7. $^{15}C_{11} = \dfrac{15!}{(15-11)!11!} = 1365$

8. (i) $^{7}C_{3} = \dfrac{7!}{(7-3)!3!} = 35$

(ii) $^{6}C_{2} = \dfrac{6!}{(6-2)!2!} = 15$

(iii) $35-15=20$ or $^{6}C_{3} = \dfrac{6!}{(6-3)!3!} = 20$

9. (i)

$6+7=13$ people

$^{13}C_{4} = \dfrac{13!}{(13-4)!4!} = \dfrac{13\times12\times11\times10}{4\times3\times2\times1} = 715$

(ii)

$^{6}C_{2} \times {^{7}C_{2}} = 15\times21 = 315$

(iii)

$^{6}C_{4} = 15$

13.

$^{13}C_{2} = \dfrac{13!}{(13-2)!2!} = \dfrac{13\times12}{2\times1} = 78$

17. (i)

$\dbinom{10}{5} = {^{10}C_{5}} = \dfrac{10!}{(10-5)!5!} = 252$

(ii)

$^{10}C_{5} \div 2 = 252 \div 2 = 126$

Note: There are 252 ways to choose 5 from 10. Put each 5 with the 5 remaining and you end up with 126 groups.

21. (i)

$^{12}C_{2} = \dfrac{12!}{(12-2)!2!} = \dfrac{12\times11}{2\times1} = 66$

(ii)

$^{12}C_{3} = \dfrac{12!}{(12-3)!3!} = \dfrac{12\times11\times10}{3\times2\times1} = 220$

22. (i)

$^{52}C_{5} = \dfrac{52!}{(52-5)!5!} = \dfrac{52\times51\times50\times49\times48}{5\times4\times3\times2\times1} = 2598960$

(ii)

$^{51}C_{4} = \dfrac{51!}{(51-4)!4!} = \dfrac{51\times50\times49\times48}{4\times3\times2\times1} = 249900$

(iii)

$^{52}C_{5} - {^{51}C_{4}} = 2598960 - 249900 = 2349060$

(iv)

$52-4=48$

$^{48}C_1=48$

(v)

$^{4}C_3\times {}^{48}C_2=4\times 1128=4512$