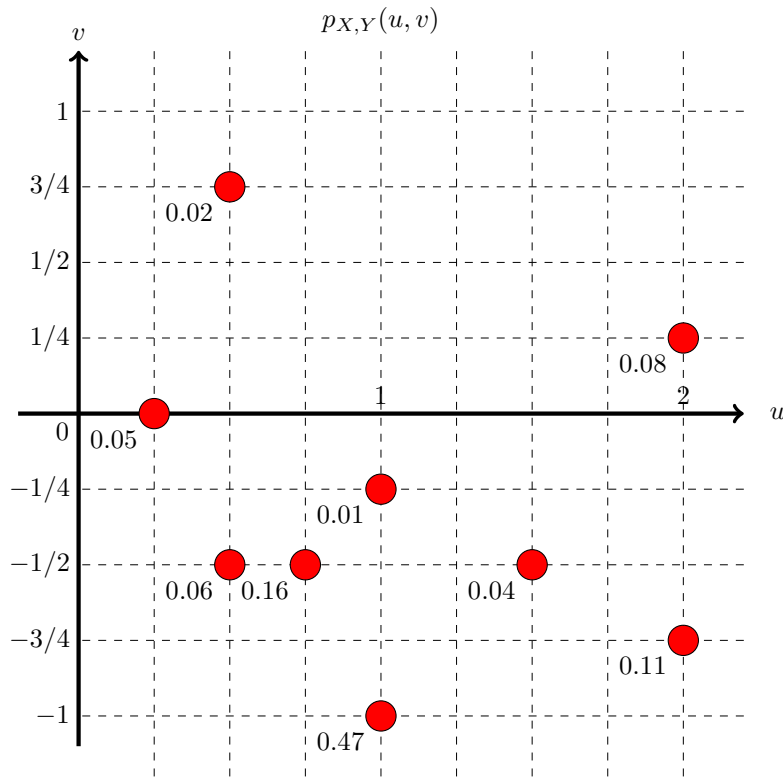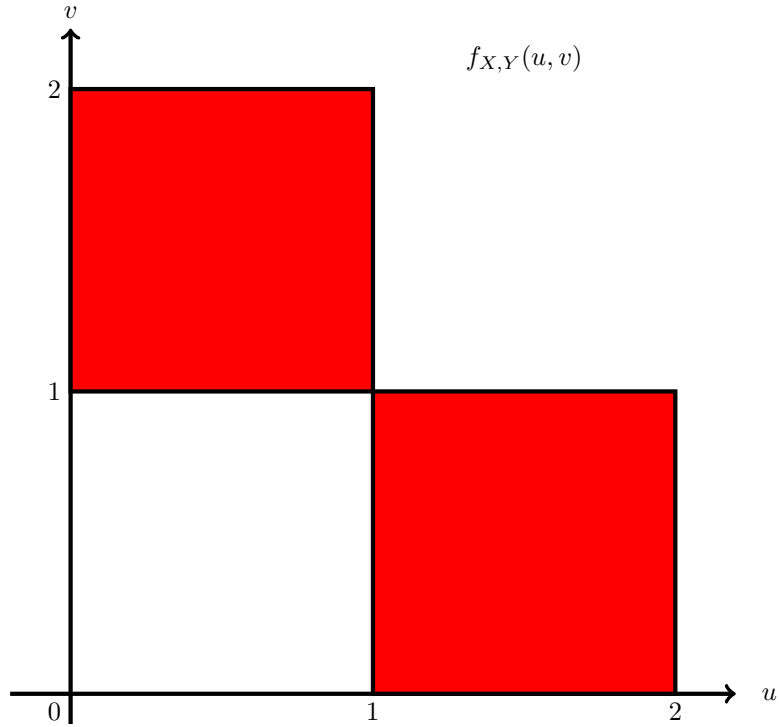Suppose random variables X and Y have joint probability mass function shown below. What is the probability that Y is smaller than $\sin(\pi X)$?
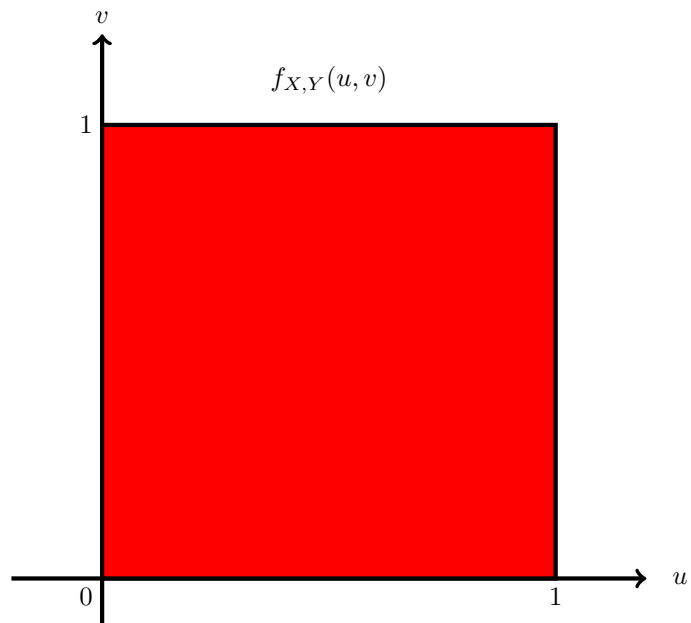
$$p_{X,Y}(u,v)$$

- 0.02
- 0.08
- 0.05
- 0.01
- 0.06
- 0.16
- 0.04
- 0.11
- 0.47

(a) 0.88

(b) 0.82

(c) 0.96

(d) 0.12

(e) 0.18

(f) 0.04

(g) 0.88

(h) 0.90

(i) 0.86

(j) 0.02

(k) 1

(l) 0

(m) None of these

Suppose random variables X and Y have a joint probability density function $f_{X,Y}(u,v)$ which is constant in the red region shown below, and zero elsewhere. What is the joint cummulative distribution function value $F_{X,Y}(\sqrt{2}, \sqrt{2})$?

$f_{X,Y}(u,v)$

(a) $\sqrt{2} - 1$

(b) $2\sqrt{2} - 2$

(c) $1/4$

(d) $3 - 2\sqrt{2}$

(e) $1.5 - \sqrt{2}$

(f) $2\sqrt{2}$

(g) $\sqrt{2}/2$

(h) $\sqrt{2}/4$

(i) $\sqrt{2}/8$

(j) $\sqrt{2} - 1$

(k) $2 - \sqrt{2}$

(l) $1/2$

(m) None of these

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Suppose random variables X and Y have a joint probability density function $f_{X,Y}(u,v) = 2u$ in the red region shown below, and zero elsewhere. What is the probability that Y is greater than X ?

(a) 1/3

(b) 1/6

(c) 2/3

(d) 1/2

(e) 5/6

(f) 1/12

(g) 1/4

(h) 3/4

(i) 5/12

(j) 1/8

(k) 3/8

(l) None of these