✓1) a) 1 → ${}_4C_4 \to 1$

2 → ${}_4C_3 \to 4$

3 → ${}_4C_2 \to 6$

11 unique subsets

b) $1 \cdot 5! + \frac{4}{2} \cdot \frac{5!}{2!} + 6 \cdot \frac{5!}{3!} = 480$

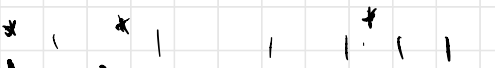
✓2) ${}_{13}C_2 \cdot {}_4C_2 \cdot {}_4C_2 \cdot 44$

$= \frac{13!}{2! \cdot 11!} \cdot \frac{4!}{2! \cdot 2!} \cdot \frac{4!}{2! \cdot 2!} \cdot 44 = 78 \cdot 6 \cdot 6 \cdot 44$

$= 123{,}552$

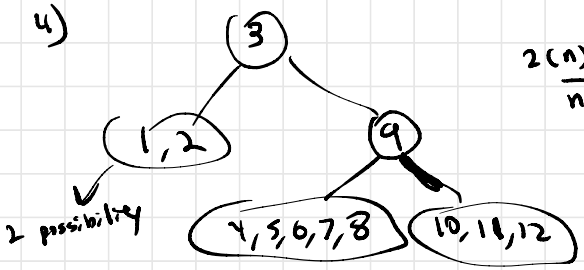
3) songs: 15 couples: 6 → $15 + 6 - 1$ → 5

songs: 16 couples: 6 → $16 + 6 - 1$ → 5



${}_{20}C_5 + {}_{21}C_5 = 35853$

4)



$\frac{2(n)C_n}{n+1}$

${}_4C_2 \to 2$

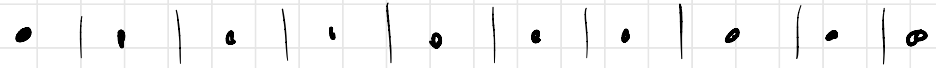
$\frac{10C_5}{6} \to 42$

$\frac{6C_3}{4}$

5

$5 \times 2 \times 42 = 420$

5) 10 friends, @ least one person



9 gaps

$$_9C_3 + {}_9C_4$$

$$= 210$$

$9 + 8 = 17$

1	1	1	7
1	2	1	6
1	2	2	5
1	2	3	4
2	2	2	4
3	3	3	1
4	4	1	1
3	3	2	2
3	5	1	1

1	1	8
1	2	7
2	2	6
3	3	4
4	4	2
4	1	5
3	2	5
3	1	6