Grade 12 GS

Probability ex 11

By Mr.Kassem Hodeib

K.H

K.H

Exercise 11: "If then question or two actions:

Consider a box V containing six cards numbered 1 ; 2 ; 3 ; 4 ; 7 ; 9, and two urns U1 and U2 such that:

• U1 contains 3 red balls and 5 black balls

• U2 contains 4 red balls and 4 black balls.

One card is randomly selected from the box **V**.

If this card shows an **even number**, then **two balls** are randomly and simultaneously selected from U1 .

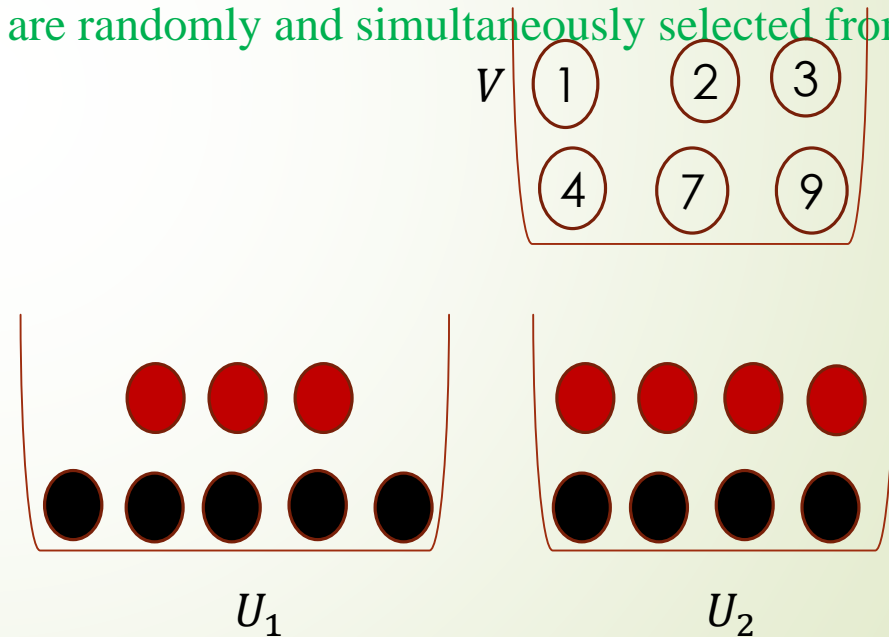If the card shows an odd number then two balls are randomly and simultaneously selected from U2.
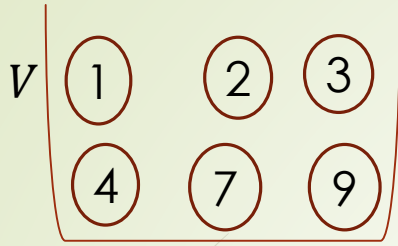
Consider the following events:

  E: "The card selected shows an even number"

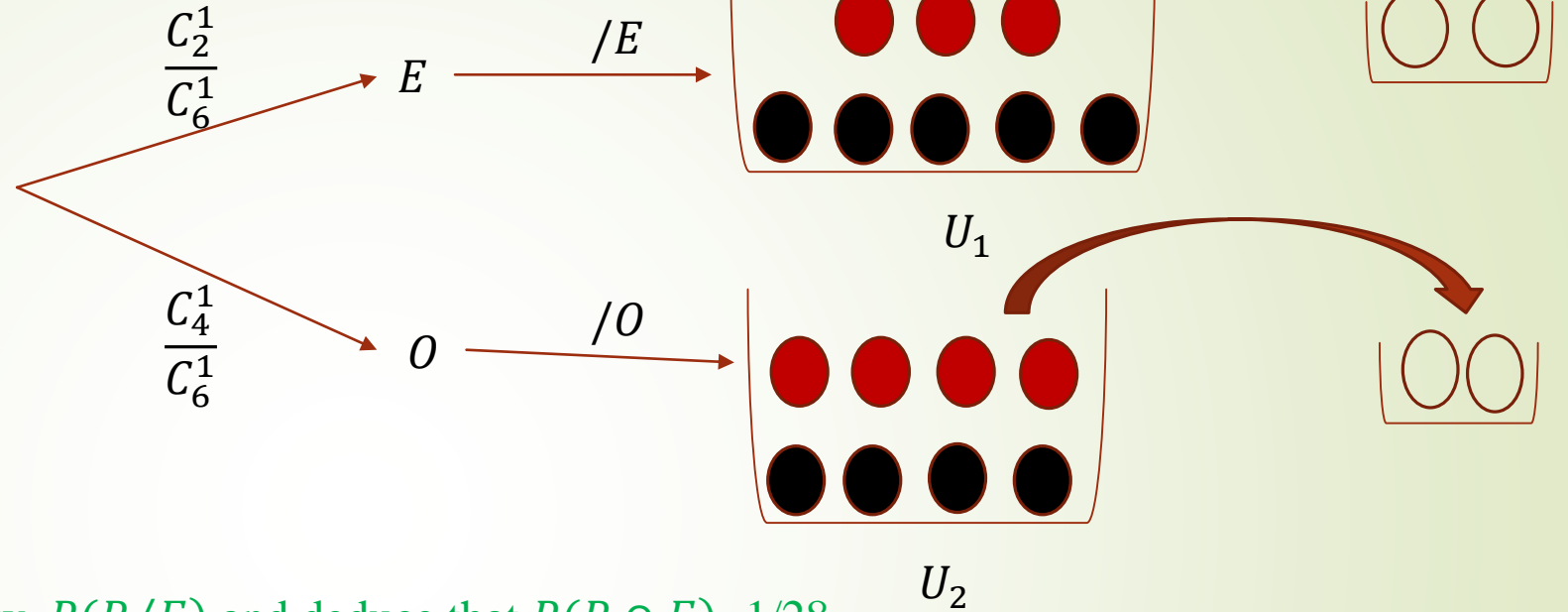 **O**: "The card selected shows an odd number"

  R: "The two selected balls are red"

  B: "The two selected balls are black".

V ① ② ③ ④ ⑦ ⑨

- *one card drawn from V*:

$\dfrac{C_2^1}{C_6^1}$ → E → $/E$

U_1

$\dfrac{C_4^1}{C_6^1}$ → O → $/O$

U_2

1) a- Calculate the probability $P(R/E)$ and deduce that $P(R \cap E)=1/28$.

- $P(R/E)=\dfrac{C_3^2}{C_8^2}=\dfrac{3}{28}$

- $P(R \cap E)= P(R/E)\times P(E) = \dfrac{3}{28} \times \dfrac{2}{6}= \dfrac{1}{28}$

b- Calculate P(R∩ O) and deduce P(R).

- $P(R \cap O)= P(R/O)\times P(O) = \dfrac{C_4^2}{C_8^2} \times \dfrac{4}{6} = \dfrac{1}{7}$

- P(R)= $P(R \cap E) + P(R \cap O) = \dfrac{1}{28} + \dfrac{1}{7} = \dfrac{5}{28}$

2) Show that P(B) = $\frac{11}{42}$.

- P(B)= $P(B \cap E) + P(B \cap O) = P(B/E) \times P(E) + P(B/O) \times P(O)$

$$= \frac{C_5^2}{C_8^2} \times \frac{2}{6} + \frac{C_4^2}{C_8^2} \times \frac{4}{6}$$

$$= \frac{11}{42}$$

3) Knowing that the two selected balls are black, calculate the probability that these two balls come from urn U1.

- P(E/B)= $\frac{P(B \cap E)}{P(B)} = \frac{\frac{5}{42}}{\frac{11}{42}} = \frac{5}{11}$