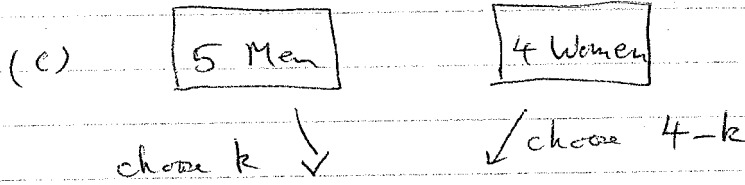
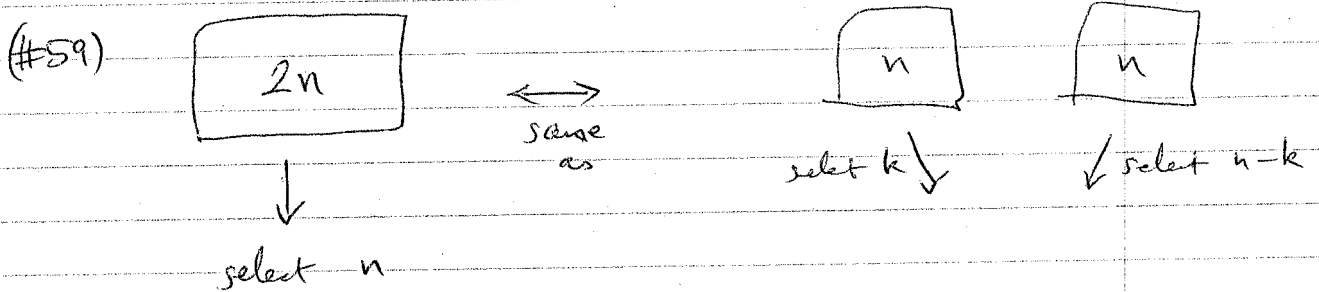


2



$$\Rightarrow \binom{5}{1}\binom{4}{3} + \binom{5}{2}\binom{4}{2} + \binom{5}{3}\binom{4}{1}$$

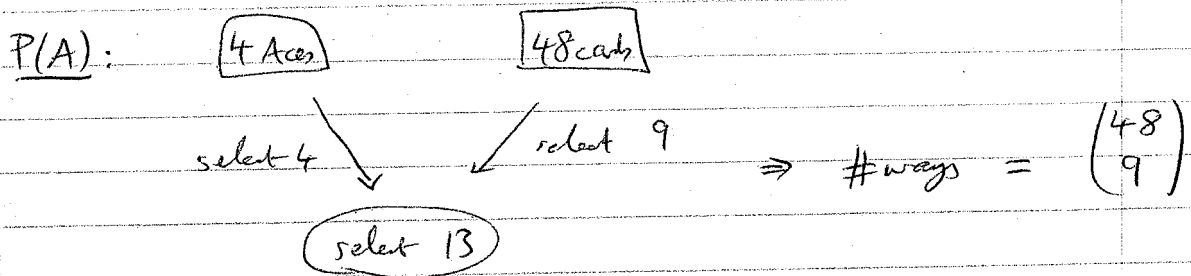
(#55) $\binom{10}{5}$ (when first team is selected, second is also fixed)



$$\begin{aligned} \Rightarrow \binom{2n}{n} &= \binom{n}{n}\binom{n}{0} + \binom{n}{n-1}\binom{n}{1} + \binom{n}{n-2}\binom{n}{2} + \dots + \binom{n}{0}\binom{n}{n} \\ &= \binom{n}{0}^2 + \binom{n}{1}^2 + \binom{n}{2}^2 + \dots + \binom{n}{n}^2 \end{aligned}$$

4 (p.122)

(#4), $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.



(3)

Since total # ways is $\binom{52}{13}$ we get

$$P(A) = \frac{\binom{48}{9}}{\binom{52}{13}}$$

Same for B: $P(B) = \frac{\binom{48}{9}}{\binom{52}{13}}$

For $A \cap B$, same reasoning gives

$$P(A \cap B) = \frac{\binom{44}{5}}{\binom{52}{13}}$$

$$\text{Hence } P(A \cup B) = \frac{2 \binom{48}{9} + \binom{44}{5}}{\binom{52}{13}}$$

(#11). Total number of possibilities is 7^7 (each person has 7 choices). If they each choose differently then number of possibilities is $7!$. Hence

$$P(\text{all on different floors}) = \frac{7!}{7^7}$$

$$\text{Clearly } P(\text{all on same floor}) = \frac{7}{7^7}$$

(#14) By reasoning similar to #11, get

$$P(\text{each face appears}) = \frac{6!}{6^6}$$