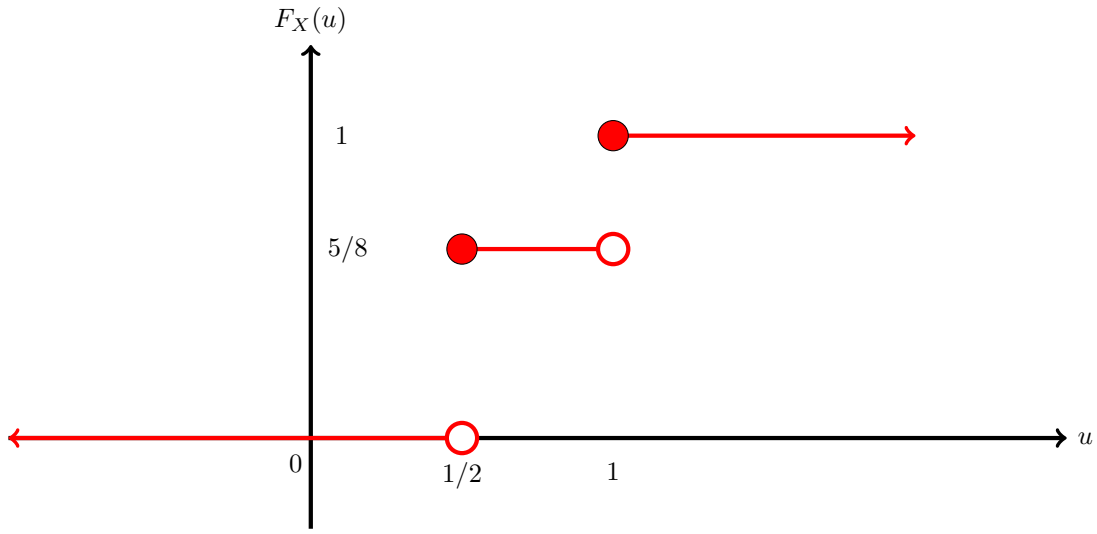
An experiment has a sample space $S = \{\text{red}, \text{blue}, \text{green}\}$ with probabilities $P(\{\text{red}\}) = 1/2$, $P(\{\text{blue}\}) = 3/8$, $P(\{\text{green}\}) = 1/8$. The cummulative distribution function (CDF) of a random variable X on S is shown below.



Which of the following could be true about X ?

(a) $X(\text{red}) = 1/2$, $X(\text{blue}) = 1$, $X(\text{green}) = 1/2$.

(b) $X(\text{red}) = 1$, $X(\text{blue}) = 1/2$, $X(\text{green}) = 1$.

(c) $X(\text{red}) = 0$, $X(\text{blue}) = 1$, $X(\text{green}) = 1$.

(d) $X(\text{red}) = 1/2$, $X(\text{blue}) = 1$, $X(\text{green}) = 1$.

(e) $X(\text{red}) = 1$, $X(\text{blue}) = 1/2$, $X(\text{green}) = 1/2$.

(f) $X(\text{red}) = 1/2$, $X(\text{blue}) = 3/8$, $X(\text{green}) = 1/8$.

(g) $X(\text{red}) = 1/8$, $X(\text{blue}) = 3/8$, $X(\text{green}) = 1/2$.

(h) $X(\text{red}) = 0$, $X(\text{blue}) = 5/8$, $X(\text{green}) = 1$.

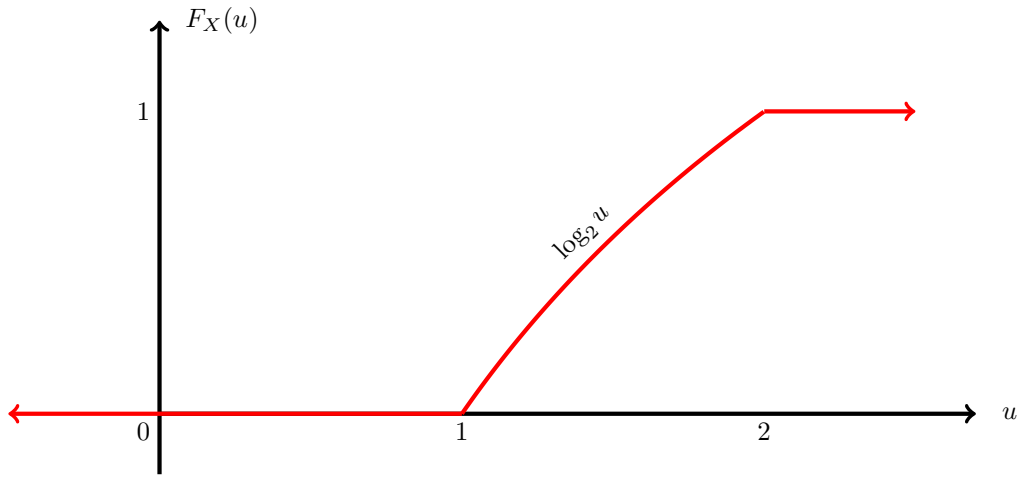
(i) $X(\text{red}) = 1$, $X(\text{blue}) = 5/8$, $X(\text{green}) = 0$.

(j) $X(\text{red}) = 1/2$, $X(\text{blue}) = 5/8$, $X(\text{green}) = 1$.

(k) $X(\text{red}) = 1$, $X(\text{blue}) = 5/8$, $X(\text{green}) = 1$.

(l) $X(\text{red}) = 1/2$, $X(\text{blue}) = 5/8$, $X(\text{green}) = 1/2$.

A random variable X has cummulative distribution function (CDF) shown below.



What is the probability that $\sin(2X)$ lies in the interval $[0, 1]$?

(a) $\log_2(\pi) - 1$

(b) $\log_2(\pi)$

(c) $\log_2(2\pi)$

(d) $\pi - 1$

(e) $\pi/2$

(f) $\pi/4$

(g) $1/2$

(h) $1/(2\pi)$

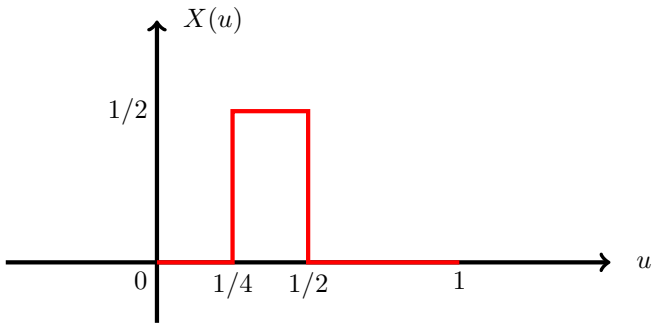
(i) $e^{-\pi/2}$

(j) 1

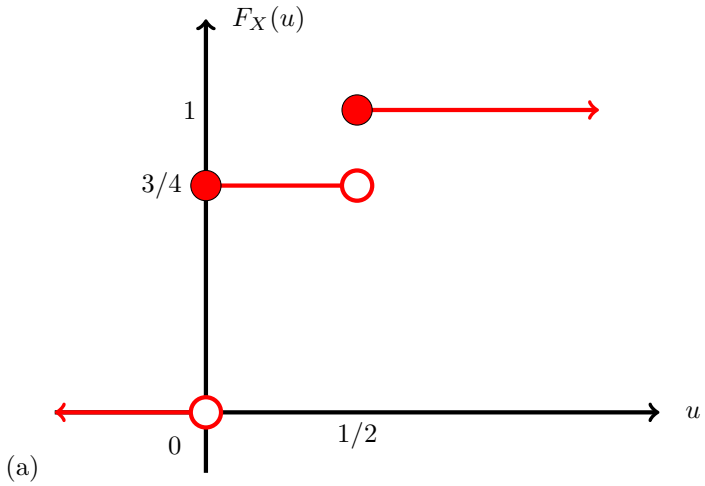
(k) 0

(l) None of these.

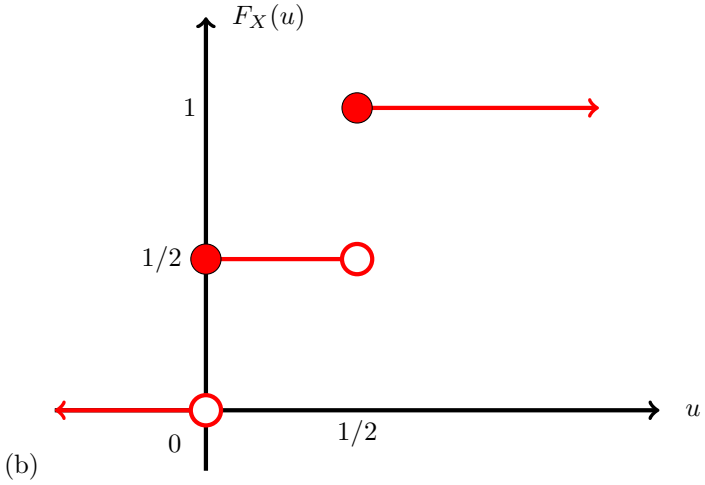
The sample space of an experiment is the unit interval $S = [0, 1]$, and $P([a, b]) = b - a$ whenever $0 \leq a \leq b \leq 1$. A random variable $X : S \to R$ is shown in red in the figure below.



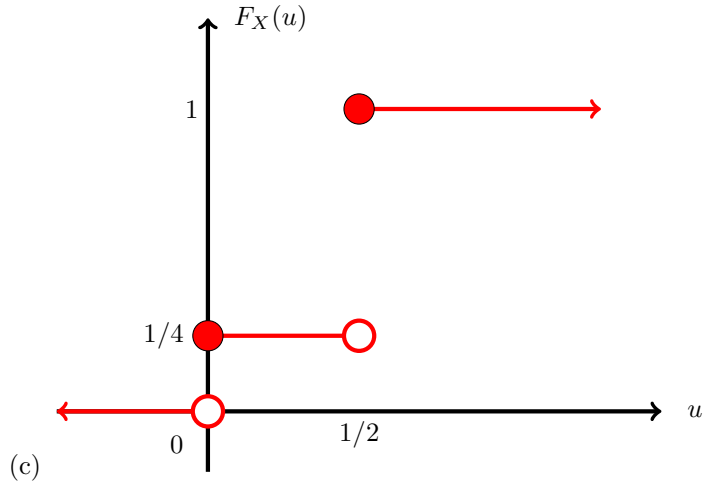
Which of the following is the cummulative distribution function (CDF) of X ?



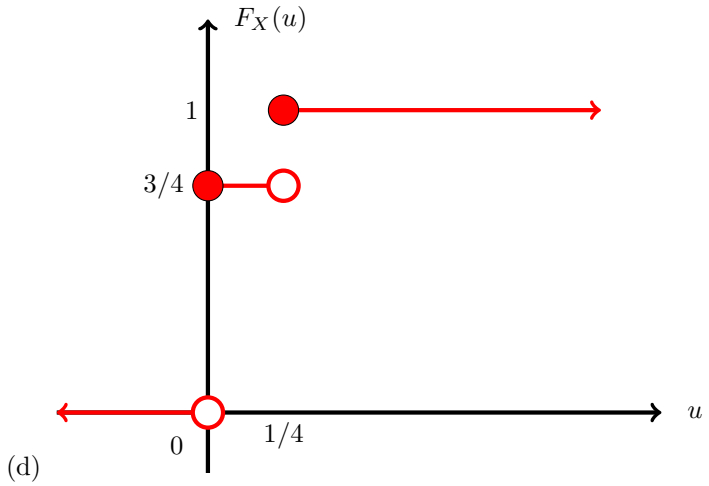
(a)



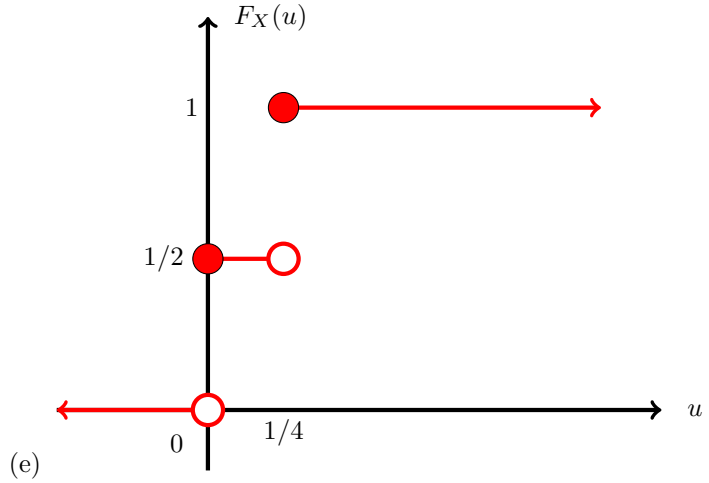
(b)



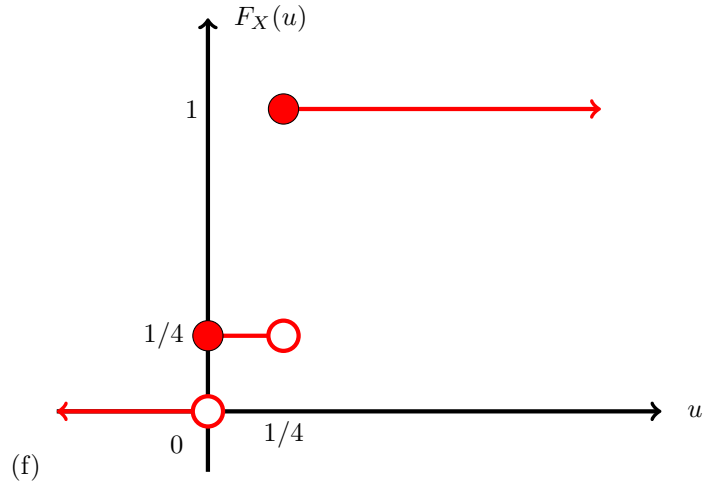
(c)



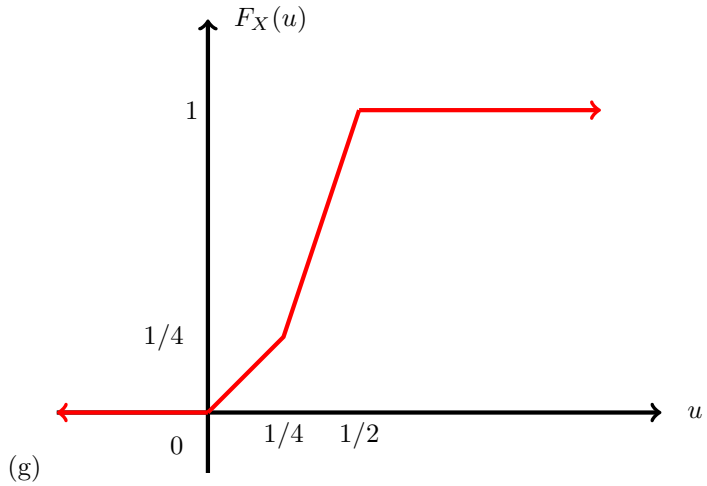
(d)



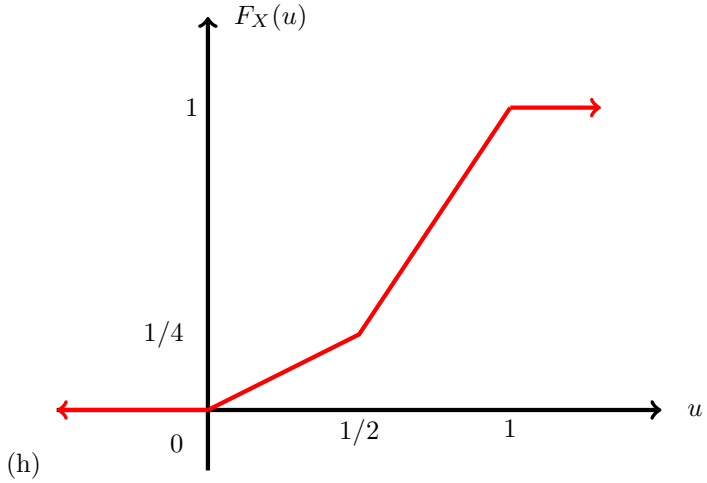
(e)



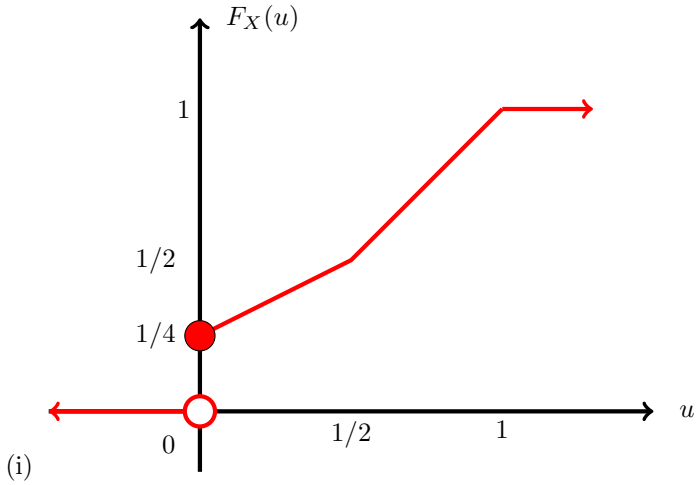
(f)



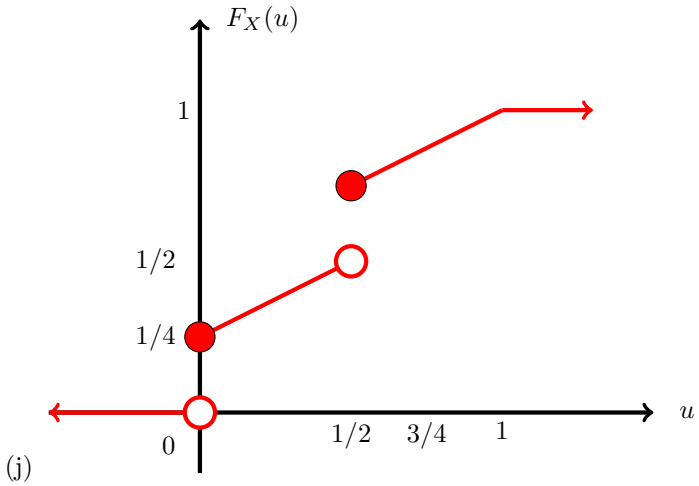
(g)



(h)



(i)



(j)