Set Theory WS 1 Name Fuston

If **A = {2, 5, 7, 8}**, **B = {3, 6, 7, 8}**, **C = {1, 4, 5}**, and **U = {1, 2, 3, ... , 8}**, find each of the following.

$A' = \{1, 3, 4, 6\}$ $C' = \{2, 3, 6, 7, 8\}$

1. Find C'

$\{2, 3, 6, 7, 8\}$

2. Find A ∪ B

$\{2, 3, 5, 6, 7, 8\}$

3. Find A' ∩ C

$\{1, 4\}$

4. Write |U|

8

5. Write A ⊕ C

$\{1, 2, 4, 7, 8\}$

6. Find A – B

$\{2, 5\}$

7. Find B – C

$\{3, 6, 7, 8\}$

8. Find |C'|

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What can be said about sets A and B if each of the following is true? Think about all possibilities!

9. A ∪ B = A

$B \subseteq A$ OR $B = \emptyset$

10. A ∩ B = A

$A \subseteq B$ OR $A = \emptyset$

11. A – B = A

A and B are disjoint.
OR $B = \emptyset$

12. A – B = B – A

$A = B$

13. A ∪ ∅ = B

$A = B$

14. A ∩ ∅ = B

$B = \emptyset$

Multisets

Let **A = {3·a, 4·b, 1·c}** and **B = {2·a, 2·b, 4·c}**. Find each of the following:

15. $A \cup B$

$\{3\cdot a, 4\cdot b, 4\cdot c\}$

16. $A \cap B$

$\{2\cdot a, 2\cdot b, 1\cdot c\}$

17. $A - B$

$\{1\cdot a, 2\cdot b\}$

18. $B - A$

$\{3\cdot c\}$

19. $A + B$

$\{5\cdot a, 6\cdot b, 5\cdot c\}$

20. $|A|$

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Suppose that the math department and the science department are ordering technology. Let M be the multiset that the math department needs, M = {8·computers, 6·monitors, 5·printers, 105·calculators}. Let S be the multiset that the science department needs, S = {5·computers, 5·monitors, 7·printers, 4·scanners}.

21. What combination of M and S represents the equipment that should be purchased assuming both departments share equipment?

$M \cup S = \{8\cdot c, 6\cdot m, 7\cdot p, 4\cdot s, 105\cdot calc\}$

22. What combination of M and S represents the equipment that the department will share?

$M \cap S = \{5\cdot c, 5\cdot m, 5\cdot p\}$

23. What combination of M and S represents the equipment that, if they share, can still be housed in the math department, because the science department won't need it?

$M - S = \{3\cdot c, 1\cdot m, 105\cdot calc\}$

24. What combination of M and S represents the equipment that should be purchased if the departments don't share equipment?

$M + S = \{13\cdot c, 11\cdot m, 12\cdot p, 4\cdot s, 105\cdot calc\}$