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1. Derive the luminosity and angular diameter distances in FRW cosmologies from the metric.

$$ds^2 = c^2 dt^2 - a^2(t) \left(\frac{dr^2}{1 - kr^2} + r^2 d\theta^2 + r^2 \sin^2 \theta d\phi^2 \right)$$

2. Starting from geodesic equation compute the angle of deflection of light by a point mass.