Grade 12 GS

Probability ex 6

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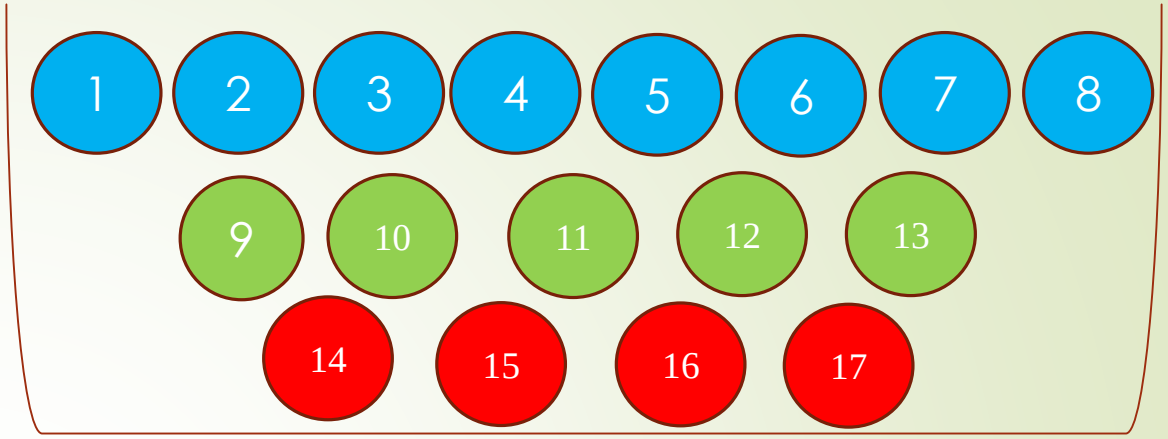
Exercise 6:



An urn contains 17 balls numbered 1 through 17.

The balls numbered from **1 to 8 are blue**.

The balls numbered from **9 to 13 are green**.

The balls numbered from **14 to 17 are red.**

Three balls are randomly and simultaneously selected from the urn.

Consider the following events: **A**:"the three selected balls hold odd numbers"

B:"the three selected balls have the same color"

1) a) Calculate $P(A)$ *and* $P(B)$.

- $P(A) = \frac{C_9^3}{C_{17}^3} = \frac{21}{170}$
- $P(B) = P(3b \text{ or } 3g \text{ or } 3r) = \frac{C_8^3}{C_{17}^3} + \frac{C_5^3}{C_{17}^3} + \frac{C_4^3}{C_{17}^3} = \frac{7}{68}$

b) Calculate $P(A \cap B)$. Then **deduce** $P(\bar{A} \cap B)$ *and* $P(B/\bar{A})$.

- $P(A \cap B) = P(\text{three balls of same color and odd}) = P(3\ b \text{ odd or } 3\ g \text{ odd}) = \frac{C_4^3}{C_{17}^3} + \frac{C_3^3}{C_{17}^3} = \frac{1}{136}$
- $P(\bar{A} \cap B) = P(B) - P(A \cap B) = \frac{13}{136}$
- $P(B/\bar{A}) = \frac{P(B \cap \bar{A})}{P(\bar{A})} = \frac{\frac{13}{136}}{1 - P(A)} = \frac{65}{596}$

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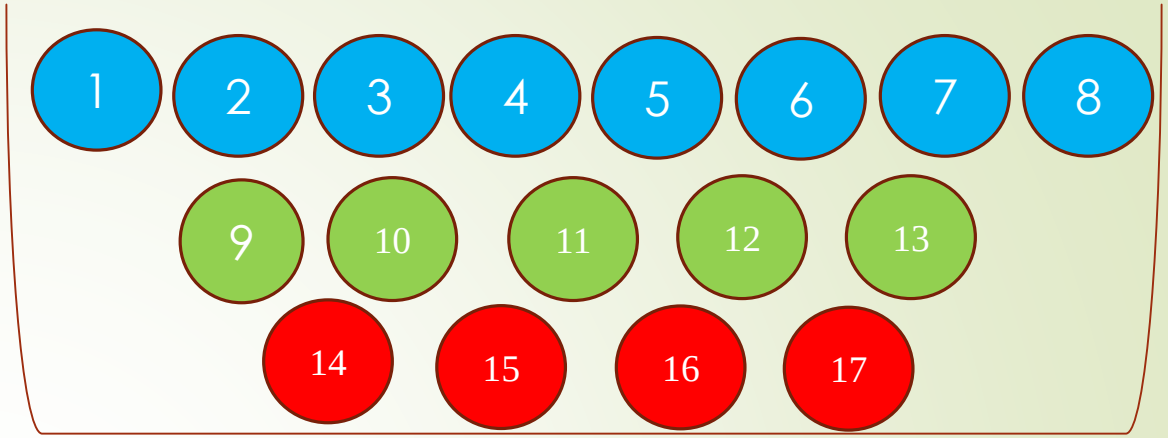

2) Knowing that the three balls selected are green, calculate the probability that exactly two of them hold even number.

$given$

- $P(exactly\ 2\ even\ /\ 3\ are\ green) = \dfrac{P(exactly\ 2\ even\ \boldsymbol{and}\ \ 3\ green)}{P(3\ green)}$

$$= \frac{P(2green\ even\ and\ 1\ green\ odd)}{P(3\ green)}$$

$$= \frac{C_3^2 \times C_2^1}{C_5^3} = \frac{3}{5}$$