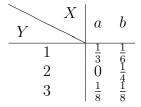# Worksheet

Please email your completed worksheet to conor.houghton@bristol.ac.uk.

Q1 - marginal and conditional distributions

Work out the marginal probability distributions and the $x = a$ conditional probability distribution $P(Y|X = a)$ for

Y \ X	a	b
1	$\frac{1}{3}$	$\frac{1}{6}$
2	0	$\frac{1}{4}$
3	$\frac{1}{8}$	$\frac{1}{8}$

Q2 - Working out entropy and information

Let $p(x, y)$ be given by $p(0, 0) = p(0, 1) = p(1, 1) = 1/3$ and $p(1, 0) = 0$. Find $H(X)$, $H(Y)$, $H(X|Y)$, $H(Y|X)$, $H(X, Y)$, $H(Y) - H(Y|X)$ and $I(X; Y)$.