Assignment 1

AI1110: Probability and Random Variables
Indian Institute of Techonology Hyderabad

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12.13.6.7: Question. A die is thrown again and again until three sixes are obtained. Find the probability of obtaining the third six in the sixth throw of the die.

Answer: $\frac{625}{23328}$.

Solution:

Probability of getting a six in a throw of a die $= \frac{1}{6}$.

Probability of not getting a six in a throw of a die $= \frac{5}{6}$.

Number of ways that 2 sixes will come in first five throws is ${}^5C_2 \times 5^3$

The probability that the 2 sixes come in the first five throws of the die is

$$\frac{{}^5C_2 \times 5^3}{6^5} = \frac{10 \times 5^3}{6^3}$$

Probability that third six comes in the sixth throw

$= \frac{10\times5^3}{6^3} \times \frac{1}{6}$

$= \frac{625}{23328}$