

CSE 312 : Practice Quiz 1 (Form 2)

Name:

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Instructions

- You have twenty minutes to complete this exam.
- You are permitted one piece of 8.5x11 inch paper with handwritten notes (notes are allowed on both sides of the paper). You should also get a provided formula sheet (in section it'll be on different colored paper separate from the exam; if you take the exam with DRS it will be the last page of your exam).
- You may not use a calculator or any other electronic devices during the exam.
- We will be scanning your exams before grading them. Please write legibly, and avoid writing up to the edge of the paper.
- If you run out of room, you may also use the last page for extra space, but tell us where to find your answer if it's not right below the problem.
- Since you don't have a calculator, you are generally free to **not** simplify expressions (though you may if you think it will be helpful).
- In general, you should show us the work you used to get to an answer, and explanations will help us reward partial credit, but we do **not** expect explanations at the level we usually require on homeworks.

Advice

- Writing a few words about where an expression came from is often very helpful for awarding partial credit.
- Remember to take deep breaths.

Question	Max points
1. Counting	25
Total	25

There are no problems on this page, go to the next one.

1. Passwords [25 points]

You are tasked with designing a secure password system. You will require passwords to meet the following criteria

- Order matters for passwords, and repeating characters is allowed.
- A password must be exactly **10 characters long**.
- It can only contain characters from the following three categories:
 - **Alphabet Letters**: 26 lowercase English letters.
 - **Digits**: 10 numeric digits.
 - **Special Characters**: a set of 10 characters such as !, @, etc.

Additionally:

- To be **valid** the password must include:
 - At least **one digit**.
 - At least **one special character**.
- A string of length 10 not meeting these last two criteria is an **invalid password**.

Let:

- Ω = the set of all passwords of length 10 .
- D = the set of passwords of length 10 containing at least one digit.
- S = the set of passwords of length 10 containing at least one special character.

(a) Using only the sets defined above and set operations, give the **set notation** for each of these sets. An answer for these might look like $\overline{D} \cap S$ [2 points each]

- the set of all valid passwords?

- the set of passwords of length 10 without any digits?

- the set of passwords of length 10 without any special characters?

- the set of invalid passwords as a union of two sets.

(b) Give a **formula** for the number of passwords of length 10 (both invalid and valid)? [3 points]

(c) Give a **formula** for the number of passwords of length 10 without any digit? [3 points]

(d) Give a **formula** for the number of passwords of length 10 without any special characters? [3 points]

(e) Compute the size of the set of **invalid** passwords. You may use b, c, d to refer to the correct answers from parts b,c,d. [4 points]

(f) Compute the size of the set of **valid** passwords. You may use b, c, d, e to refer to the correct answers of parts b,c,d,e. [4 points] (**Hint**: you should already have most of what you need).