

# Assignment 2

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Download all python codes from

<https://github.com/VIB2020/AI1103/blob/main/Assignment%202/code/Assignment%202.py>

and latex-tikz codes from

<https://github.com/VIB2020/AI1103/blob/main/Assignment%202/Assignment%202.tex>

$$P(X) = \sum_{n=1}^{+\infty} q^{2n} p \quad (1)$$

$$= p \sum_{n=1}^{+\infty} (q^2)^n \quad (2)$$

$$= p \left( \frac{1}{1 - q^2} \right) = \frac{p}{1 - q^2} = \frac{\frac{1}{6}}{1 - \frac{25}{36}} = \frac{6}{11} \quad (3)$$

$$P(\text{A wins the game}) = P(X) = \frac{6}{11}$$

Option D

## 1 PROBLEM

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(ELECTRICAL ENGG. SECTION)

Two players A, and B alternately keep rolling a fair dice. The person to get a six first wins the game. Given that player A starts the game, the probability that A wins the game is:

A:  $\frac{5}{11}$       B:  $\frac{1}{2}$       C:  $\frac{7}{13}$       D:  $\frac{6}{11}$

## 2 SOLUTION

Let the random variables X denote the win of A

Give that the die is fair

$$\Rightarrow \text{The probability of getting 6} = \frac{1}{6} = p \text{ (say)}$$

$$\Rightarrow \text{The probability of getting 6} = \frac{5}{6} = q \text{ (say)}$$

$$P(\text{A wins on the first throw}) = p$$

Constraint: A wins the game

Thus, if A does not get 6 on the first throw then B also should not get 6 on the second throw. P (A wins on the third throw) =  $q^2 p$

$$P(\text{A wins on the } (2n + 1)^{\text{th}} \text{ throw}) = q^{2n} p$$