One piece of fruit is chosen randomly from a box containing 3 apples, 4 bananas, and 5 cherries. Each piece of fruit is equally likely. The random variables X and Y are defined as follows:

$$\begin{aligned} X(apple) &= 0 & Y(apple) &= 1 \\ X(banana) &= 1 & Y(banana) &= 1 \\ X(cherry) &= -1 & Y(cherry) &= 0 \end{aligned}$$

What is the probability that $(X^2 - 2XY)^2$ is positive?

(a) 3/4

(b) 1/4

(c) 1/3

(d) 2/3

(e) 5/12

(f) 7/12

(g) 0

(h) 1

(i) 1/2

(j) 1/12

(k) 3/8

(l) None of these