P75, 2: $4!13!^4$

P75, 7: a) $\binom{13}{1}\binom{4}{3}\binom{12}{1}\binom{4}{2}\binom{13}{1}\binom{4}{1}$

b) $10 \cdot 4^5$

e) $\binom{13}{2}\binom{4}{2}^2\binom{44}{1}$

P75, 8: Fix a specific man to be at the "top" position, then there are 5! options to seat the other 5 men, and 6! options to seat the women. So the answer is 5!6!.

Or, you can say there are 6! options to seat the 6 men, and same is true for women. We can also switch men and women, that will double the result. Since the seats can be rotated in 12 different ways to get the same result, the answer is $\frac{6!6!2}{12}$.

P75, 9: Seat A at the "top", then there are 12 options for B, and 13! options for the rest of them. So the answer is $12 \cdot 13!$. You can also count how many ways to seat A next to B.

Same idea, answer to the second part is $13 \cdot 13!$

P75, 10: $\binom{10}{3}\binom{12}{2} + \binom{10}{2}\binom{12}{3} + \binom{10}{1}\binom{12}{4} + \binom{10}{0}\binom{12}{5} = 23562$

If none of the specific man and woman in the committee, number of choices is $\binom{9}{3}\binom{11}{2} + \binom{9}{2}\binom{11}{3} + \binom{9}{1}\binom{11}{4} + \binom{9}{0}\binom{11}{5}$; If the man is in but not the woman, $\binom{9}{2}\binom{11}{2} + \binom{9}{1}\binom{11}{3} + \binom{9}{0}\binom{11}{4}$; If the woman is in but not the man, $\binom{9}{3}\binom{11}{1} + \binom{9}{2}\binom{11}{2} + \binom{9}{1}\binom{11}{3} + \binom{9}{0}\binom{11}{4}$. Add them together.

Or you can take the choices of both of them in out of those in the first part. The number of bad ones is $\binom{9}{2}\binom{11}{1} + \binom{9}{1}\binom{11}{2} + \binom{9}{0}\binom{11}{3} = 1056$. Answer is $23562 - 1056 = 22506$.

P75, 12: If none of those 2 is in the team, number of choices is $\binom{5}{4}\binom{8}{7}$; If 1 is on the line, none in the backfield, $\binom{2}{1}\binom{5}{3}\binom{8}{7}$; If none on the line, 1 in the backfield, $\binom{2}{1}\binom{5}{4}\binom{8}{6}$; If 1 on the line, 1 in the backfield, $2!\binom{5}{3}\binom{8}{7}$; If both on the line, $\binom{2}{2}\binom{5}{2}\binom{8}{7}$; If both in the backfield, $\binom{2}{2}\binom{5}{4}\binom{8}{5}$. Add them together.

P75, 14: There are $P(8,5)$ ways to seat the 5 always in the front, $P(8,4)$ ways to seat the 4 always in the back. Now we have 7 seats left to seat the remaining 5, which has $P(7,5)$ ways to do so. So the answer is $P(8,5)P(8,4)(7,5)$.

Extra: (1) The number of ways to deal those 8 cards is $\binom{50}{8}$, since we do not care who gets which card. The number of ways that none gets an Ace is $\binom{47}{8}$. So the probability is $1 - \frac{\binom{47}{8}}{\binom{50}{8}}$.

(2) The number of ways to deal those 8 cards is $\binom{47}{8}$. The number of ways that none gets an Ace is $\binom{45}{8}$. So the probability is $1 - \frac{\binom{45}{8}}{\binom{47}{8}}$.

(3) Since we cannot see the 8 cards dealt to the other 4 players, they are as good as still in the deck. Therefore the probability of dealing two more hearts is $\frac{\binom{10}{2}}{\binom{47}{2}}$.