Callen

3.6-1. What will be the temp. of universe's radiation when its volume is doubled along an isentropic?

$$\frac{1}{T} = b^{1/4} V^{1/4} U^{-1/4},$$

$$S = \frac{4}{3} b^{1/4} U^{3/4} V^{1/4}$$

$$= \frac{4}{3} b^{1/4} U U^{-1/4} V^{1/4}$$

$$= \frac{4}{3} \frac{U}{T} = \frac{4}{3} \frac{bVT^4}{T} = \frac{4}{3} bVT^3.$$

S being constant requires $V \propto T^{-3}$

$\Rightarrow V \to 2V$ implies ~~$T \to 2^{-3} T$~~.

$$T^{-3} \to 2 T^{-3}$$

$$\Rightarrow T \to 2^{-1/3} T.$$