

Lecture 3 (9/8/20)

In-class exercise: a_1, a_2, a_3, a_4

a) $\begin{matrix} a_1 & a_2 & a_3 & a_4 \\ 100 & \times 99 & \times 98 & \times 97 \end{matrix} = P(100, 4)$

b) $\begin{matrix} a_1 & a_2 & a_3 & a_4 \\ \downarrow & \downarrow & \downarrow & \downarrow \\ "47" & & & \\ 1 & \times 99 & \times 98 & \times 97 \end{matrix} = P(99, 3)$

c) $4 \times P(99, 3)$

In-class exercise:

a) 3 M & 3 W
 $C(10, 3) \times C(15, 3)$

b) $\begin{matrix} 4W & \& 2M \\ \text{or} & & \\ 5W & \& 1M \\ \text{or} & & \\ 6W & \& 0M \end{matrix} \rightarrow \begin{matrix} C(15, 4) \times C(10, 2) \\ + \\ C(15, 5) \times C(10, 1) \\ + \\ C(15, 6) \end{matrix}$

$$S = (0, 1, 2, 3, \dots, 9)$$

$\begin{matrix} a_1 & a_2 & a_3 \\ \downarrow & \downarrow & \downarrow \\ 10 & 9 & 8 \end{matrix} \rightarrow \text{permutation without repetition}$

$\begin{matrix} a_1 & a_2 & a_3 \\ \downarrow & \downarrow & \downarrow \\ 10 & 10 & 10 \end{matrix} \rightarrow \text{permutation with repetition}$

3 types of cookies (T_1, T_2, T_3)
 $n = 3$

5 cookies $\rightarrow n = 5$

5 T_1

4 T_1 & 1 T_2

3 T_1 & 1 T_2 & 1 T_3

$$C(3+5-1, 5)$$

$$C(7, 5) = \frac{7!}{2!5!}$$

$$= \frac{6 \cdot 7}{2}$$

$$= 21$$

$$S = \{A, O, P\} \rightarrow n = 3$$

no. of A ≥ 1 4 4 pieces $\rightarrow n = 4$

O ≥ 1 4

P ≥ 1 4

4 A

4 O

$$C(3+4-1, 4)$$

$$C(6, 4) = 15$$

$$S = \{T_1, T_2, T_3\} \rightarrow n = 3$$

x_1 no. of T_1 x_3 no. of T_3

x_2 no. of T_2

x_2 no. of T_2

1, 2, 3

1.1, 1.11...

$$x_1 + x_2 + x_3 = 11 \rightarrow n = 11$$

$$C(n+r-1, r) = C(13, 11)$$