Numbered exercises are from Do Carmo, *Differential Geometry of Curves and Surfaces*.

1. Section 4.3, number 7.
2. Section 4.4, number 2.
3. Section 4.4, number 3.
4. Section 4.4, number 4.
5. Section 4.4, number 5.
6. Section 4.4, number 10.
7. Section 4.4, number 14.
8. Suppose we have a coordinate chart $\mathbf{x}$ with $E = G = 1/v^2$, $F = 0$ on the upper half plane $\{(u, v)|v > 0\}$. Show that the vertical lines $\alpha(t) = (0, t)$ for $t \in (0, \infty)$ and the circles $\alpha(t) = (b + a \sin t, a \cos t)$ for $t \in (-\pi, \pi)$ are geodesics.