Solution for exercise 4.3.2 in Pitman

We first show that a constant Hazard rate implies an exponential distribution. Using (7) page 297

$$G(t) = e^{\int_0^t \lambda \mathrm{d}u} = e^{-\lambda t}$$

the survival function of an exponential distribution. The density of an exponential distribution with parameter(intensity) λ is $f(t) = \lambda e^{-\lambda t}$. The hazard rate is found using (6) page 297

$$\lambda(t) = \frac{\lambda e^{-\lambda t}}{e^{-\lambda t}} = \lambda$$

and the proof is complete.