#1-10
(a) 8! = 40,320
(b) 2 * 7! = 10,080
(c) 5! * 4! = 2,880
(d) 4! * 2! = 384

#1-19
(a) There are \( \binom{8}{3} \binom{4}{3} + \binom{8}{3} \binom{2}{1} \binom{4}{2} \) = 896 possible committees.

There are \( \binom{8}{3} \binom{2}{1} \binom{4}{2} \) that do not contain either of the 2 men, and there are \( \binom{8}{3} \binom{4}{2} \) that contain exactly 1 of them.

(b) There are \( \binom{6}{3} \binom{6}{6} + \binom{2}{1} \binom{6}{3} \binom{6}{3} \) = 1000 possible committees.

(c) There are \( \binom{7}{3} \binom{5}{3} + \binom{7}{2} \binom{5}{3} + \binom{7}{3} \binom{5}{2} \) = 910 possible committees. There are \( \binom{7}{3} \binom{5}{3} \) in which neither feuding party serves; \( \binom{7}{2} \binom{5}{3} \) in which the feuding women serves; and \( \binom{7}{3} \binom{5}{2} \) in which the feuding man serves.

#2-11
Let \( A \) be the event that a randomly chosen person is a cigarette smoker and let \( B \) be the event that she or he is a cigar smoker.

(a) \( P(A \cup B) = 1 - (0.07 + 0.28 - 0.05) = 0.7 \) Hence, 70 percent smoke neither.

(b) \( P(A^cB) = P(B) - P(AB) = 0.07 - 0.05 = 0.02 \) Hence 2 percent smoke cigars, but not cigarettes.

#2-15
(a) \( \binom{13}{5} \binom{52}{5} \)

(b) \( \binom{13}{2} \binom{12}{3} \binom{4}{1} \binom{4}{1} \binom{4}{1} \binom{52}{5} \)

(c) \( \binom{13}{2} \binom{4}{2} \binom{4}{1} \binom{4}{1} \binom{52}{5} \)
(d) \[
\binom{4}{3} \binom{12}{2} \binom{4}{1} \binom{4}{1} \binom{52}{5}
\]
(e) \[
\binom{4}{4} \binom{48}{1} \binom{52}{5}
\]

\[
\frac{\#2-17}{8!} = \frac{64}{8} = 9.1095 \times 10^{-6}
\]

#2-6 (Theoretical Exercises)
(a) \(E F^C G^C\)
(d) \(E F \cup E G \cup F G\)
(f) \(E^C F^C G^C\)

#2-10 (Theoretical Exercises)
We can partition \(E \cup F \cup G\) into 7 mutually disjoint sets and use axiom 3 so that
\[
P(E \cup F \cup G) = P(EFG) + P(EGF) + P(EFG^C) + P(EF^C G) + P(EF^C G^C) + P(E^C F G) + P(E^C F G^C)
\]
Note that we can also use axiom 3 for \(E, F,\) and \(G\) to get that
\[
P(E) = P(EFG) + P(EFG^C) + P(EFG^C) + P(EF^C G) + P(E^C F G)
\]
\[
P(F) = P(EFG) + P(EFG^C) + P(EFG^C) + P(F^C G) + P(E^C F G)
\]
\[
P(G) = P(EFG) + P(EFG^C) + P(EFG^C) + P(EF^C G) + P(E^C F G)
\]
We then have that
\[
P(E) + P(F) + P(G) = P(E \cup F \cup G) + 2P(EFG) + P(EGF) + P(EFG^C) + P(EF^C G) + P(E^C F G)
\]
Rearranging terms we get the desired answer.