

a)

$$\begin{aligned} H(\text{fair dice}) &= -\frac{1}{6}\log_2 \frac{1}{6} - \frac{1}{6}\log_2 \frac{1}{6} - \frac{1}{6}\log_2 \frac{1}{6} - \frac{1}{6}\log_2 \frac{1}{6} - \frac{1}{6}\log_2 \frac{1}{6} - \frac{1}{6}\log_2 \frac{1}{6} \\ &= 0.43 + 0.43 + 0.43 + 0.43 + 0.43 + 0.43 = 2.58 \end{aligned}$$

b)

$$\begin{aligned} H(\text{loaded dice}) &= -\frac{1}{10}\log_2 \frac{1}{10} - \frac{1}{10}\log_2 \frac{1}{10} - \frac{1}{10}\log_2 \frac{1}{10} - \frac{1}{10}\log_2 \frac{1}{10} - \frac{1}{10}\log_2 \frac{1}{10} - \frac{1}{10}\log_2 \frac{1}{10} - \frac{1}{2}\log_2 \frac{1}{2} \\ &= 0.33 + 0.33 + 0.33 + 0.33 + 0.33 + 0.33 + 0.5 = 2.15 \end{aligned}$$