

MATH 271 – Summer 2016
Practice problems – Week 4

1. Consider the set of 4-digit positive integers. How many of them...
 - (a) ... are there total?
 - (b) ... are odd?
 - (c) ... have distinct digits?
 - (d) ... are odd and have distinct digits?
 - (e) ... are even and have distinct digits?
 - (f) ... have their digits in strictly increasing order? (i.e. 1234)
 - (g) ... have the property that the sum of their digits is even?
 - (h) ... are odd and have the property that the sum of their digits is even?
 - (i) ... are odd and don't have the property that the sum of their digits is even?
2. Consider the set of integers $T = \{0, 1, 2, 3, \dots, 99999\}$.
 - (a) How many elements are in T ?
 - (b) How many elements of T contain the digit 1 at least once?
 - (c) How many integers in T contain each of the digits 1 and 2 at least once?
 - (d) How many integers in T contain each of the digits 1, 2, and 3 at least once?
3. How many ways are there to arrange the 7 letters $AAABBBB$?
4. How many ways are there to arrange the 12 letters of $AAABBBBCCCCC$?
5. How many ways are there to arrange the 12 letters of $AAABBBBCCCCC$ without having two C 's together?
6. Consider the set $S = \{1, 2, 3, \dots, 100\}$.
 - (a) How many ways can two different integers be selected from S such that their sum is even?
 - (b) How many ways can two different integers be selected from S such that their sum odd?
7. Consider the set $X = \{1, 2, 3, 4\}$ and $Y = \{a, b, c, d, e, f\}$.
 - (a) How many functions are there from X to Y ?
 - (b) How many functions are there from Y to X ?
 - (c) How many one-to-one functions there from X to Y ?
 - (d) How many one-to-one functions are there from Y to X ?
 - (e) How many functions F are there from X to Y so that $F(1) = a$?
 - (f) How many one-to-one functions F are there from X to Y so that $F(1)$ is not a vowel?

In addition to the problems given above, you can try these problems in the book to practice your counting. Solutions for these problems can be found in the back of the textbook.

- Section 9.2: 11, 12(a), 13(a), 14(a,b,d), 16(a,b,c,d), 32(a,b), 38(a), 39(a,c).
- Section 9.3: 3, 4, 6, 8(a), 11, 16(a,b), 23(a), 37.
- Section 9.5: 6, 9(b), 11(a,c,f), 13(a,d), 15, 17(a), 19.