

Black Holes, Problem Set 6 for Monday, Sept. 30

Readings from Spacetime Physics

If you feel solid about Chapters 1, 2, 3, and L, there is not much new in Chapter 4. On the other hand, if you feel you need to cementing in some ideas with the twin paradox as the example then Chapter 4 is great. Everyone, whether feeling solid or not, should pay close attention to pp. 127-130 of Chapter 4, and then continue studying through Section 5.5, p. 148

For Problem Set 6

Problem 1 — Adding Up a Path in Space

On p. 148 is Figure 5-7. There are 20 path segments. Let's make our lives a little easier by idealizing this as just three path segments.

(a) What is the length of the path demarcated by the points 0-8? Just treat this path as straight and use the Pythagorean theorem to get an answer. The units weren't specified on the figure's axes. Let's assume they are meters.

(b) What is the length of the path demarcated by the points 8-12?

(c) What is the length of the path demarcated by the points 12-20?

(d) Add up (a), (b), and (c).

(e) What is the length of a path that straight from 0 to 20 without taking any bend off to the east.

Problem 2 — Map-Making in Spacetime

Do Problem 5-3 on pp. 164-166

I have supplied you with tracing paper and a photocopy of the Figure on p. 165 so that you can do an accurate job.