

14 Three dice are thrown at the same time. Find the probability of getting three two's, if it is known that the sum of the numbers on the dice was six.

On a throw of three dice, we have sample space $[n(S)] = 6^3 = 216$

Let E_1 is the event when the sum of numbers on the dice was six and E_2 is the event when three two's occurs.

$$\Rightarrow E_1 = \{(1, 1, 4), (1, 2, 3), (1, 3, 2), (1, 4, 1), (2, 1, 3), (2, 2, 2), (2, 3, 1), (3, 1, 2), (3, 2, 1), (4, 1, 1)\}$$

$$\Rightarrow n(E_1) = 10 \text{ and } E_2 = \{2, 2, 2\}$$

$$\Rightarrow n(E_2) = 1$$

$$\text{Also, } (E_1 \cap E_2) = 1$$

$$\therefore P(E_2 / E_1) = \frac{P \cdot (E_1 \cap E_2)}{P(E_1)} = \frac{1/216}{10/216} = \frac{1}{10}$$