

Math/Stat 251 Fall 2015

Computing Probabilities for Discrete Random Variables (December 2, 2015)

Example. Suppose that the joint probability function $\mathbf{P}(X = x, Y = y)$ of X and Y is as follows.

$X \downarrow Y \rightarrow$	$Y = 2$	$Y = 4$	$Y = 6$
$X = 1$	0.05	0.14	0.10
$X = 2$	0.25	0.10	0.02
$X = 3$	0.15	0.17	0.02

- (a) Determine $\mathbf{P}(XY < 6)$.
- (b) Determine the marginal for Y . In other words, determine $\mathbf{P}(Y = y)$ for all values of y .
- (c) Determine the conditional probability function (or conditional mass function or conditional density) for X given $Y = 4$. In other words, determine $\mathbf{P}(X = x | Y = 4)$ for all values of x .
- (d) Determine the marginal for X . In other words, determine $\mathbf{P}(X = x)$ for all values of x .
- (e) Determine the conditional probability function (or conditional mass function or conditional density) for Y given $X = 3$. In other words, determine $\mathbf{P}(Y = y | X = 3)$ for all values of y .
- (f) Compute $\mathbb{E}(Y | X = 3)$, the conditional expectation of Y given $X = 3$.