# AI1103–Assignment-3

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Download all latex-tikz codes from

https://github.com/AravindCSEiith/Probability−and−Random−variables_AI1103_Asignment−3/blob/main/Assignment_3_AI1103.tex

## Question

Let the random variable X have the distribution $P(X = 0) = P(X = 3) = p$, $P(X = 1) = 1 - 3p$ for $0 \leq p \leq \frac{1}{2}$. What is the maximum value of V(X)?

A) 3
B) 4
C) 5
D) 6
E) none

## Solution

Given, for $0 \leq p \leq \frac{1}{2}$,

$$P(X = 0) = p \tag{0.0.1}$$
$$P(X = 1) = 1 - 3p \tag{0.0.2}$$
$$P(X = 3) = p \tag{0.0.3}$$

Now consider $P(X = 1) = 1 - 3p$ for $p = \frac{1}{2}$. We get,

$$P(X = 1) = 1 - 3p \tag{0.0.4}$$
$$= 1 - (3)\left(\frac{1}{2}\right) \tag{0.0.5}$$
$$= 1 - \frac{3}{2} \tag{0.0.6}$$
$$= -\frac{1}{2} < 0 \tag{0.0.7}$$

Probability cannot be negative. But in equation (0.0.7) probability is negative, which is not possible. Therefore, the question is not a proper one.

Answer : Option E