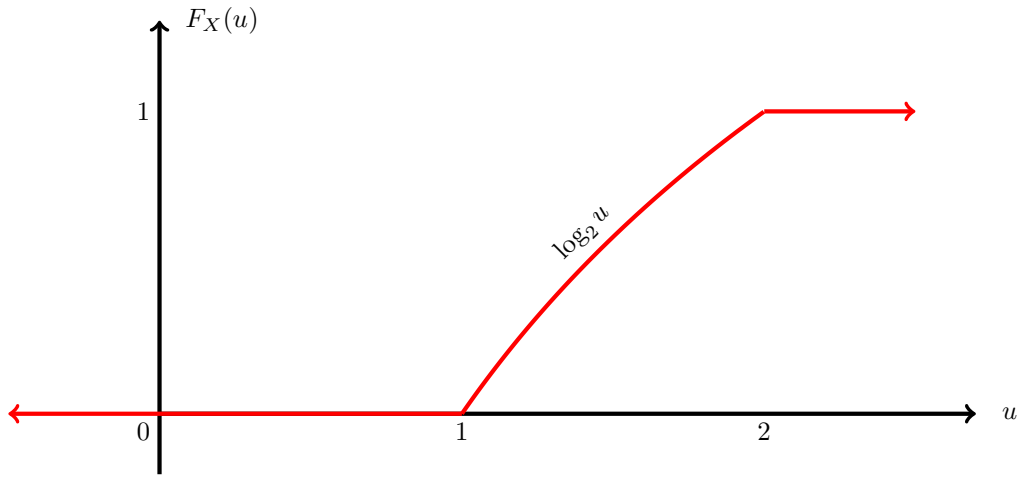
A random variable X has cummulative distribution function (CDF) shown below.



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.