(6.8) THE FIRST EQUALITY IS A SUBSTITUTION OF (6.7) INTO (6.3). AND THE SECOND RESULTS FROM SUBSTITUTION OF (6.4).

(6.15) SINCE $P=0$, THE $\frac{4\pi G}{3}\rho$ FACTOR COMES FROM $\frac{\ddot{a}}{a}$ IN THE ACCELERATION EQUATION, (3.18). THE SECOND FACTOR IS ARRIVED AT BY SOLVING (6.4) FOR $1/H^2$. THIS IS $1/H_0^2$ SINCE WE ARE DEALING WITH THE <u>CURRENT</u> DECELERATION PARAMETER, q_0.

(7.8) MAKING THE INDICATED SUBSTITUTIONS INTO THE FLUID EQUATION GIVES

$$\dot{\rho} + 3\frac{\dot{a}}{a}\left(\rho + \frac{P}{c^2}\right) = 0 \rightarrow \dot{\rho} + \dot{\rho}_\Lambda + 3\frac{\dot{a}}{a}\left(\rho + \rho_\Lambda + \frac{P+P_\Lambda}{c^2}\right) = 0$$

THIS EQUATION SEPARATES INTO

$$\left[\dot{\rho} + 3\frac{\dot{a}}{a}\left(\rho + \frac{P}{c^2}\right)\right] + \left[\dot{\rho}_\Lambda + 3\frac{\dot{a}}{a}\left(\rho_\Lambda + \frac{P_\Lambda}{c^2}\right)\right] = 0$$

SINCE THE FIRST BRACKET IS ZERO (BY THE FLUID EQUATION), THE SECOND MUST ALSO BE ZERO.

(7.9) $\rho_\Lambda = \text{CONSTANT} \rightarrow \dot{\rho}_\Lambda = 0$, SINCE $\dot{a}$ IS NOT ZERO, $\rho_\Lambda + \frac{P_\Lambda}{c^2}$ MUST BE ZERO.

(7.11) SEE PROBLEM 7.3.