3.7 The step response is obtained by accumulating the impulse response values.

$$s(n) = \sum_{k=-\infty}^{n} h(k) = \sum_{k=0}^{n} (0.8)^k - \sum_{k=0}^{n} (0.6)^k = \frac{1-(0.8)^{n+1}}{1-0.8} - \frac{1-(0.6)^{n+1}}{1-0.6}$$

Note that $s(n) \to H(1)$ as $n \to \infty$. Proof.

$$s(n) = \sum_{k=-\infty}^{n} h(k) \ \text{Æ} \sum_{k=-\infty}^{\infty} h(k)\, z^{-k} = H(1) \text{ for } z = 1$$

In this case we have $s(n) \to \dfrac{1}{1-0.8} - \dfrac{1}{1-0.6} = 2.5$ and

$$H(1) = \frac{0.2}{(1-0.8)(1-0.6)} = \frac{0.2}{0.2 \cdot 0.4} = 2.5$$