Chapter 4

Section 4.1:  #8  15,600
#12  \( 2^0 + 2^1 + 2^2 + \cdots + 2^6 = 2^7 - 1 = 127 \)
#18  (d) Use the inclusion-exclusion principle.

(g) Break the count into three cases: one digit, two digits, three digits. (If you don’t consider cases, 7 = 007 might be counted incorrectly.)

(h) It is easier to count the odd numbers with distinct digits and subtract from Part (g). For easier counting, choose the ones-digit first, then the hundreds-digit, and the tens-digit at the end. (Otherwise there are a lot of cases to consider.)

#26  63,273,600

#36 How many have less?

Section 4.2:  #14 (a) Regard \{1, 10\}, \{2, 9\}, \{3, 8\}, \{4, 7\}, \{5, 6\} as the “holes” and the choice of seven integers as the pigeons. Apply the pigeonhole principle twice.

#16 What are the pigeons and what the holes?

#20 Use Theorem 3.

#30 Do Problem 29 first.

#31 Compare with Example 7.

Section 4.3:  #22 (a) How many are there with no women?

#30  \( C(45, 3) \cdot C(57, 4) \cdot C(69, 5) \)

#32 For every arrangement there are 6 identical rotations: \((6!)/6 = 5\!\!.\!

#48 (a) Think of selecting a committee of \( r \) people from of total of \( n \) people, \( k \) of which should be granted extra powers. Each side of the equation represents of different procedure of doing that. Describe these procedures.

#50 (a) Think of a group of \( n \) men and \( n \) women. When selecting 2 people from this group, the result can fall into one of three categories: 2 men, 2 women, one each.
#52 Note that $C(n, k)^2 = C(n, k) \cdot C(n, n - k)$.

Section 4.6: #24 Notice that the role of $n$ and $r$ are reversed.

#25 The answer in the back of your textbook is wrong. The correct answer is 84.

#42 This is the same as writing down a sequence of 12 letters using five Ts (for TAKE) and seven Ss (for SKIP), such that no two Ts are adjacent. Write down five Ts. Then put Ss between them. Finally, the only choice you have is positioning the remaining three Ss into the six positions before, between, or after the Ts. Hence, the answer is $C(3 + 6 - 1, 3) = 56$. 