slowly toward the same destination but with a velocity of 0.985c.

1. What will be the distance to Omicron Aquilae, as measured by an astronaut on board the first rocket? [3 pts]

2. What will be the diameter of the first rocket as measured by an observer at rest on the Earth? [3 pts]

3. How long will it take for this rocket to reach Omicron Aquilae, according to an astronaut on board the rocket? [3 pts]

4. What will be the velocity of the second rocket as measured by an astronaut on board the first rocket? [3 pts]

5. Assuming that these two rockets are initially 4.0 light years apart [as measured from the rest frame], how long will it take for the first rocket to overtake the second rocket according to an observer at rest on board the first rocket? [3 pts]