Question

A die marked A to E is rolled 50 times. Find the probability of getting "D" exactly 5 times

Answer:-

This is a problem of binomial distribution

Probability of getting D in one throw of dice

$$= p = \frac{\text{No of D in Dice}}{\text{Total Number of Chairs (A to E)}}$$

$$= \frac{1}{5} = 0.2$$

Probability of not getting D in one throw of dice

$$= q = 1 - p = 1 - 0.2 = 0.8$$

No of times dice thrown $= n = 50$

Exact number of times D should show up $= r = 5$

Using formula for binomial distribution, probability of getting D

$$= {}^{n}C_{r} (p)^{r} (q)^{n-r}$$

$$= {}^{50}C_{5} (0.2)^{5} (0.8)^{50-5}$$

$$= \frac{\lfloor 50}{\lfloor 5 \lfloor 50-5} (0.2)^{5} (0.8)^{45}$$

$$= 0.182953$$