A random variable X has a probability density function which equals Ae^{-u} on the interval $[0, 1]$ and is zero otherwise, where A is a constant. What is the probability that X is less than $1/2$?

(a) $\frac{e-\sqrt{e}}{e-1}$

(b) $\frac{e-1}{e-1}$

(c) $\frac{e-\sqrt{e}}{e}$

(d) $\frac{e^2-e}{e-1}$

(e) $\frac{1}{e-1}$

(f) $\frac{e-\sqrt{e}}{e+1}$

(g) $\frac{e^2}{e-1}$

(h) $\frac{e}{e+1}$

(i) $\frac{e^2}{e+1}$

(j) $\frac{\sqrt{e}}{e-1}$

(k) $\frac{\sqrt{e}}{e+1}$

(l) $1/2$

(m) None of these