



## Revision Topic 6

### Set Language And Matrices

#### Revision Practice 6

- Suppose a universal set  $\varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ . If  $A = \{x: x \text{ is an even number}\}$  and  $B = \{x: x \text{ is a multiple of 3}\}$ ,
  - list the elements in  $A$ ,
  - list the elements in  $B$ ,
  - find  $A \cap B$ ,
  - find  $A \cup B$ .

#### Solution

- $\varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$   
 $A = \{x: x \text{ is an even number}\}$   
 $= \{2, 4, 6, 8, 10\}$

- $B = \{x: x \text{ is a multiple of 3}\}$   
 $= \{3, 6, 9\}$

- $A \cap B = \{6\}$

- $A \cup B = \{2, 3, 4, 6, 8, 9, 10\}$

- Let a universal set  $\varepsilon = \{\text{red, orange, yellow, green, indigo, blue, purple}\}$ ,  $A = \{\text{red, yellow, blue}\}$  and  $B = \{\text{yellow, green}\}$ .
  - Find  $n(A)$ .
  - Find  $A'$ .
  - Is  $B$  a subset of  $A$ ?

#### Solution

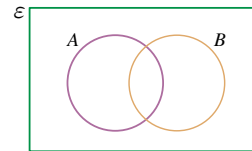
- $n(A) = 3$
- $A' = \{\text{orange, green, indigo, purple}\}$
- green  $\in B$  but green  $\notin A$ .  
 $\therefore B$  is not a subset of  $A$ .

- Let  $E = \{\text{magnesium, iron, zinc, gold}\}$  and  $F = \{\text{gold, silver, iron}\}$ .
  - Suggest a universal set that contains the two sets  $E$  and  $F$ .
  - Find  $E \cap F$ .
  - List all the possible subsets of  $E \cap F$ .

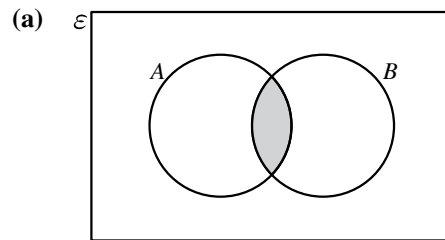
#### Solution

- A universal set may be  $\varepsilon = \{\text{all metals}\}$ .
- $E \cap F = \{\text{iron, gold}\}$
- The subsets of  $E \cap F$  are:  $\phi$ ,  $\{\text{iron}\}$ ,  $\{\text{gold}\}$ ,  $\{\text{iron, gold}\}$ .

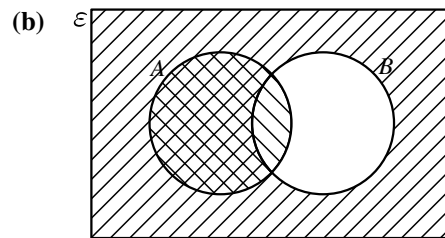
- Copy the Venn diagram and shade the region that represents
  - $A \cap B$ ,
  - $A \cup B'$ .



#### Solution



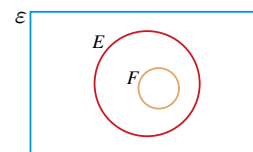
$$A \cap B = \text{shaded region}$$



$$A = \text{shaded region}, B' = \text{shaded region}$$

$$A \cup B' = \text{all the shaded region}$$

- Refer to the Venn diagram.
  - State the relationship between the sets  $E$  and  $F$ .
  - Find  $E \cup F$  and  $E \cap F$ .
  - Copy the Venn diagram and shade the region that represents  $E \cap F'$ .



#### Solution

- $F$  is a subset of  $E$ .
- $E \cup F = E$   
 $E \cap F = F$