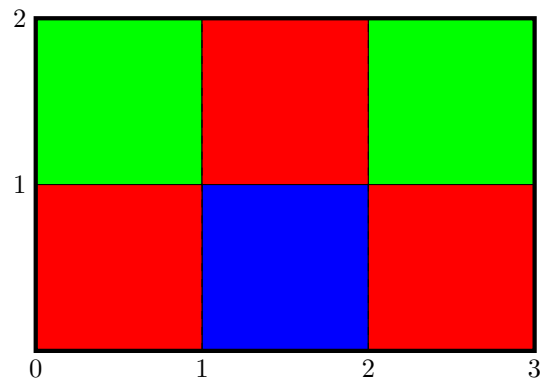If two points are independently chosen uniformly at random from inside the tri-colored rectangle shown below, then what is the probability they will be in the same colored region?

(a) 7/18

(b) 7/9

(c) 7/36

(d) 11/18

(e) 5/6

(f) 1/6

(g) 1/3

(h) 1/2

(i) 1/4

(j) 1/9

(k) 1/18

(l) None of these

If X is a random variable uniformly distributed on the interval $[0, 1]$, then what is the correlation coefficient between X and X^2?

(a) $\sqrt{15}/4$

(b) $\sqrt{15}/2$

(c) $\sqrt{15}$

(d) $\sqrt{5}/4$

(e) $45/4$

(f) $25/12$

(g) $\sqrt{15}/12$

(h) $5/4$

(i) $3\sqrt{15}/4$

(j) $\sqrt{3}/4$

(k) $1/12$

(l) None of these

If the joint probability density function of random variables X and Y is

$$f_{X,Y}(u, v) = \left(\pi\sqrt{3} \cdot e^{(2/3)(u^2 - uv + v^2)}\right)^{-1}$$

then what is the variance of $X + 2Y$?

(a) 7

(b) 5

(c) 2

(d) 4

(e) 6

(f) 3

(g) 1

(h) 8

(i) 9

(j) 12

(k) 10

(l) None of these