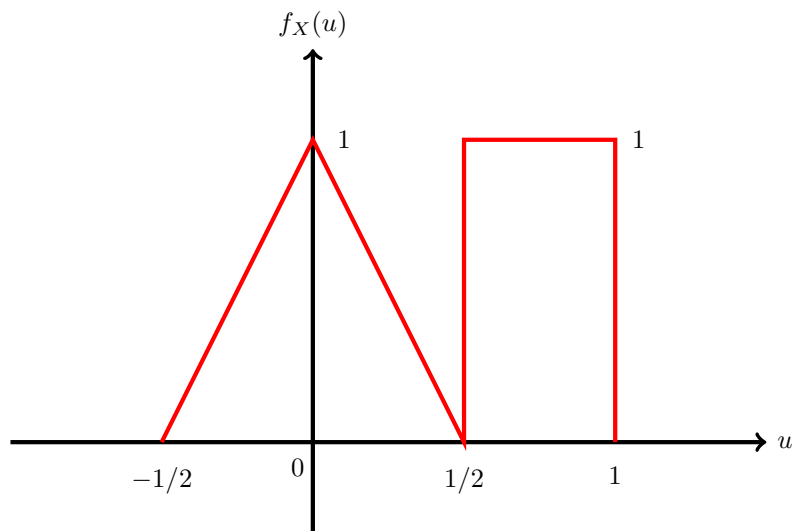Let X be a continuous random variable whose probability density function is shown below in red. What is the expected value of X ?

(a) 3/8

(b) 5/8

(c) 1/8

(d) 7/8

(e) 1/2

(f) 1/4

(g) 1/9

(h) 3/4

(i) 1/16

(j) −1/2

(k) 1

(l) 0

(m) None of these

Solution: Since $uf_X(u)$ is an odd function of u in the interval $[-1/2, 1/2]$, we get

$$E[X] = \underbrace{\int_{-1/2}^{1/2} uf_X(u)du}_{0} + \int_{1/2}^{1} u\,du = (u^2/2)\Big|_{1/2}^{1} = 3/8.$$