



# ***Grade 12 GS***

## ***Probability ex 16***

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**Exercise 16: “If then question or two actions:**

An urn contains four black balls and 1 white ball.

A game runs in the following manner:

A six faces fair die is rolled;

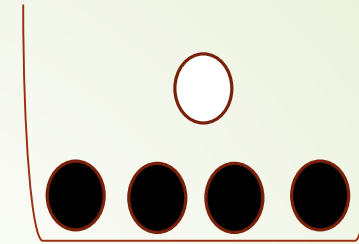
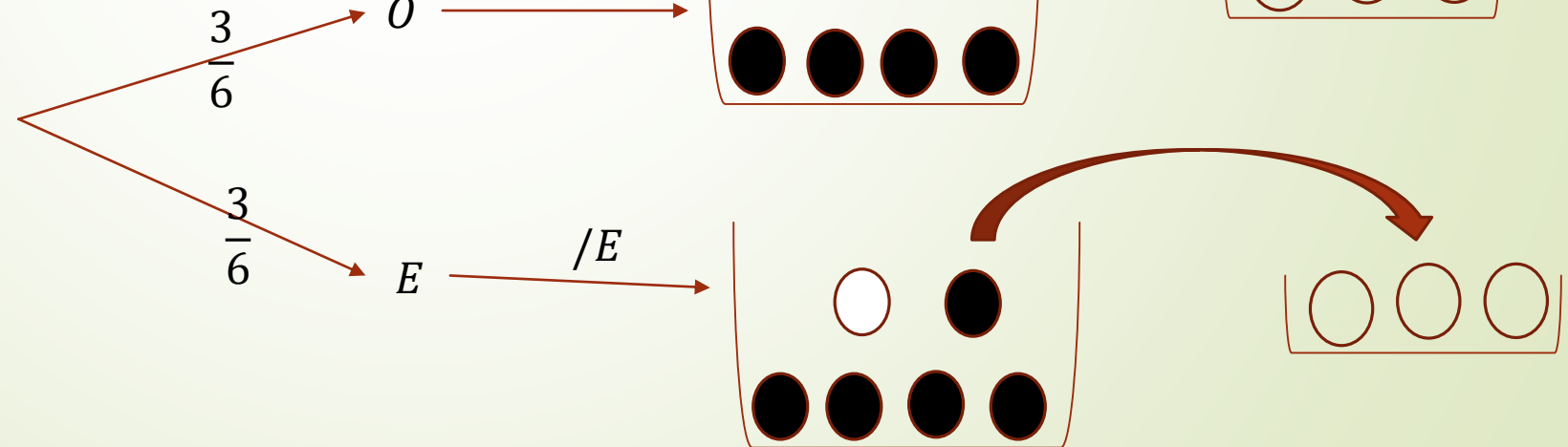
- If the die shows an odd number, then one white ball is added to the urn.
- If the die shows an even number, then one black ball is added to the urn.

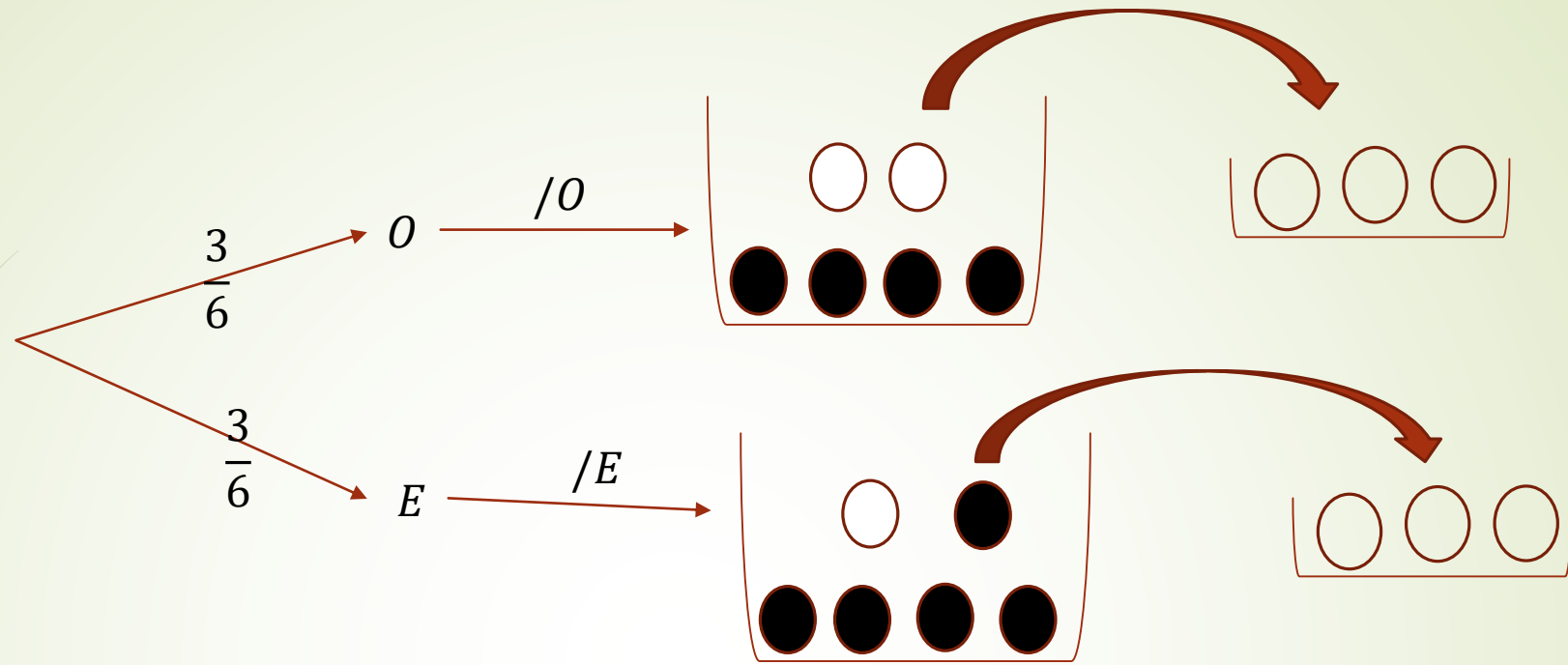
After that, three balls are randomly and simultaneously selected from the urn.

Consider the following events:

O: "The die shows an odd number"

B: "The three selected balls are black".



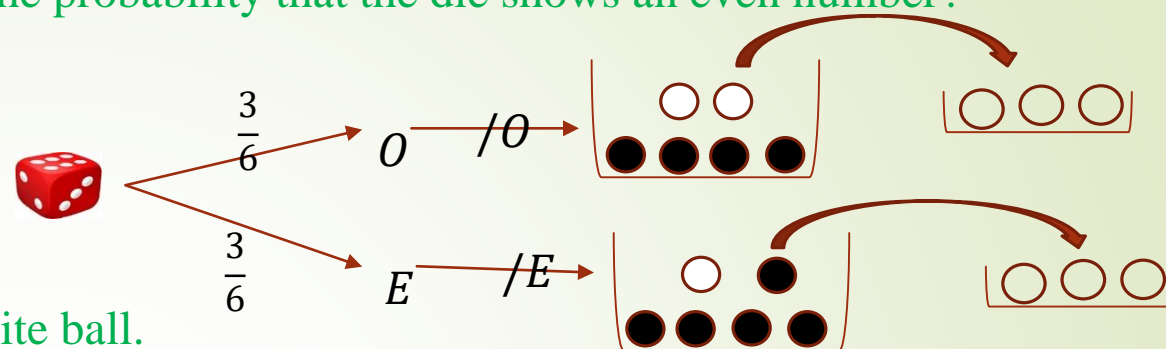


1) Calculate the probabilities  $P(B/O)$  ,  $P(B \cap O)$  and  $P(B)$ .

- $P(B/O) = \frac{C_4^3}{C_6^3} = \frac{1}{5}$
- $P(B \cap O) = P(B/O) \times P(O) = \frac{1}{5} \times \frac{3}{6} = \frac{1}{10}$
- $P(B \cap E) = P(B/E) \times P(E) = \frac{C_5^3}{C_6^3} \times \frac{3}{6} = \frac{1}{4}$
- $P(B) = P(B \cap E) + P(B \cap O) = \frac{1}{10} + \frac{1}{4} = 0.35$

2) The three selected balls are black. What is the probability that the die shows an even number?

- $$P(E/B) = \frac{P(B \cap E)}{P(B)} = \frac{\frac{1}{4}}{\frac{7}{20}} = \frac{5}{7}$$



3) Calculate the probability of getting two white ball.

- $$P(2W) = P(2w \cap E) + P(2w \cap O) = P(2w/E) \times P(E) + P(2w/O) \times P(O)$$

$$= 0 \times \frac{3}{6} + \frac{C_2^2 \times C_4^1}{C_6^3} \times \frac{3}{6} = \frac{1}{10}$$

4) Each of Sami and Karim played this game once. Calculate the probability that the total number of white balls obtained by both Sami and Karim is at least one.

- $$P(\text{at least one white}) = 1 - P(\text{Both got none white}) = 1 - (0.35) \times (0.35) = 0.8775$$