

## Lesson 49 – Review – Sets and Venn Diagrams

1. Given:  $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$   
 $A = \{2, 3, 5, 8\}$   
 $B = \{1, 3, 5, 7, 9\}$   
 $C = \{3, 5\}$

Draw a Venn diagram with all the elements listed inside. Then list the elements of the following sets:

- (a)  $A \cap B$                       (b)  $A \cup B$                       (c)  $A'$                               (d)  $B'$   
 (e)  $(A' \cup B)'$                       (f)  $A' \cap B'$                       (g)  $A' \cup C$

Write true for false for each statement:

- (h)  $6 \notin A$                       (i)  $A \subset C$                       (j)  $B \supset C$   
 (k)  $B \cap B' = \emptyset$                       (l)  $A \cap B = C$                       (m)  $3 \notin C'$

D is a set containing 2 elements and  $D \subset A'$  and  $D \cap B = \emptyset$ .

(n) List the elements of D.

2. Given:  $U = \{a, b, c, d, e, f, g, h, i, j\}$   
 $X = \{d, e, a, f\}$   
 $Y = \{d, i, c, e\}$   
 $Z = \{b, a, g\}$

Draw a Venn diagram with all the elements listed inside. Then list the elements of the following sets:

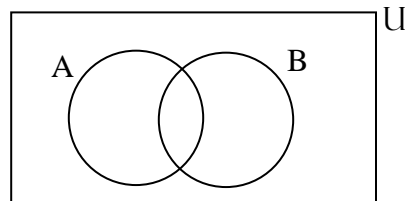
- (a)  $X \cap Y$                       (b)  $X \cup Z$                       (c)  $Y'$                               (d)  $Z'$   
 (e)  $(Y \cap Z)'$                       (f)  $X' \cap Y$                       (g)  $Y \cap Z'$

Write true for false for each statement:

- (h)  $Y' \cap Z = Z$                       (i)  $c \notin (X \cup Y)$   
 (j)  $Y' \supset Z$                       (k) If  $Z' = A$  then  $A' = Z$

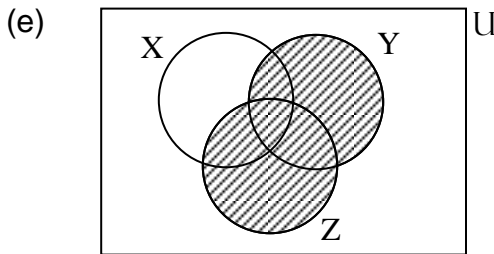
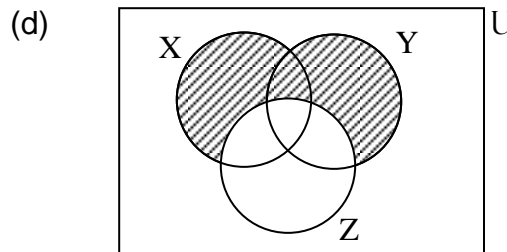
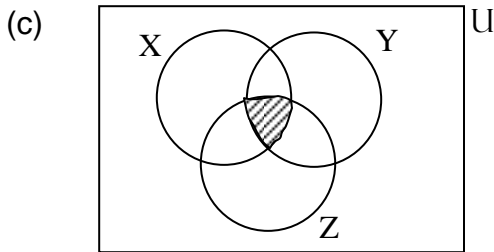
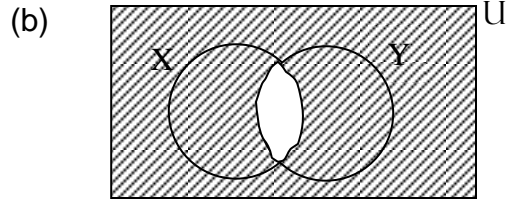
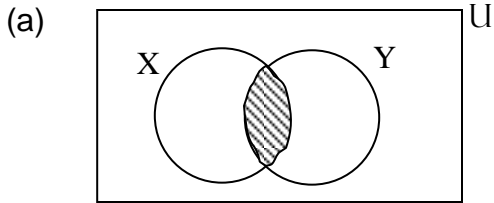
3. For each part of this question copy the Venn diagram. Shade the area(s) corresponding to:

- (a)  $A \cup B$                       (b)  $(A \cup B)'$   
 (c)  $A'$                               (d)  $A' \cap B$   
 (e)  $A \cup B'$



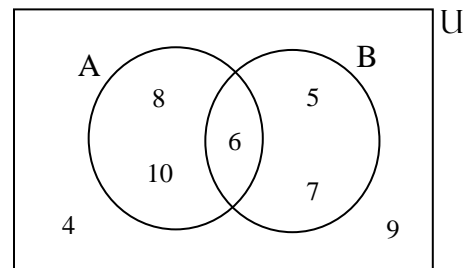
4. At a school, 21 girls play sport. Of these, 12 play tennis, 15 play netball and 6 play both. Draw a Venn diagram to show this information and find out how many play:  
 (a) Tennis only;                      (b) Netball only.

5. For each diagram, describe the shaded region using correct mathematical symbols.



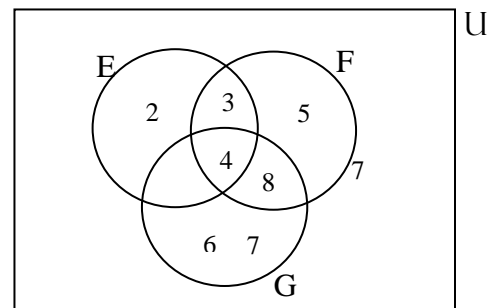
6. From the Venn diagram below, list the elements in:

- (a) A
- (b) U
- (c) B'
- (d)  $A \cap B$
- (e)  $A \cup B$
- (f)  $A' \cup B$
- (g)  $(A \cup B)'$



7. From the Venn diagram below, list the elements in:

- (a)  $E \cup F$
- (b)  $E \cap F \cap G$
- (c)  $(E \cup F) \cap G$
- (d)  $(E' \cap F) \cup G$



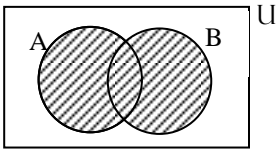
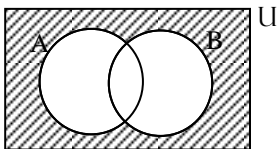
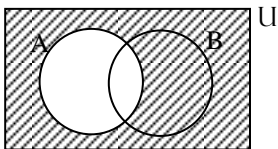
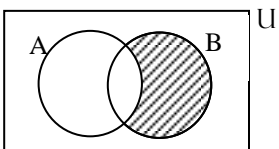
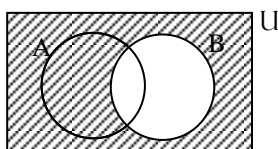
8. In a class of 31 students, 12 take physical education, 14 take Latin and 18 take technical drawing; 4 students take physical education only, 7 students take Latin only, and 8 take technical drawing only; 3 take physical education and Latin, 5 take Latin and technical drawing and 6 take technical drawing and physical education.

Draw a Venn diagram to illustrate these three sets, and find out how many students take all three subjects.

## Answers to Review – Sets and Venn Diagrams

1. (a)  $\{1, 3\}$  (b)  $\{1, 2, 3, 5, 7, 8, 9\}$  (c)  $\{1, 4, 6, 7, 9\}$   
 (d)  $\{2, 4, 6, 8\}$  (e)  $\{2, 8\}$  (f)  $\{4, 6\}$   
 (g)  $\{1, 3, 4, 5, 6, 7, 9\}$  (h) True (i) False  
 (j) True (k) True (l) True  
 (m) True (n)  $\{4, 6\}$

2. (a)  $\{d, e\}$  (b)  $\{a, b, d, e, f, g\}$  (c)  $\{a, b, f, g, h, j\}$   
 (d)  $\{c, d, e, f, h, i, j\}$  (e)  $U$  (f)  $\{c, i\}$   
 (g)  $\{c, d, e, i\}$  (h) True (i) False  
 (j) True (k) True

3. (a)  (b)  (c)   
 (d)  (e) 

4. (a) 6 play tennis only (b) 9 play netball only

5. (a)  $X \cap Y$  (b)  $(X \cap Y)'$  (c)  $X \cap Y \cap Z$   
 (d)  $(X \cup Y) \cap Z'$  (e)  $Y \cup Z$

6. (a)  $\{6, 8, 10\}$  (b)  $\{4, 5, 6, 7, 8, 9, 10\}$  (e)  $\{5, 6, 7, 8, 10\}$   
 (c)  $\{4, 8, 9, 10\}$  (d)  $\{6\}$   
 (f)  $\{4, 5, 6, 7, 9\}$  (g)  $\{4, 9\}$

7. (a)  $\{2, 3, 4, 5, 8\}$  (b)  $\{4\}$   
 (c)  $\{4, 8\}$  (d)  $\{4, 5, 6, 7, 8\}$

8. 1 student takes all 3 subjects