A random variable X with mean and variance both equal to one has probability density function $f(u)$. What is the value of $\int_{-\infty}^{\infty}(1-2u)(u+1)f(u)du$?

(a) -4

(b) -3

(c) -2

(d) -1

(e) 0

(f) 1

(g) 2

(h) 3

(i) 4

(j) 5

(k) 6

(l) None of these