Sec	Ser	ID	Name	**KEY**

Eight Boxes each contain identical numbers of **white** and **black balls** only.

Each box contain **3 white** and **4 black** balls.
One ball is selected from each box **find the followings**:

(a) The probability of getting all the **8 balls** selected are white **?**

(b) The probability of getting **4 white balls** from the **8 balls** selected ?

(c) The probability of getting more **white balls** than **black balls** from the **8 balls** selected **?**

Solution

Bernoulli Trials $\Rightarrow \dbinom{n}{k}\left(P_{sucsess}\right)^k\left(1-P_{sucsess}\right)^{n-k}$

n=8

$PW=\dfrac{3}{7}$ $PB=\dfrac{4}{7}$

(a) $k = 8 \Rightarrow P_{8\text{ balls are white}} = \dbinom{8}{8}(PW)^8(PB)^{8-8} = (1)\left(\dfrac{3}{7}\right)^8\left(1-\dfrac{3}{7}\right)^{8-8} = \left(\dfrac{3}{7}\right)^8 = 0.0011$

(b) $k = 4 \Rightarrow P_{4\text{ balls are white}} = \dbinom{8}{4}(PW)^4(PB)^{8-4} = (70)\left(\dfrac{3}{7}\right)^4\left(1-\dfrac{3}{7}\right)^{8-4} = \left(\dfrac{3}{7}\right)^8 = 0.2518$

(c) $P_{more\ white} = P_{5\text{ balls are white}} + P_{6\text{ balls are white}} + P_{7\text{ balls are white}} + P_{8\text{ balls are white}}$

$= \dbinom{8}{5}(PW)^5(PB)^{8-5} + \dbinom{8}{6}(PW)^6(PB)^{8-6} + \dbinom{8}{7}(PW)^7(PB)^{8-7} + \dbinom{8}{8}(PW)^8(PB)^{8-8}$

$= (56)\left(\dfrac{3}{7}\right)^5\left(1-\dfrac{3}{7}\right)^{8-5} + (28)\left(\dfrac{3}{7}\right)^6\left(1-\dfrac{3}{7}\right)^{8-6} + (8)\left(\dfrac{3}{7}\right)^7\left(1-\dfrac{3}{7}\right)^{8-7} + (1)\left(\dfrac{3}{7}\right)^8\left(1-\dfrac{3}{7}\right)^{8-8}$

$= 0.1511 + 0.0567 + 0.0121 + 0.0011 = 0.2210$

Sec	Ser	ID	Name KEY

Nine Boxes each contain identical numbers of **red** and **green balls** only.

Each box contain **5 red** and **3 green** balls.

One ball is selected from each box **find the followings:**

(a) The probability of getting all the **9 balls** selected are **green ?**

(b) The probability of getting   **4 green ball** from the **9 balls** selected ?

(c) The probability of getting more **green balls** than **red balls** from the **9 balls** selected **?**

Solution

Bernoulli Trials $\Rightarrow \begin{pmatrix} n \\ k \end{pmatrix} (P_{sucsess})^k (1-P_{sucsess})^{n-k}$

n=9

$PR=\dfrac{5}{8}$ $PG=1-PR=\dfrac{3}{8}$

(a) $k = 9 \Rightarrow P_{9 \text{ balls are green}} = \begin{pmatrix} 9 \\ 9 \end{pmatrix}(PG)^9 (PR)^{9-9} = (1)\left(\dfrac{3}{8}\right)^9 \left(1-\dfrac{3}{8}\right)^{9-9} = \left(\dfrac{3}{8}\right)^9 = 0.000146$

(b) $k = 4 \Rightarrow P_{4 \text{ balls are green}} = \begin{pmatrix} 9 \\ 4 \end{pmatrix}(PG)^4 (PR)^{9-4} = (126)\left(\dfrac{3}{8}\right)^4 \left(1-\dfrac{3}{8}\right)^{9-4} = 0.2376$

(c) $P_{more white} = P_{5 \text{ balls are green}} + P_{6 \text{ balls are green}} + P_{7 \text{ balls are green}} + P_{8 \text{ balls are green}} + P_{9 \text{ balls are green}}$

$= \begin{pmatrix} 9 \\ 5 \end{pmatrix}(PG)^5 (PR)^{9-5} + \begin{pmatrix} 9 \\ 6 \end{pmatrix}(PG)^6 (PR)^{9-6} + \begin{pmatrix} 9 \\ 7 \end{pmatrix}(PG)^7 (PR)^{9-7} + \begin{pmatrix} 9 \\ 8 \end{pmatrix}(PG)^8 (PR)^{9-8} + \begin{pmatrix} 9 \\ 9 \end{pmatrix}(PG)^9 (PR)^{9-9}$

$= (126)\left(\dfrac{3}{8}\right)^5 \left(1-\dfrac{3}{8}\right)^{9-5} + (84)\left(\dfrac{3}{8}\right)^6 \left(1-\dfrac{3}{8}\right)^{9-6} + (36)\left(\dfrac{3}{8}\right)^7 \left(1-\dfrac{3}{8}\right)^{9-7} + (9)\left(\dfrac{3}{8}\right)^8 \left(1-\dfrac{3}{8}\right)^{9-8} + (1)\left(\dfrac{3}{8}\right)^9 \left(1-\dfrac{3}{8}\right)^{9-9}$

$= 0.1426 + 0.0570 + 0.0147 + 0.0022 + 0.000146 = 0.2166$