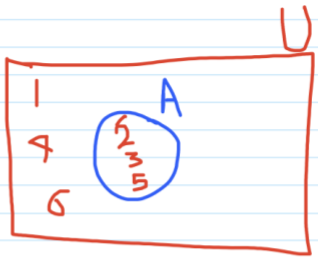
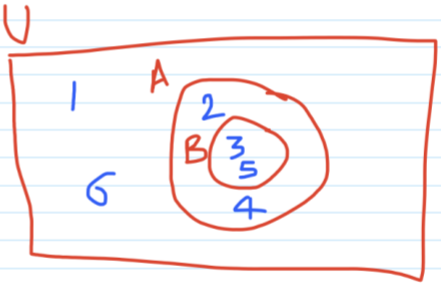
SET Theory - part 2

Venn Diagram

$U = \{1, 2, 3, 4, 5, 6\}$. $A = \{2, 3, 5\}$



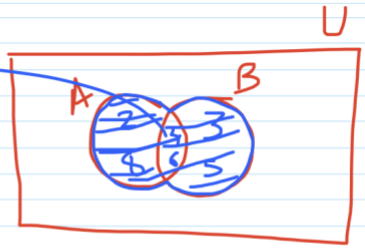
$U = \{1, 2, 3, 4, 5, 6\}$
$A = \{2, 3, 4, 5\}$
$B = \{3, 5\}$



Operations on set:

1. Union: $\cup$ = OR

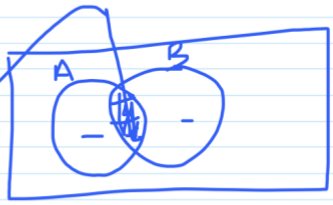
$A \cup B$ → A union B => A or B



$A \cup B = \{x : x \in A \text{ or } x \in B\}$

$A = \{2, 4, 6, 8\}$
$B = \{3, 4, 5, 6\}$
$A \cup B = \{2, 4, 6, 8, 3, 5\}$

2. Intersection: $\cap$ AND



$A \cap B = \{x : x \in A \text{ and } x \in B\}$

$A \cap B = B \cap A$ Commutative law

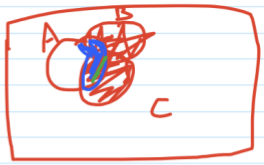
$(A \cap B) \cap C = A \cap (B \cap C)$ Associative law

$A \cap \phi = \phi$ $\{\}$ $\{- -\}$

$A \cap A = A$

$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

$A \times (B + C)$



3. Difference: A - B

A - B = {x : x belongs to A and x doesn't belong to B}

A = {2, 4, 6, 8}

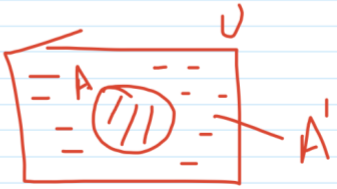
B = {3, 4, 5, 6}

A - B = {2, 8}

4. Compliment: A ==> A', A^c, $\bar{A}$

A' = {x : x belongs to U and x doesn't belong to A}

A' = U - A



PROPERTIES:

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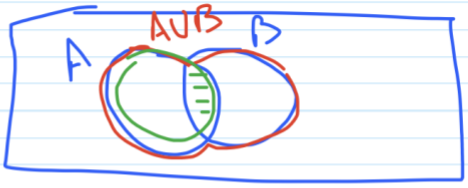
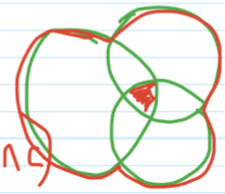
1. $n(A \cup B) = n(A) + n(B) - n(A \cap B)$



2. $n(A \cup B \cup C) = n(A) + n(B) + n(C)$
$- n(A \cap B) - n(B \cap C)$
$- n(A \cap C) + n(A \cap B \cap C)$



Q. In a class of 20 students, who play cricket or football. Of these 12 play cricket, and 4 play football and cricket. How many play:

(a). Football $n(F) = 12$

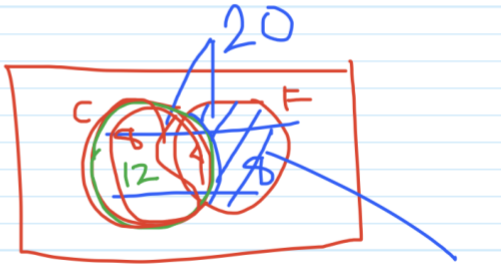
(b) football but not cricket $n(F - C) = 8$

© cricket but not football $n(C - F) = 12$

$n(C \cup F) = 20$

$n(C) = 12$

$n(C \cap F) = 4$



$$n(C \cup F) = n(C) + n(F) - n(C \cap F)$$

$$20 = 12 + n(F) - 4$$