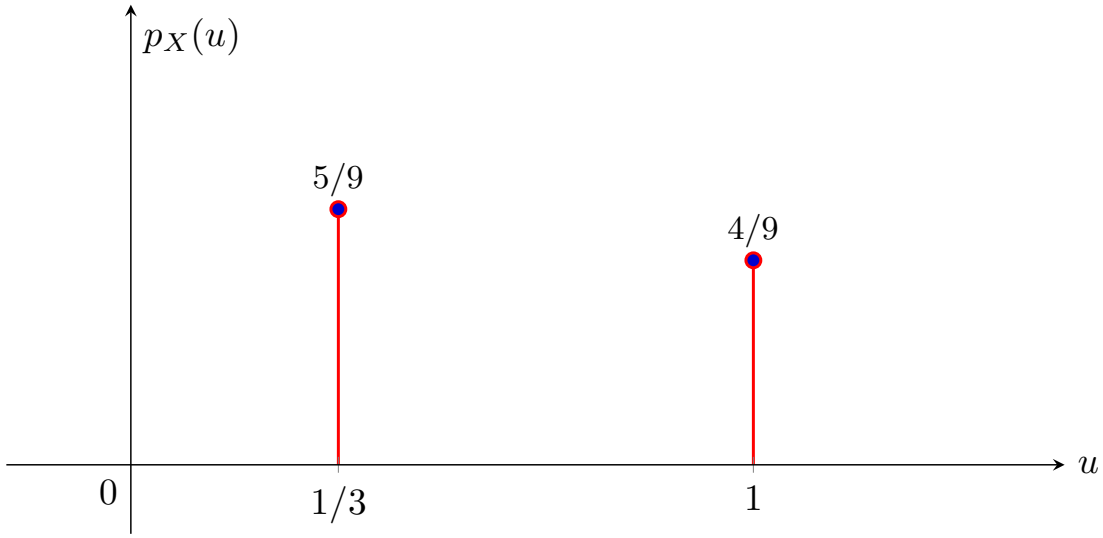
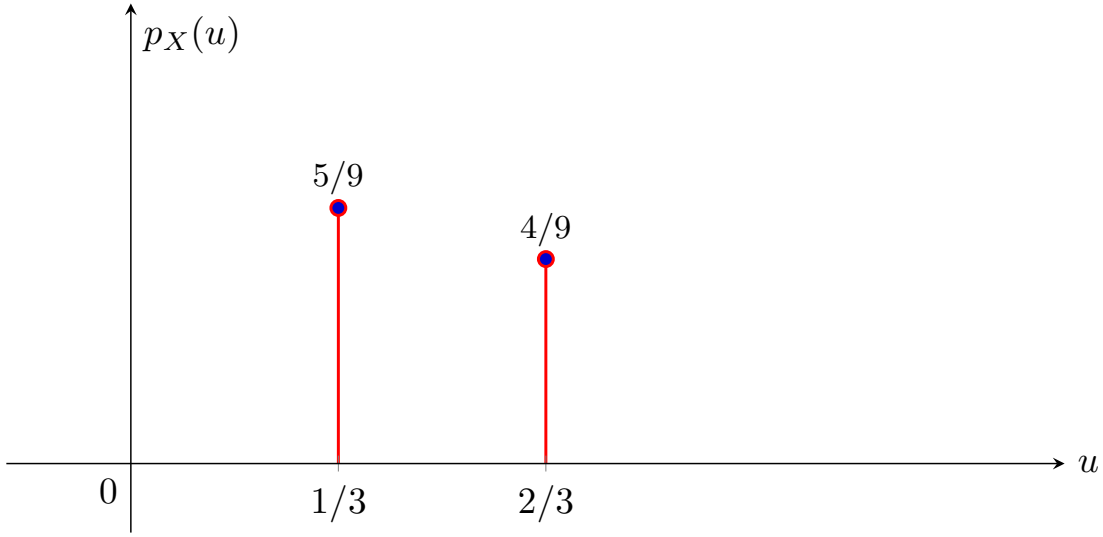
Suppose a biased coin with $P(Heads) = 1/3$ is flipped twice, and a random variable X equals $1/3$ whenever the outcomes of the two flips are the same, and X equals 1 when the outcomes are different. Which of the following is the probability mass function of X ?

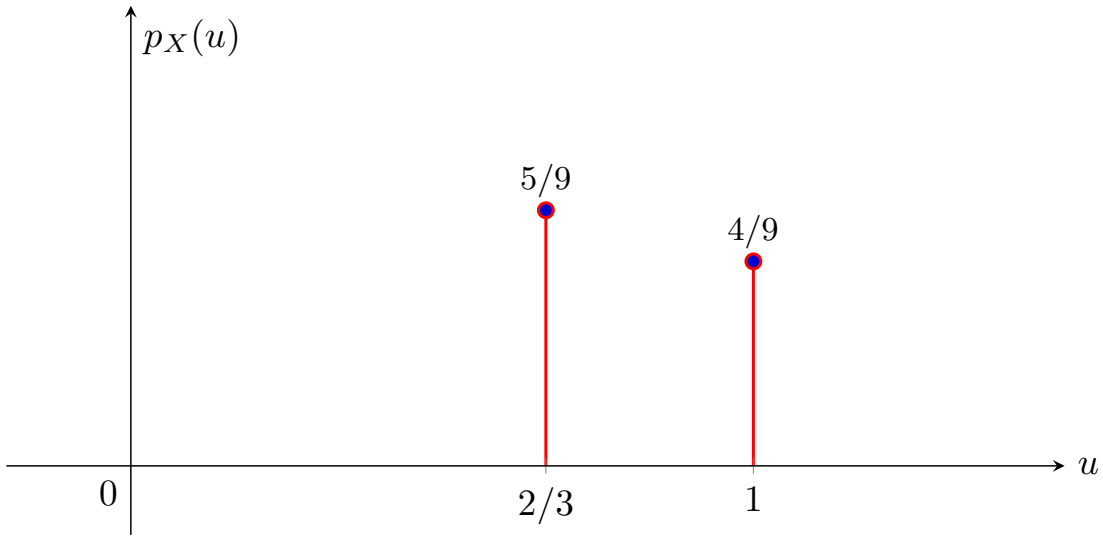
(a)



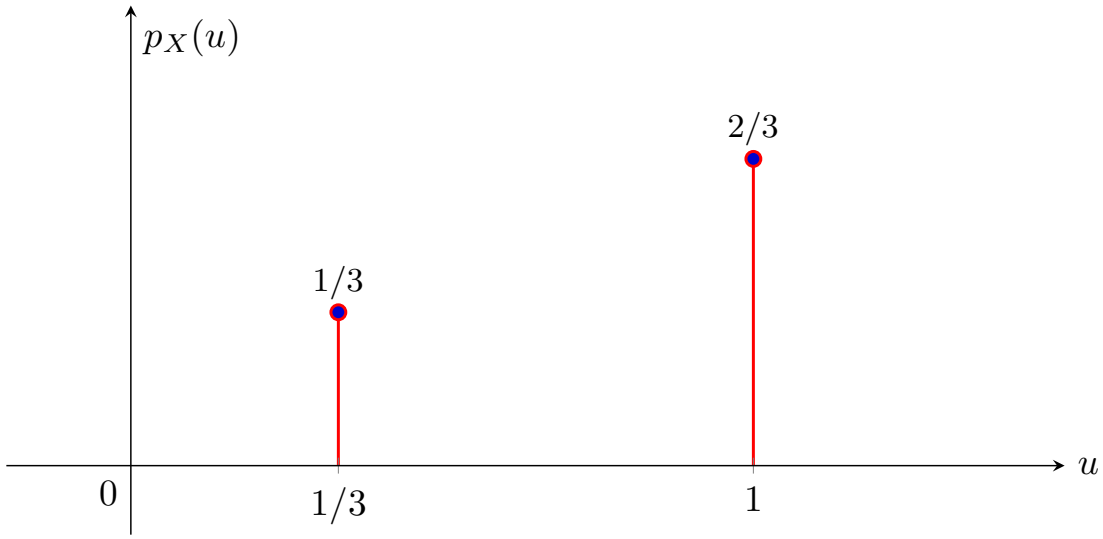
(b)



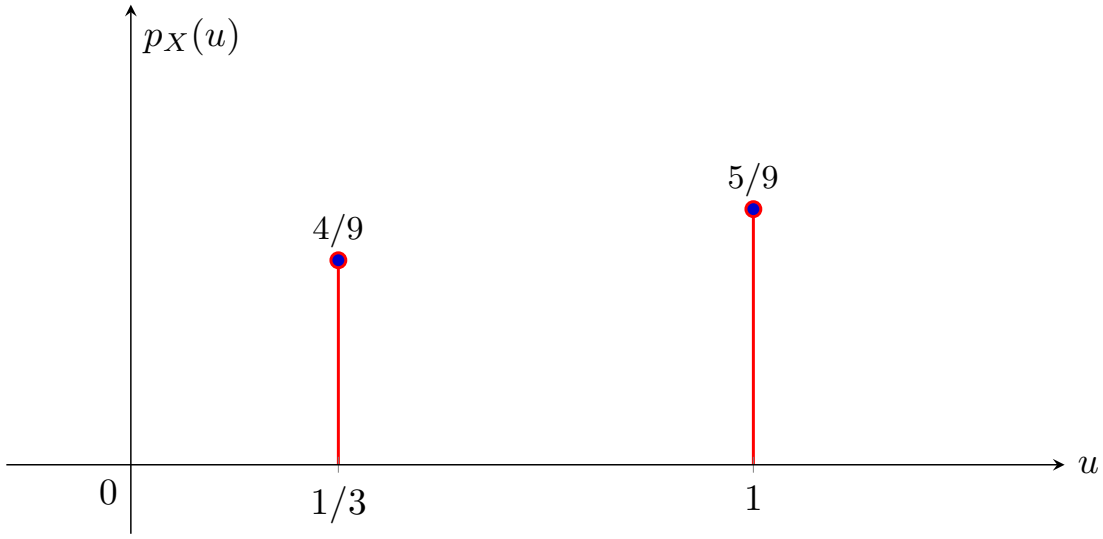
(c)



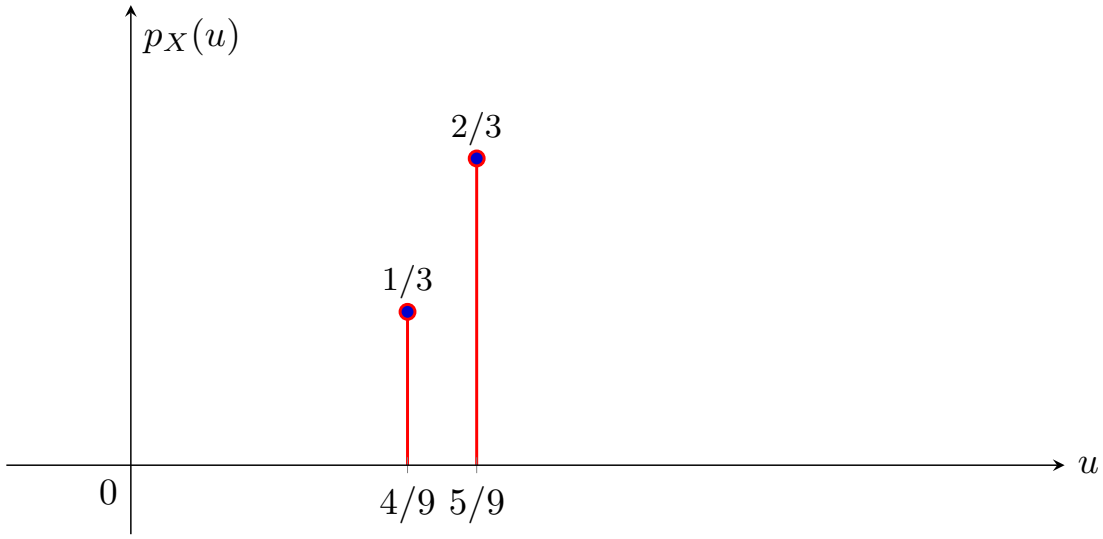
(d)



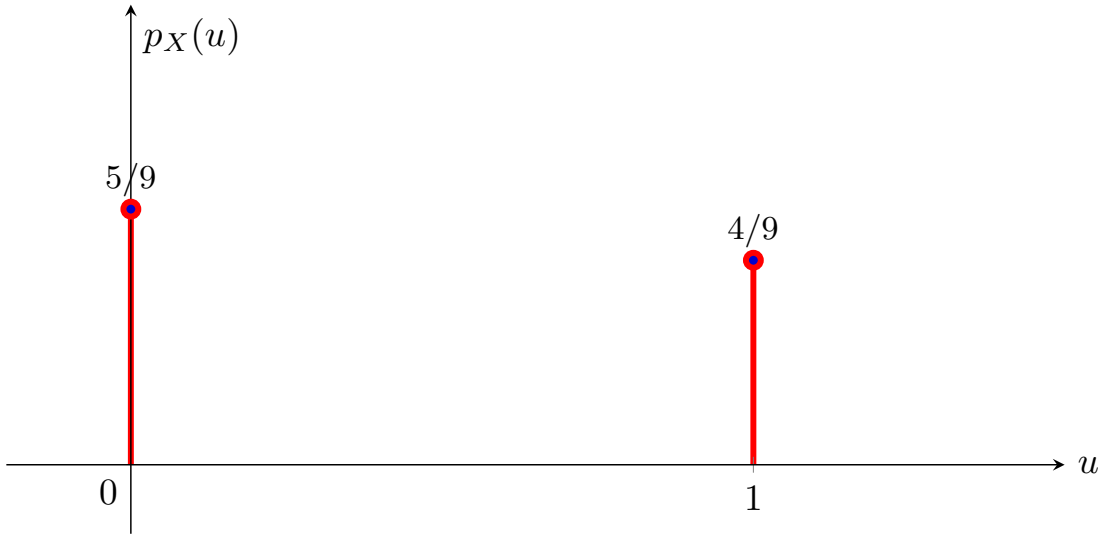
(e)



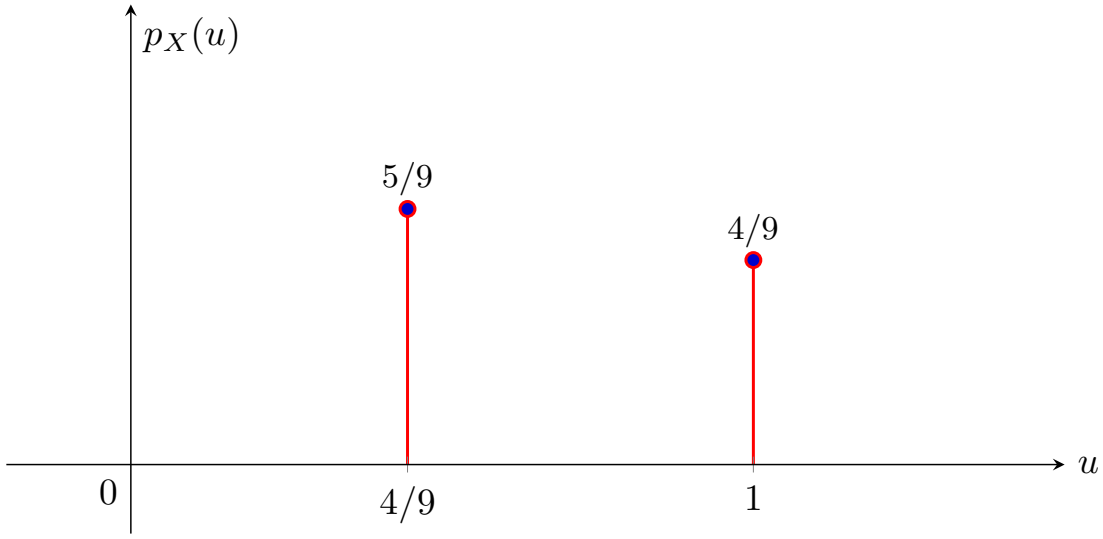
(f)



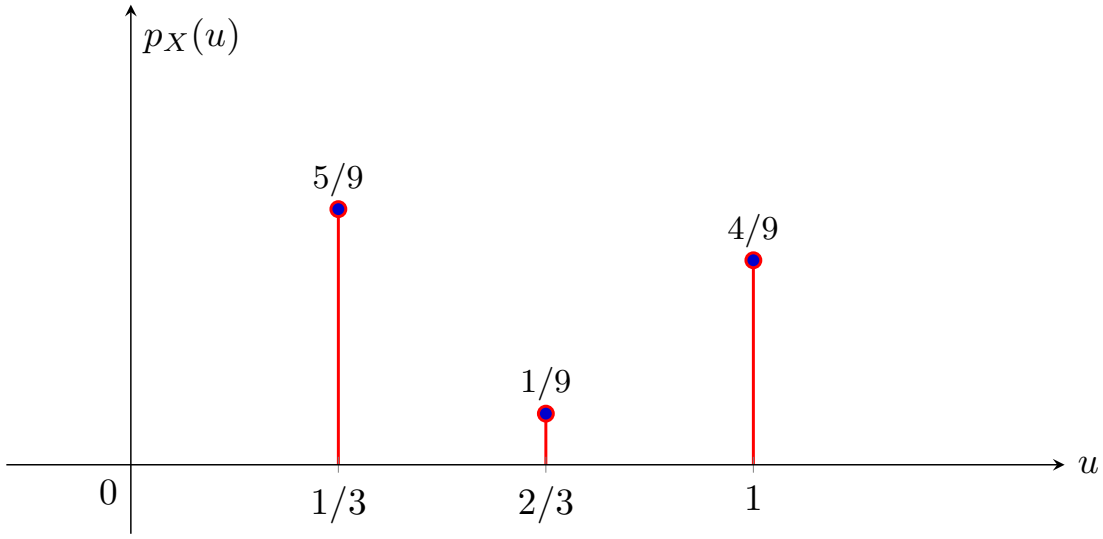
(g)



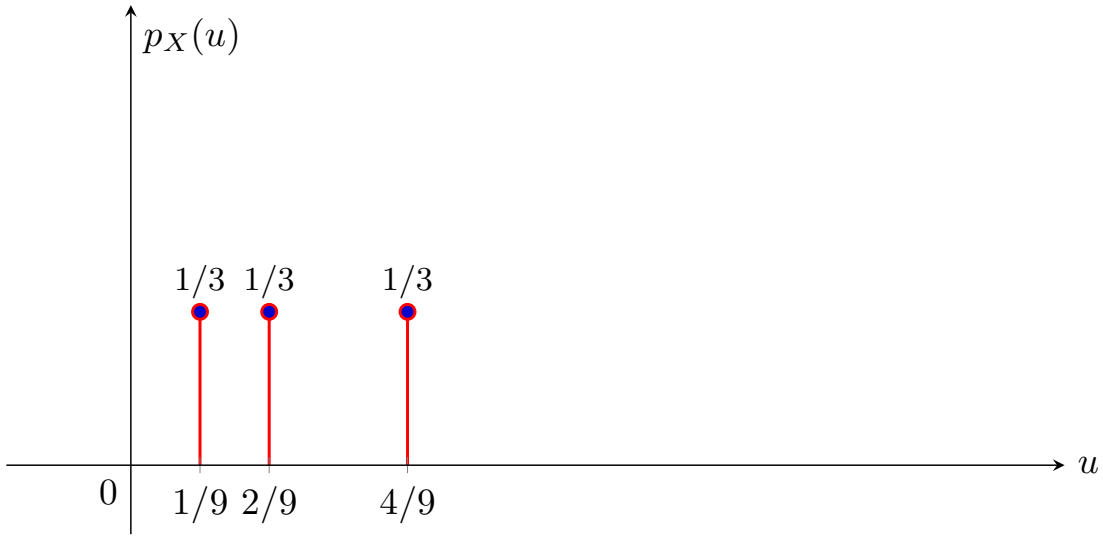
(h)



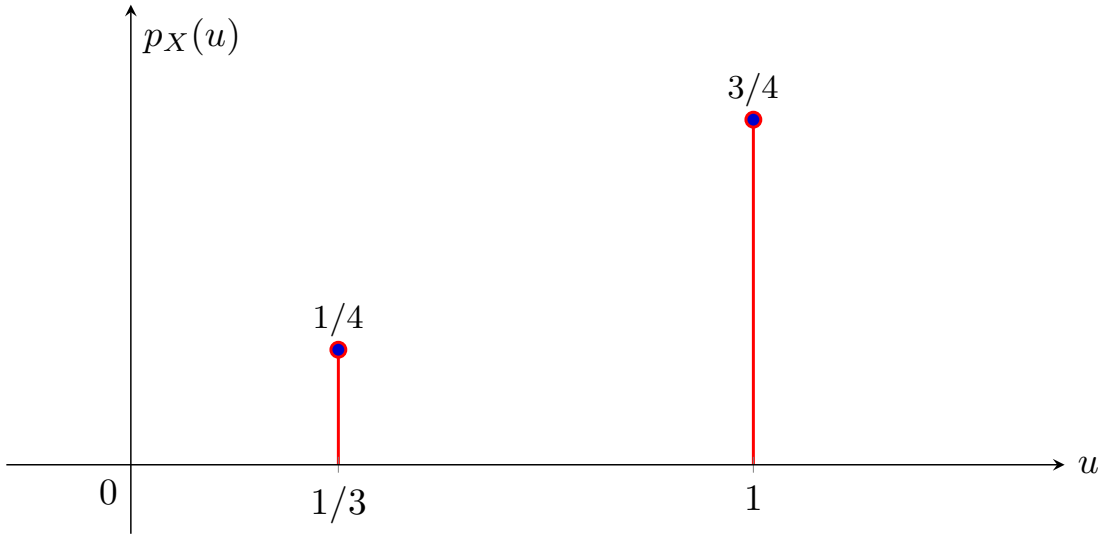
(i)



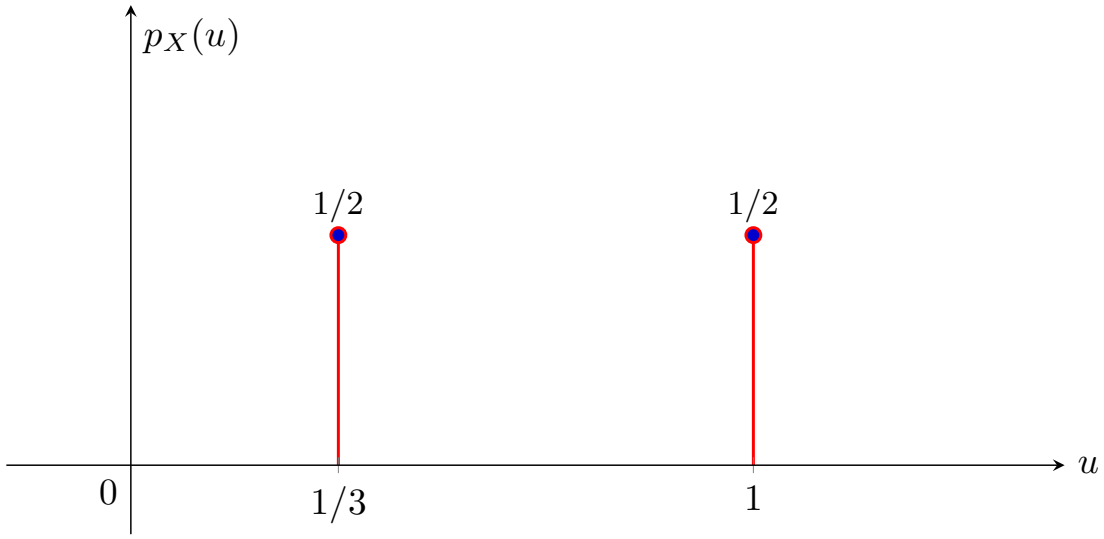
(j)



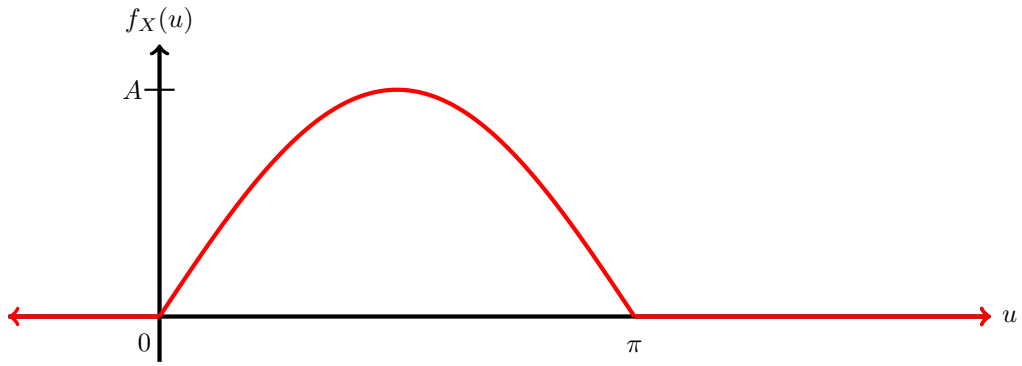
(k)



(l)



The probability density function (pdf) of a random variable X is the first half of one period of a sine wave, as plotted in the figure below.



What is the probability that X is between $-\pi/3$ and $\pi/3$?

(a) $1/4$

(b) $1/2$

(c) 1

(d) 0

(e) $1/8$

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

(g) $3/\pi$

(h) $1/\pi$

(i) $\frac{\sqrt{3}}{2}$

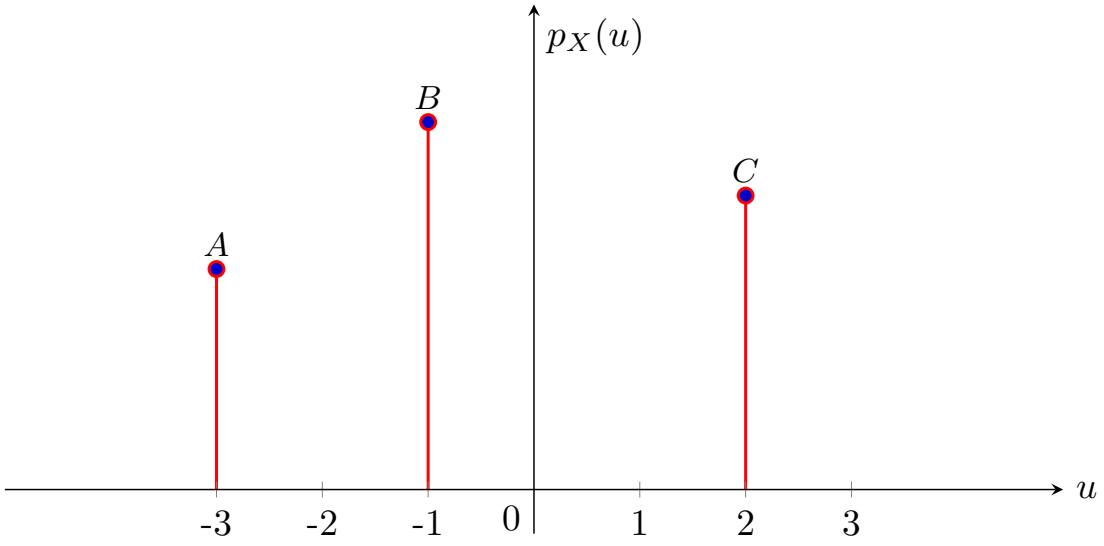
(j) $1 - \frac{\sqrt{3}}{2}$

(k) $\frac{1}{2} - \frac{\sqrt{3}}{4}$

(l) $2/3$

(m) None of these.

Let X be a discrete random variable, whose probability mass function (pmf) is shown below. If X has mean $-1/2$ and cummulative distribution (CDF) value $F_X(0) = 2/3$, then what is the value of B ?



(a) 5/12

(b) 5/24

(c) 5/6

(d) 7/12

(e) 1/6

(f) 1/3

(g) 1/4

(h) 3/4

(i) 2/3

(j) 0

(k) 1/8

(l) 1/2

(m) None of these