

Math 184A, Winter 2019, Prof. Tesler
Homework #1, Due Wednesday January 16, 2019

Please remember, on this and all other homework assignments:

- Present your solutions in the order the problems are listed.
- Show your work on all problems.
- When applicable, circle your final answer.
- On proof-oriented problems, you need to write a coherent proof.
- You may study with others currently enrolled in the class, but the work you turn in should be your own; do not just copy someone else's answer. That includes that you should not copy from an answer manual, answer key, or the internet.
- The book has answers to some problems at the end of each chapter (roughly the first half of the problems in the chapter). Do not just copy these answers.

Chapter 1: 1, 19, 20*, 21*, 26

Chapter 3: 2*, 3, 4, 19, 30, 33*, 34, 40, 49

Chapter 4: 34, 35, 40

and the problem below, H-101.

*Notes:

- Problem 1.20: Interpret “26 times” as “26 days”.
- Problem 1.21: The solution makes use of prime numbers. Note that 1 is *not* a prime number.
- Problem 3.2: You must state the value of n for which this is true.
- Problem 3.33: x precedes y when x is earlier in the permutation than y . The numbers do not have to be adjacent. For example, both 1 and 2 precede 4 in 2,1,4,3.

Problem H-101. For the purposes of this problem, a “word” is any ordered sequence of letters, regardless of whether they are actual English words. It’s a “string” in computer science. Also for this problem, a “repeated letter” just means the letter occurs more than once in the word; it does not require that the repetitions be consecutive.

- (a) How many rearrangements are there of the letters in CLASSICAL?
- (b) How many rearrangements of CLASSICAL are palindromes (that is, they stay the same when reversed)?
- (c) How many 3 letter words can be made from the letters of CLASSICAL if no repeated letters are allowed?
- (d) How many 3 letter words can be made from the letters of CLASSICAL if repeated letters are allowed but no letter can be used more often than it appears in CLASSICAL?
- (e) How many 3 letter words can be made from the alphabet $\{C, L, A, S, I\}$ if repeated letters are allowed and there is no restriction on the number of repetitions?