Venn Diagrams

Draw a Venn Diagram to represent the universal set $\mathcal{U} = \{0, 1, 2, 3, 4, 5, 6\}$ with subsets:
$A = \{2, 4, 5\}$
$B = \{1, 4, 5, 6\}$

Find each of the following

(a) $A \cup B$

(b) $A \cap B$

(c) $A - B$

(d) $B - A$

(e) $A \oplus B$

1 1.7 Venn diagrams

Often the relationships that exist between sets can best be shown using a Venn diagram. To construct a Venn diagram we let a certain region, usually a rectangle, represent the universal set.

This rectangle is often implied by the constraints of the page and only in those circumstances where its boundary is important is the rectangle drawn (see the diagrams below for example). Individual sets are then represented by regions, often circles, within this rectangle. One can then easily depict intersections, unions, complements, etc. on the diagram. For example:

- Let A,B and C be subsets of a universal set U.

- Draw a labelled Venn diagram depicting A,B,C in such a way that they divide U into 8 disjoint regions.

Region	A	B	C	
1	No	No	No	
2	Yes	No	No	
3	No	Yes	No	
4	Yes	Yes	No	
5	No	No	Yes	
6	Yes	No	Yes	
7	No	Yes	Yes	
8	Yes	Yes	Yes	$A \cap B \cap C$

Region	A	B	C	
1	No	No	No	
2	Yes	No	No	
3	No	Yes	No	
4	Yes	Yes	No	
5	No	No	Yes	
6	Yes	No	Yes	
7	No	Yes	Yes	
8	Yes	Yes	Yes	$A \cap B \cap C$

Region	A	B	C	
1	No	No	No	$(A \cup B \cup C)^C$
2	Yes	No	No	
3	No	Yes	No	$B - (A \cap C)$
4	Yes	Yes	No	$(A \cap B) - C$
5	No	No	Yes	$C - (A \cap B)$
6	Yes	No	Yes	$(A \cap C) - B$
7	No	Yes	Yes	$(B \cap C) - A$
8	Yes	Yes	Yes	$A \cap B \cap C$