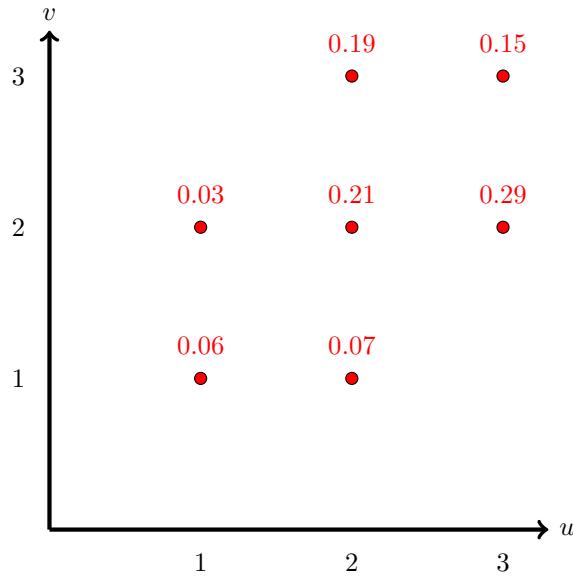


Let X and Y be random variables whose joint probability mass function $p_{X,Y}(u,v)$ is shown below, and let $Z = \min(X, Y)$. What is the value of $p_Z(1)$?

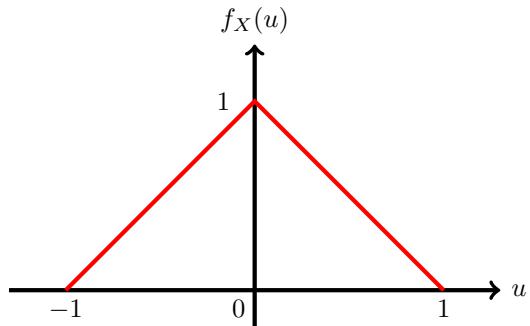


- (a) 0.16
- (b) 0.22
- (c) 0.1
- (d) 0.78
- (e) 0.49
- (f) 0.37
- (g) 0.09
- (h) 0.13
- (i) 0.03
- (j) 0.06
- (k) None of these

Let X and Y be i.i.d. random variables whose probability density functions $f_X(u)$ and $f_Y(u)$ equal e^{-u} when $u > 0$, and equal zero when $u \leq 0$. Define two new random variables $W = X + 3$ and $Z = Y + 4$. What is the probability that $W + 2Z$ is less than 11?

- (a) 0
- (b) $1/2$
- (c) $1/e$
- (d) $1/e^2$
- (e) $e/(1+e)$
- (f) 1
- (g) $1 - (1/e)$
- (h) $1/(2e)$
- (i) $1/7$
- (j) $1/11$
- (k) $7/11$
- (l) None of these

Suppose X is a continuous random variable, whose probability density function is shown in the figure below. If $Y = 3X + 7$, then what is the correlation coefficient $\rho_{X,Y}$ of X and Y ?



- (a) 1
- (b) -1
- (c) 0
- (d) $1/3$
- (e) $1/7$
- (f) $-1/3$
- (g) $-1/7$
- (h) $1/2$
- (i) $1/\sqrt{2}$
- (j) $1/9$
- (k) $1/49$
- (l) $1/21$
- (m) None of these