SPH4U Name: Date:

Relativistic Length Contraction Drills

1 A stick is moving at 0.817c. If its relativistic length is 1.04 m, calculate its proper length.

2 A spaceship is moving at 0.650c. If its relativistic length is 178.58 m, calculate its proper length.

3 A muon is moving at 0.897c. If it seems to pass through 8.35 km, what distance does someone on the ground see?

4 A 4.0-m car, parking in a garage with a proper length of 9.20 m, is moving at 0.804c. Will it fit in the garage?

5 A spaceship is moving at 0.773c. If its relativistic length is 268.42 m, calculate its proper length.

6 An spaceship with a proper length of 355.00 m is moving at 0.648c. Calculate its relativistic length.

7 A muon passes through the Earth's atmosphere from a height of 10.70 km but which seems to be 8.08 km. Calculate its speed as a percent of c.

8 A stick with a proper length of 1.10 m is moving at 0.867c. Calculate its relativistic length.

9 A stick with a proper length of 1.40 m has a relativistic length of 1.12 m. Calculate its speed as a percent of c.

10 A muon is moving at 0.670c. If it seems to pass through 5.86 km, what distance does someone on the ground see?

11 An spaceship with a proper length of 282.80 m is moving at 0.954c. Calculate its relativistic length.

12 A muon, passing through the Earth's atmosphere from a height of 8.80 km, is moving at 0.633c. How far does it seem to go?

13 A 4.0-m car, parking in a garage with a proper length of 6.00 m, is moving at 0.827c. Will it fit in the garage?

Answers:

1. 1.80 m 2. 235.00 m 3. 18.90 km 4. Yes, relativistic length is 5.47 m 5. 423.10 m 6. 270.38 m 7. 0.656 c 8. 0.55 m 9. 0.600 c 10. 7.90 km 11. 84.79 m 12. 6.81 km 13. No, relativistic length is 3.37 m