$\begin{array}{c} \rm PHYS~480/581 \\ \rm Cosmology \end{array}$

Worksheet #8 Monday 09/19/2022

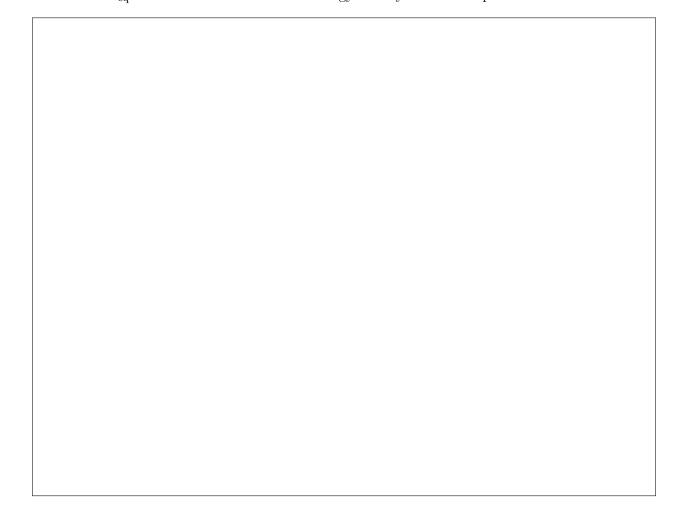
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Ques	stion	1.

Derive some simple expressions for the conformal time η as a function of a.

- (a) Show that $\eta \propto a^{1/2}$ in a matter dominated universe, and $\eta \propto a$ in a radiation dominated universe.
- (b) Consider a universe with only matter and radiation. Show that

$$\eta = \frac{2}{\sqrt{\Omega_{\rm m} H_0^2}} \left[\sqrt{a + a_{\rm eq}} - \sqrt{a_{\rm eq}} \right],\tag{1}$$

where $a_{\rm eq}$ is the scale factor when the energy density of matter equals that of radiation.



PHYS 480/581

Worksheet # 8