Q2. Bag I contains 4 white and 6 black balls while another Bag II contains 4 white & 3 black balls. One ball is drawn at random from one of the bags & it is found to be black. Find the probability that it was drawn from Bag I.

E_1 = Bag I contains (4 white + 6 Black balls)

$p(E_1) = 1/2$

E_2 = Bag 2 contains (4 white + 3 Black balls)

$p(E_2) = 1/2$.

A = probability of black balls

$p(A/E_1) = 6/10$

$p(A/E_2) = 3/7$.

using Baye's theorem p(of getting black ball from bag I) $= \dfrac{p(E1) * p(A/E_1)}{P(E1) * p(A/E_1) + p(E_2) * p(A/E_2)}$

$$= \frac{\frac{6}{10} \times \frac{1}{2}}{\frac{6}{10} \times \frac{1}{2} + \frac{3}{7} \times \frac{1}{2}} = 7/12 \text{ Ans.}$$

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Q3. A man is known to speak truth 2 out of 3 times. He throws a dice & reports that number obtained is four. Find the probability that the number obtained is actually a four.

E_1 = probability of speaking truth = 2/3

$P(E_1) = 2/3$

E_2 = probability of speaking lie = 1/3

A = rolling a dice with number = 4.

$P(A/E_1) = 1/6$

$P(A/E_2) = 5/6$

Using Baye's theorem

P(of speaking truth with 4 on dice)

$$= \frac{P(E_1) * P(A/E_1)}{P(E_1) * P(A/E_1) + P(E_2) * P(A/E_2)}$$

$$= \frac{1/6 \times 2/3}{1/6 \times 2/3 + 1/3 \times 5/6} = 2/7 \text{ Ans}$$