

ITCS 2175 HW 4

There are 100 points total over the entire homework.

Section 1.6,

1) [10 points]

Use set builder notation to express each of the following sets.

- $\{0,3,6,9,12\}$
- $\{-3,-2,-1,0,1,2,3\}$
- $\{m,n,o,p\}$

2) [8 points]

Determine whether each of the following sets is the power set of a set.

- \emptyset
- $\{\emptyset, \{a\}\}$
- $\{\emptyset, \{a\}, \{\emptyset, a\}\}$
- $\{\emptyset, \{a\}, \{b\}, \{a,b\}\}$

3) [10 points]

Show that $A \times B \neq B \times A$ if A and B are non-empty and not equal.

Section 1.7

4) [10 points]

Let $A = \{a,b,c,d,e\}$ and $B = \{a,b,c,d,e,f,g,h\}$. Find

- $A \cup B$
- $A \cap B$
- $A - B$
- $B - A$

5) [10 points]

Find the sets A and B if $A - B = \{1,5,7,8\}$, $B - A = \{2,10\}$, and $A \cap B = \{3,6,9\}$.

6)

Show the following. (For a, b use a sentence-type proof; for c prove using each of the 4 set proof techniques: i. Membership table; ii. Propositional logic (using set builder notation and logical equivalences; iii. Tabular proof (using set identities; iv. Sentence-type logical argument.)

- $(A \cup B) \subseteq (A \cup B \cup C)$ [10 points]
- $(A - B) - C \subseteq (A - C)$ [10 points]
- $(B - A) \cup (C - A) = (B \cup C) - A$ [8 points for each part; 32 total]