

1)

$$p(1,24), p(4,16), p(4,24) = 0$$

Poiché la somma della probabilità degli altri valori è 1.

2)

$$H(X) = \left(\frac{2}{18} \log_2 \frac{18}{2}\right) + \left(\frac{6}{18} \log_2 \frac{18}{6}\right) + \left(\frac{6}{18} \log_2 \frac{18}{6}\right) + \left(\frac{4}{18} \log_2 \frac{18}{4}\right) = 1.891061$$

$$H(X) = \left(\frac{10}{18} \log_2 \frac{18}{10}\right) + \left(\frac{6}{18} \log_2 \frac{18}{6}\right) + \left(\frac{2}{18} \log_2 \frac{18}{2}\right) = 1.3516441$$

$$H(X|Y) = \frac{10}{18} \cdot \left(\frac{1}{10} \log_2 10 + \frac{4}{10} \log_2 \frac{10}{4} + \frac{1}{10} \log_2 10 + \frac{4}{10} \log_2 \frac{10}{4}\right) + \frac{6}{18} \cdot \left(\frac{1}{6} \log_2 6 + \frac{1}{6} \log_2 6 + \frac{2}{3} \log_2 \frac{3}{2}\right) + \frac{2}{18} \cdot \left(\frac{1}{2} \log_2 2 + \frac{1}{2} \log_2 2\right) = 1.484947553$$

$$H(Y|X) = \frac{2}{18} \cdot \left(\frac{1}{2} \log_2 2 + \frac{1}{2} \log_2 2\right) + \frac{6}{18} \cdot \left(\frac{2}{3} \log_2 \frac{3}{2} + \frac{1}{6} \log_2 6 + \frac{1}{6} \log_2 6\right) + \frac{6}{18} \cdot \left(\frac{1}{6} \log_2 6 + \frac{2}{3} \log_2 \frac{3}{2} + \frac{1}{6} \log_2 6\right) + \frac{4}{18} \cdot (1 \log_2 1) = 0.94553$$

3)

$$H(X, Y) = H(X) + H(Y|X) = 2.836591 = 1.891061 + 0.94553 = 1.3516441 + 1.484947553 = H(Y) + H(X|Y)$$

$$H(X) > H(X|Y) \rightarrow 1.891061 > 1.484947553$$

$$H(Y) > H(Y|X) \rightarrow 1.3516441 > 0.94553$$