

**CSI 30, Homework 4 on section 2.1, 2.2**

Due by Wed, Mar 8.

---

Please use lots of space and explain your answers, showing clearly any work you had to do. Each question is worth 3 points for a total of 21.

---

- (1) Let  $A$  be the set of all even integers from 10 to 800. Describe this set using set builder notation.
- (2) Let  $D$  be the set  $\{7, 8, 9, \{10, 11\}\}$ . Decide if these statements are true, false or don't make sense. (Do this one carefully!)
- (a)  $7 \in D$
  - (b)  $|D| = 4$
  - (c)  $\phi \subseteq D$
  - (d)  $10 \in D$
  - (e)  $\{7, \{10, 11\}\} \subset D$
- (3) Let  $B = \{0, 2, 8\}$ . Find the power set  $P(B)$ .  
(Hint: this power set should have 8 elements.)
- (4) Let  $B = \{0, 2, 8\}$  and  $C = \{4, 5\}$ . Find these Cartesian products:
- (a)  $C \times B$
  - (b)  $C \times C$
- (Use the brace, parenthesis, comma notation correctly. The elements of the Cartesian products should be ordered pairs.)
- (5) Let  $A = \{3, 4, 5, 6\}$  and  $B = \{5, 6, 7\}$ . Find
- (a)  $A \cup B$
  - (b)  $A \cap B$
  - (c)  $A - B$
  - (d)  $B - A$
  - (e)  $A \oplus B$
- (6) For any two sets  $A$  and  $B$  do you think it's true that

$$(A \cup B) - (A \cap B) = A \oplus B?$$

Use Venn diagrams to explain your answer.

(7) Let the universal set  $U$  be  $\{0, 1, 2, 3, 4, 5, 6, 7\}$ .

(a) Represent the set  $S = \{0, 3, 4, 6\}$  using a bit string.

(b) Represent the set  $\bar{S}$  using a bit string. (This means the complement of  $S$ .)

(c) What sets do the bit strings 00000000 and 11111111 represent here?

(Remember that for this question 1 means 'in' and 0 means 'not in'.)

---

If you get stuck on a question or aren't sure if you understand it:

- Go over the relevant class notes and section in the textbook.
- Check if you get the right answer for a similar odd-numbered question in the textbook (answers at the back of the book).
- Ask me about it after class.
- Come to my office hours: Tue 3 - 4, Wed 3 - 4 in CP 317.
- Go to the Math Tutorial Lab in-person in CP 303 or online.