In this fifth problem set is devoted to practice with 4-vectors, 1-forms, and metrics.

**Reading:**
Schutz Chapter 4 sections 1-4
Schutz Chapter 5 the first couple of sections

**Problems:**
All numbered problems are from Schutz.

(1) 3.9
(2) 3.30 parts (a) - (c)
(3) A spatial metric has the form

\[ ds^2 = \frac{dr^2}{(1 - 2M/r)} + r^2 (d\theta^2 + \sin^2 \theta \, d\phi^2) . \]

(a) Calculate the radial distance between \( r = 2M \) and \( r = 3M \).
(b) Calculate the spatial volume between spheres at \( r = 2M \) and \( r = 3M \).