Special and General Relativity (PHZ 4601/5606) Fall 2017 Solutions

Set 3

7. Spherical coordinates.

(a) $x^1 = -(5/4)\sqrt{2}\,[ly],\ x^2 = -(5/4)\sqrt{6}\,[ly],\ x^3 = -(5/2)\sqrt{2}\,[ly],$

(b) $\rho = \sqrt{(x^1)^2 + (x^2)^2} = \sqrt{5},\ \theta = \tan^{-1}\left(\rho/x^3\right) = \pi - 0.6405 = 2.501,$
$\phi = \tan^{-1}\left(x^2/x^1\right) = \tan^{-1}(-1/2) = -0.4636,\ r = \sqrt{14}.$