S2.2-18: $10 \times 9 \times 8 \times 7 = 5040$;
(a). $9 \times 9 \times 8 \times 7 = 4536$;
(b). $5040 - 1 \times 1 \times 8 \times 7 = 4984$.

S2.3-12: (a). $\frac{11!}{4!4!2!} = 34,650$;
(b) Treating all P's as one entity, the answer is $\frac{10!}{4!4!} = 6300$;
(c) Treating all I's as one entity, the answer is $\frac{8!}{4!2!} = 840$.
(d) Treating all P's as one entity, and all I's as another entity, the answer is $\frac{7!}{4!} = 210$.
(e). By (a) and (c), The answer is $840/34650 = 0.024$.

S2.4-18: $\binom{6}{2}5^4/6^6$.

S2.4-30: (a)

$$\frac{\binom{2}{1}\binom{98}{49}+\binom{2}{2}\binom{98}{48}}{\binom{100}{50}}.$$

(b). $2^{50}/\binom{100}{50}$.

R2-22:

$$\frac{\binom{15}{1}\binom{15}{1}\binom{14}{1}\binom{14}{1}\cdots\binom{1}{1}\binom{1}{1}}{\binom{30}{2}\binom{28}{2}\cdots\binom{4}{2}\binom{2}{2}}=\frac{(15!)^2}{30!/(2!)^{15}}.$$

R2-24. An ordinary deck of 52 cards is dealt, 13 each, at random among A, B, C, and D. What is the probability that (a) A and B together get two aces; (b) A gets all the face cards; (c) A gets five hearts and B gets the remaining eight hearts?

Sol: (a). $\frac{\binom{4}{2}\binom{48}{24}}{\binom{52}{26}}$. (b). $\frac{\binom{12}{12}\binom{40}{1}}{\binom{52}{13}}$. (c).$\frac{\binom{13}{5}\binom{39}{8}\binom{8}{8}\binom{31}{5}}{\binom{52}{13}\binom{39}{13}}$.