Suppose a random variable has probability density function

$$f(b) = Ae^{-(2b-1)^2}$$

where A is a constant and $-\infty < b < \infty$. What is the mean times the variance?

(a) $1/16$

(b) $1/8$

(c) $1/4$

(d) $1/2$

(e) 2

(f) 1

(g) 4

(h) $1/\sqrt{8}$

(i) $1/\sqrt{2}$

(j) $2\sqrt{2}$

(k) 8

(l) None of these.

Suppose a fair 100-sided die is rolled once and the resulting value is called X. That is, $X \in \{1, 2, 3, \ldots, 100\}$. What is the variance of $\sin(\pi X/2)$?

(a) $1/2$

(b) $1/4$

(c) 1

(d) 2

(e) 100

(f) 50

(g) 25

(h) $\sqrt{2}$

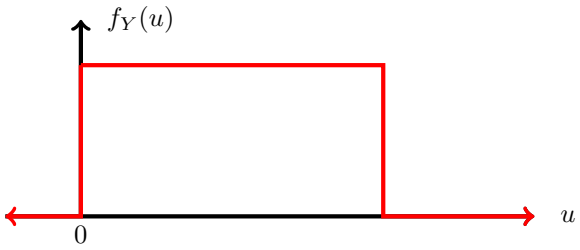
(i) $1/8$

(j) 4

(k) $25/2$

(l) None of these

Suppose Y is a random variable with variance equal to three and whose probability density function is shown below in red. What is the expected value of $e^{Y/3}$?



(a) $(e-1)(e+1)/2$

(b) $(e^2+1)/2$

(c) e^2+1

(d) $(e^2+1)/3$

(e) $(e^2+1)/6$

(f) $(e^2-1)/3$

(g) $(e+1)/3$

(h) $(e+1)/6$

(i) $(e-1)/3$

(j) $(e-1)/2$

(k) 3

(l) None of these.