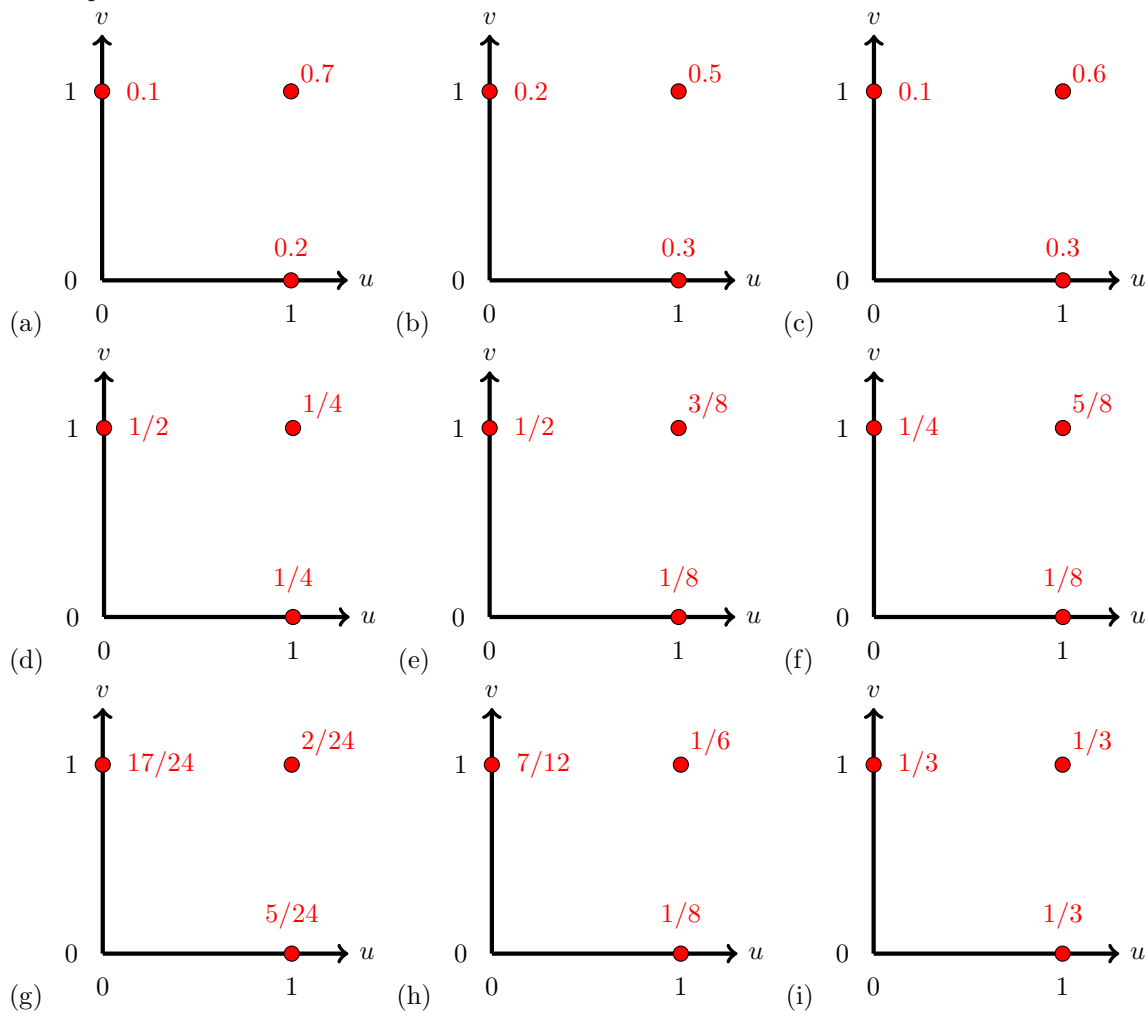


Let  $X$  and  $Y$  be random variables whose probability density function is uniform inside a circle centered at the origin and of radius 12. What is the probability that  $X$  and  $Y$  both lie in the interval  $[0, 2]$  ?

- (a)  $\frac{1}{36\pi}$
- (b)  $\frac{1}{6\pi}$
- (c)  $\frac{\pi}{6}$
- (d)  $\frac{\pi}{36}$
- (e)  $\frac{1}{36}$
- (f)  $\frac{1}{144}$
- (g)  $\frac{1}{6}$
- (h)  $\frac{1}{12}$
- (i)  $\frac{1}{2}$
- (j) 1
- (k) 0
- (l) None of these

For which of the following joint probability mass functions  $p_{X,Y}(u, v)$  are random variables  $X$  and  $Y$  independent?



(a) None of these

(b) (a)

(c) (b)

(d) (c)

(e) (d)

(f) (e)

(g) (f)

(h) (g)

(i) (h)

(j) (i)

Let  $X$  and  $Y$  be independent random variables whose probability density functions satisfy

$$f_X(u) = f_Y(u) = \begin{cases} e^{-u} & \text{if } u \geq 0 \\ 0 & \text{else} \end{cases}$$

What is the probability that  $Y$  is less than  $4X$  ?

- (a)  $4/5$
- (b)  $5/6$
- (c)  $3/4$
- (d)  $1/4$
- (e)  $1/5$
- (f)  $1/3$
- (g)  $1/2$
- (h)  $1/(4e)$
- (i)  $3/(4e)$
- (j)  $1$
- (k)  $0$
- (l) None of these