Junior Certificate School Programme

Sum Zone
Sets

Student Workbook

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Department of Education and Skills

PDST
Professional Development Service for Teachers | An tSeirbhís um Fhorbairt Ghairmiúil do Mhúinteoirí

Junior Certificate School Programme

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Chapter 1

Listing the Elements in a Set

List the elements in each of the following sets:

1. A = {the set of whole numbers between 3 and 8 inclusive}

2. B = {the set of consonants in the word M A T H E M A T I C S}

3. C = {the set of vowels in the word G E O M E T R Y}

4. D = {the set of the first three months of the calendar year}

5. E = {the set of the last three months of the calendar year}

6. F = {the set of counties in Ireland that begin with the letter C}

7. G = {the set of days of the week that begin with the letter S}

8. H = {the set of seasons in the year}

9. I = {the set of students in your class that own a dog}

10. J = {the set of whole numbers between 11 and 17 inclusive}

11. K = {the set of days of the week that begin with the letter W}

12. N = {the set of days of the week that begin with the letter T}

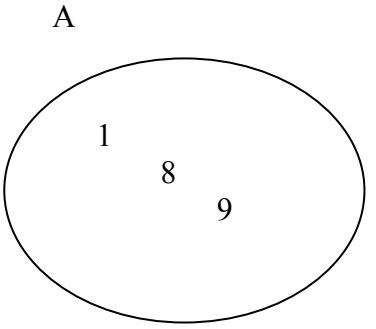
13. O = {the set of subjects that you are studying in school this year}

14. P = {the set of the next five letters of the alphabet that come directly after the letter C}

Chapter 2

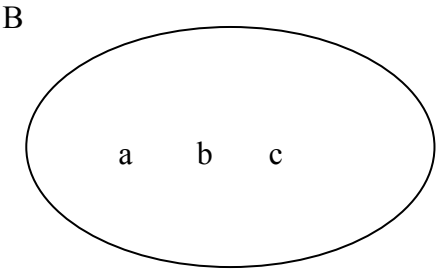
Listing the Elements in a Set

1.



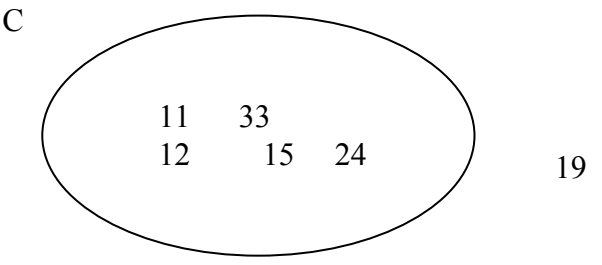
List the elements in set A. A = { , , }

2.



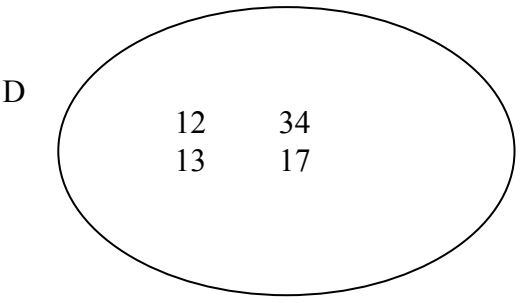
List the elements in set B. B = { , , }

3.



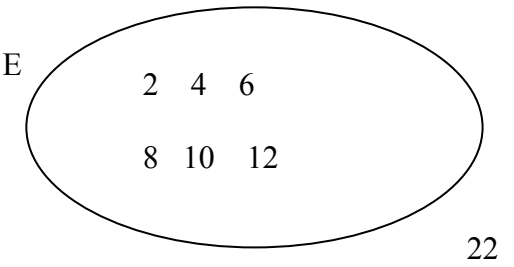
List the elements in set C. C = { , , , , }

4.



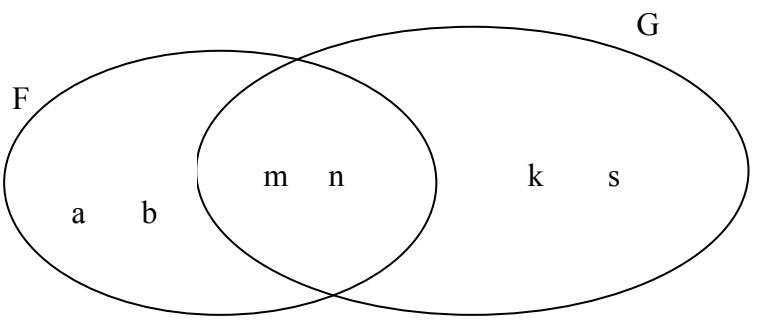
List the elements in set D. D = { , , , }

5.



List the elements in set E. E = { , , , , , }

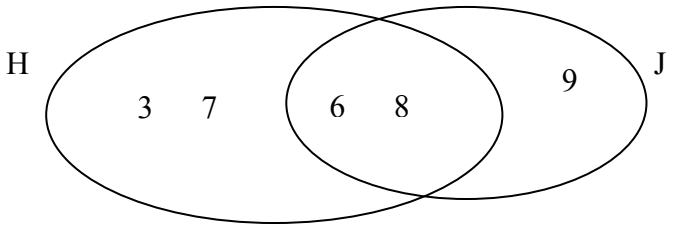
6.



List the elements in set F. F = { , , , }

List the elements in set G. G = { , , , }

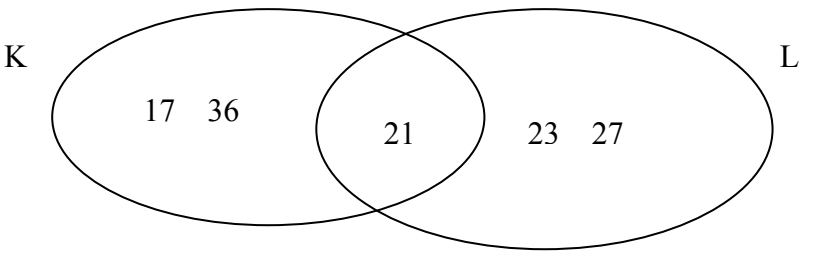
7.



List the elements in set H. H = { , , , , }

List the elements in set J. J = { , , , }

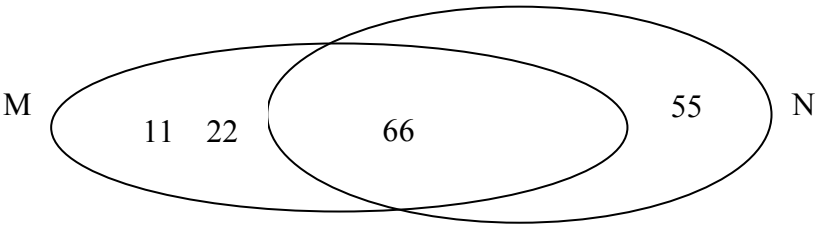
8.



List the elements in set K. K = { , , , }

List the elements in set L. L = { , , , }

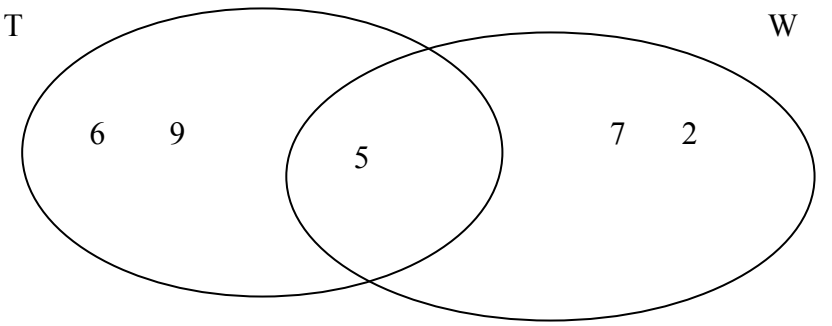
9.



List the elements in set M. M = { , , }

List the elements in set N. N = { , }

10.



List the elements in set T. T = { , , }

List the elements in set W. W = { , , }

Chapter 3

True or False

Are the following statements true or false? Circle your answer.

1. $6 \in$ {whole numbers between 4 and 11} **True** **False**

2. $7{\cdot}5 \in$ {decimal numbers between 7·2 and 7·8} **True** **False**

3. $\frac{3}{4} \notin$ {fractions between $\frac{1}{2}$ and $\frac{7}{8}$} **True** **False**

4. $1{\cdot}2 \in$ {decimal numbers between 0 · 9 and 1· 6} **True** **False**

5. $\frac{1}{2} \in$ {fractions between $\frac{2}{5}$ and $\frac{4}{5}$} **True** **False**

6. $5 \notin$ {even numbers} **True** **False**

7. $7 \in$ {odd numbers} **True** **False**

8. $3 \in$ {numbers that divide evenly into 21} **True** **False**

9. $5 \in$ {numbers that divide evenly into 100} **True** **False**

10. $1 \cdot 25 \in$ {decimal numbers between 1·2 and 1·3} **True** **False**

11. $15 \in$ {numbers that divide evenly into 75} **True** **False**

12. $6 \notin$ {Natural Numbers} **True** **False**

13. $0 \in$ {Natural Numbers} **True** **False**

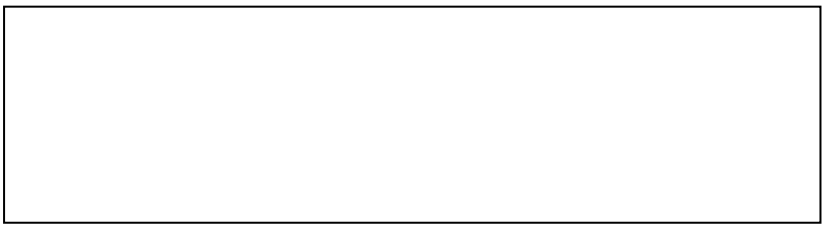
Chapter 4

Drawing a Venn Diagram
(to represent two sets)

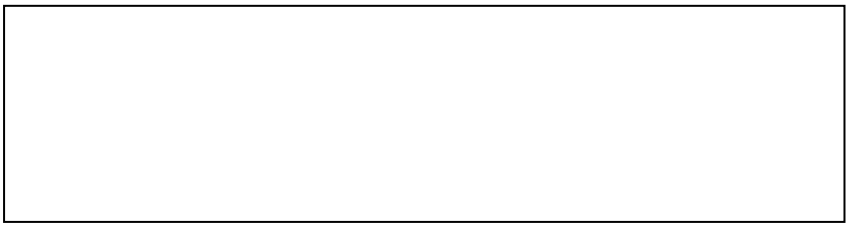
Draw a Venn Diagram for each of the following pairs of sets:

1. A = {1, 3, 5} B = {5, 7, 9}

2. C = {2, 4, 6, 8} D = { 6, 7, 8, 9, 10}

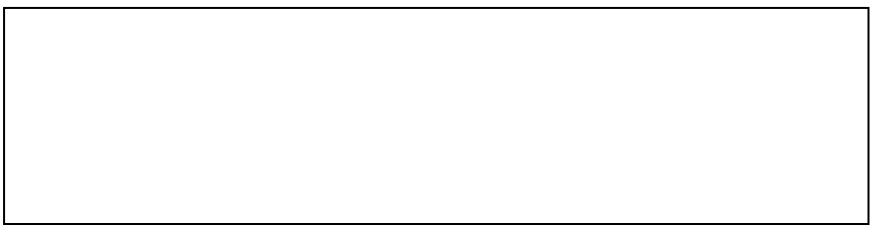


3. E = {a, b, c, d} F = {m, n, o, d,}

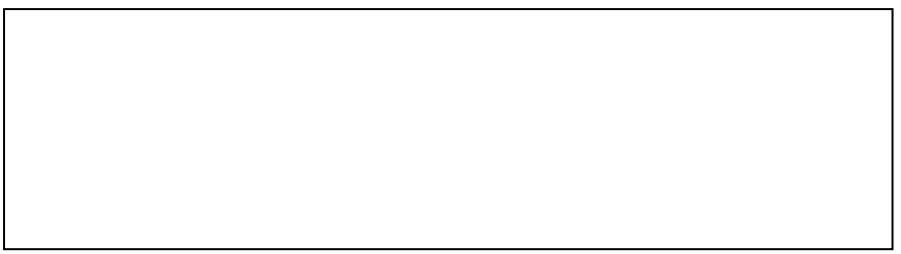


4. G = {5◎1, 3◎5, 6◎8, 7◎5} H = { 8◎4, 7◎5}

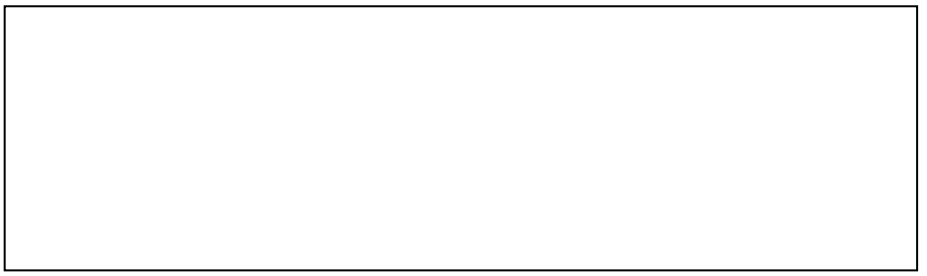
5. C = {dog, elephant, cat} D = {cat, dog, rabbit}



6. I = {11, 22, 33, 44} J = {44, 55, 66}



7. K = {set of letters in the word: M A T H S}
   L = {set of letters in the word: S Q U A R E}



8. M = {set of letters in the word: D U B L I N}
N = {set of letters in the word: D O N E G A L}

9. O = {set of letters in the word: P E A C H}
P = {set of letters in the word: P L U M}

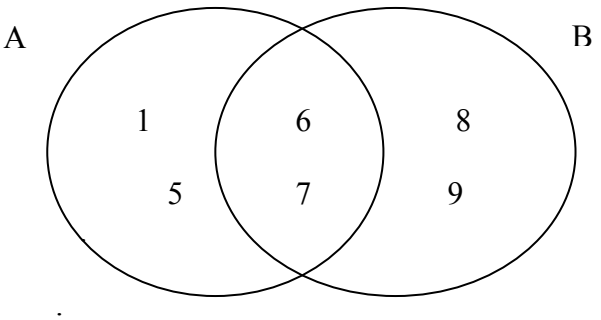
10. Q = {a, c, e, f} R = {c, r, s, t, w}

11. S = $\{\frac{1}{2}, \frac{3}{4}, \frac{5}{6}\}$ T = $\{\frac{3}{4}, \frac{7}{8}, \frac{9}{10}\}$

Chapter 5

Finding Information in a Venn Diagram

1.



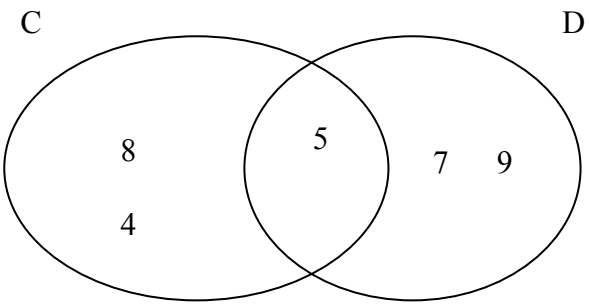
List the elements in set A. A = { , , , , }

List the elements in set B. B = { , , , , }

List the elements in A ∪ B. A ∪ B = { , , , , , , }

List the elements in A ∩ B. A ∩ B = { , }

2.



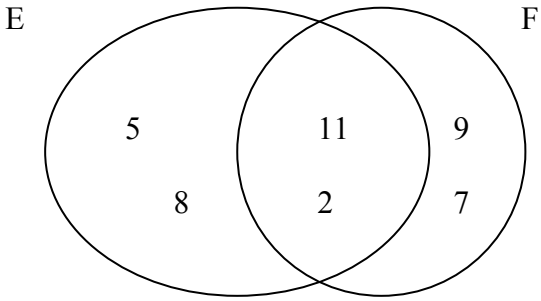
List the elements in set C. C = { , , , }

List the elements in set D. D = { 5 , , , }

List the elements in set C ∪ D. . C ∪ D = { , 56 , , , , }

List the elements in set C ∩ D. C ∩ D = { }

3.



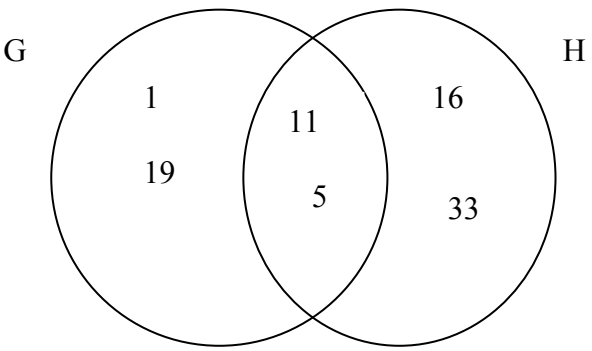
List the elements in set E. E = { , , , , }

List the elements in set F. F = { , , , , }

List the elements in set E ∪ F. E ∪ F = { , , , , , , }

List the elements in set E ∩ F. E ∩ F = { , , }

4.



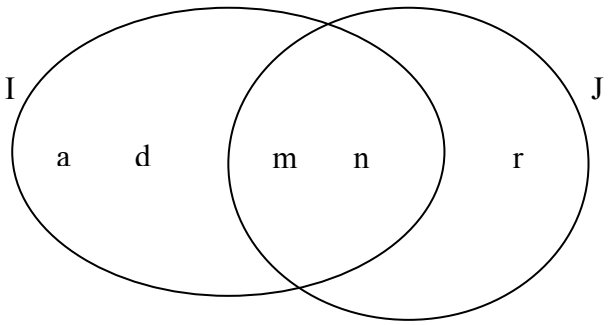
List the elements in set G. G = { , , , , }

List the elements in set H. H = { , , , , }

List the elements in set G ∪ H. G ∪ H = { , , , , , , }

List the elements in set G ∩ H. G ∩ H = { , , }

5.



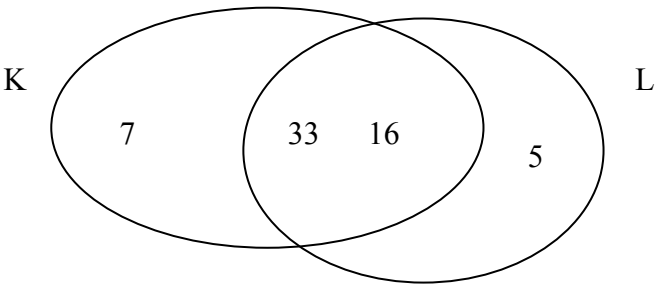
List the elements in set I. I = { , , , , }

List the elements in set J. J = { , , , }

List the elements in set I ∪ J. I ∪ J = { , , , , , }

List the elements in set I ∩ J. I ∩ J = { , , }

6.



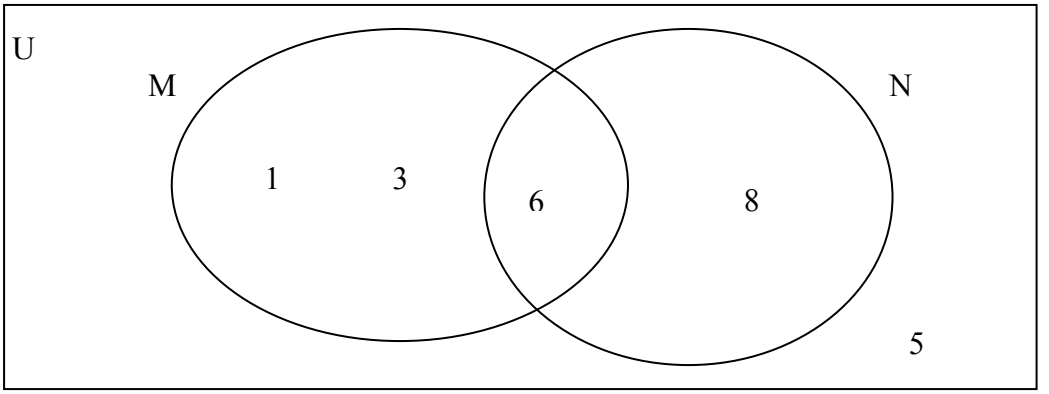
List the elements in set K. K = { , , , }

List the elements in set L. L = { , , , }

List the elements in set K ∪ L. K∪ L = { , , , , }

List the elements in set K ∩ L. K ∩ L = { , , }

7.



List the elements in U. U = { , , , , }

List the elements in set M. M = { , , }

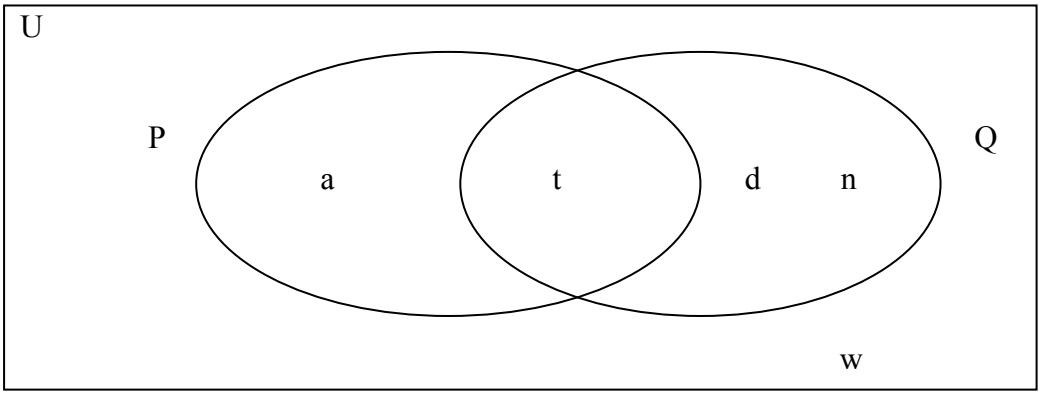
List the elements in set N. N = { , }

List the elements in set $M \cup N$. $M \cup N$ = { , , , }

List the elements in set $M \cap N$. $M \cap N$ = { }

List the elements that are neither in set M nor in set N. $(M \cup N)'$ = { }

8.



List the elements in U. U = { , , , , , }

List the elements in set P. P = { , , }

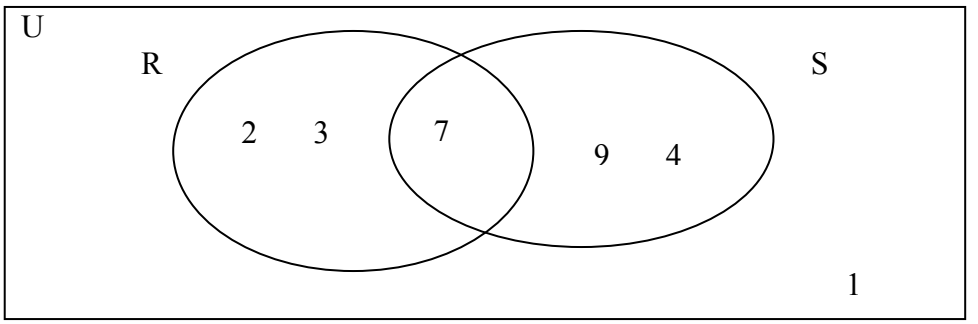
List the elements in set Q. Q = { , , , }

List the elements in set P ∪ Q. P ∪ Q = { , , , , }

List the elements in set P ∩ Q. P ∩ Q = { , }

List the elements that are neither in set P nor in set Q. $(P \cup Q)' = \{ \quad \}$

9.



List the elements in U. U = { , , , , , }

List the elements in set R. R = { , , }

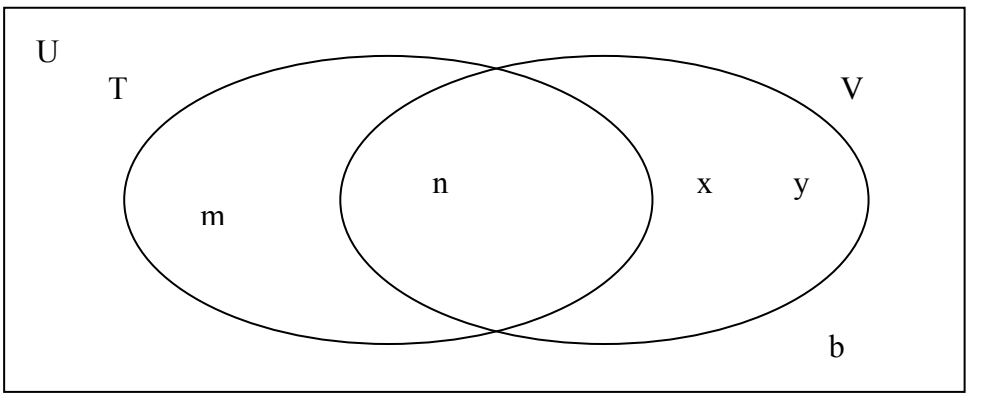
List the elements in set S. S = { , , }

List the elements in set R ∪ S. R ∪ S = { , , , , }

List the elements in set R ∩ S. R ∩ S = { }

List the elements that are neither in set R nor in set S. $(R \cup S)' = \{ \quad \}$

10.



List the elements in U. U = { , , , , }

List the elements in set T. T = { , }

List the elements in set V. V = { , , }

List the elements in set $T \cup V$. $T \cup V$ = { , , , }

List the elements in set $T \cap V$. $T \cap V$ = { }

List the elements that are neither in set T nor in set V. $(T \cup V)'$ = { }

Chapter 6

Using Venn Diagrams to Solve Problems

1. In a class of 25 students, 12 play Hurling, 13 play Soccer and 4 play both games.

Draw a Venn Diagram to illustrate the above information.

Use this Venn Diagram to find:

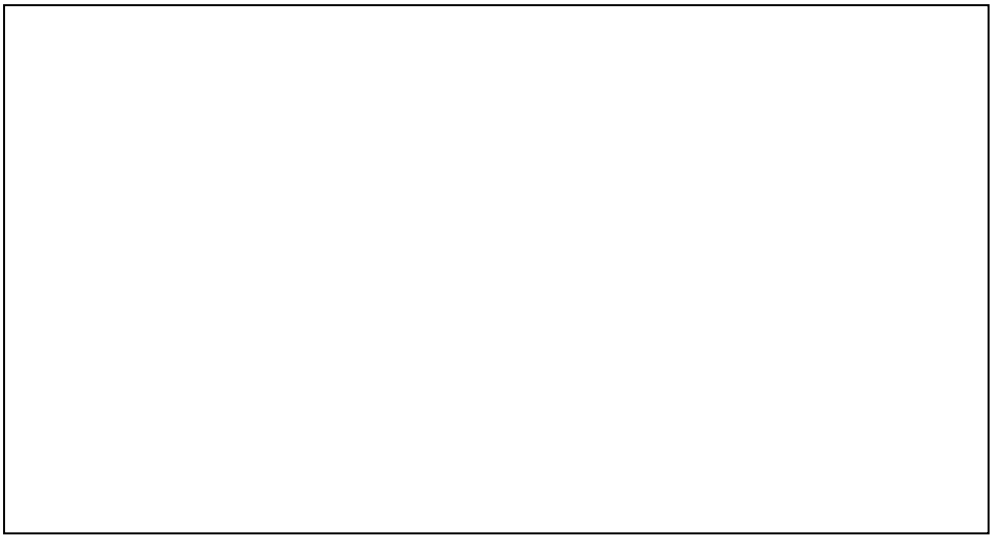
(a) the number of students who play Hurling only

(b) the number of students who play Soccer only

(c) the number of students who play neither game

2. In a class of 24 students, 15 play Snooker, 12 play Darts and 5 play both games.

Draw a Venn Diagram to illustrate the above information.



Use this Venn Diagram to find:

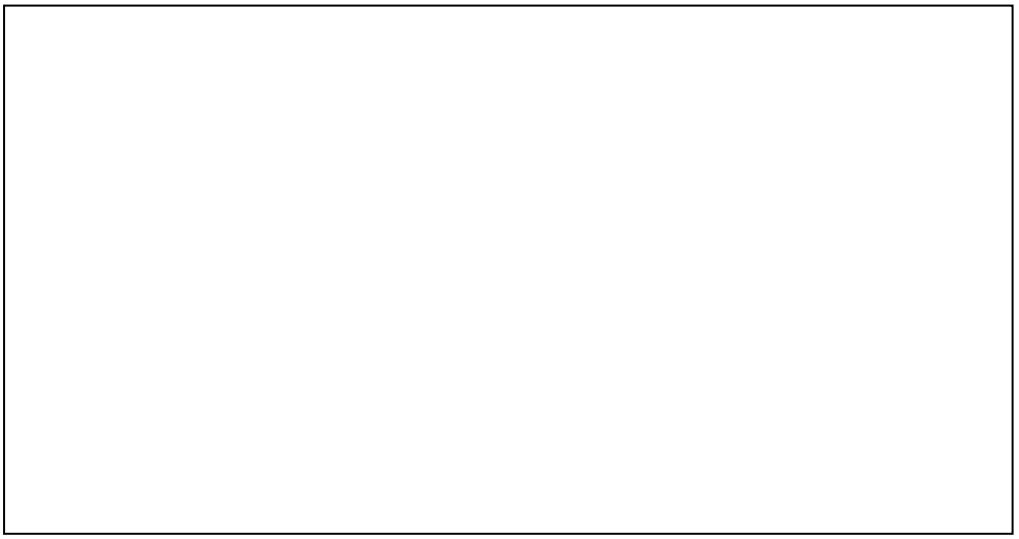
(a) the number of students who play Snooker only

(b) the number of students who play Darts only

(c) the number of students who play neither game

3. In a class of 27 students, 18 study Geography, 12 study History and 5 study both.

Draw a Venn Diagram to illustrate the above information.



Use this Venn Diagram to find:

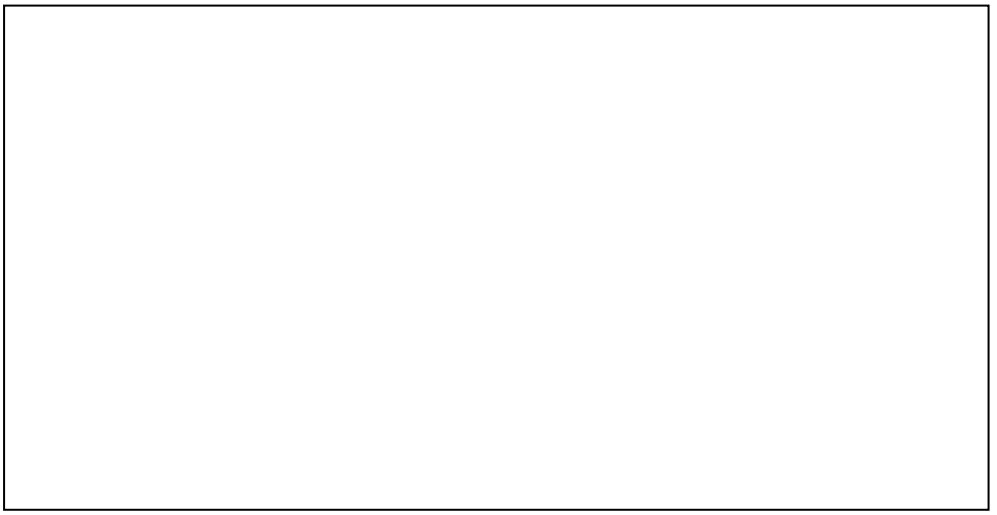
(a) the number of students who study Geography only

(b) the number of students who study History only

(c) the number of students who study neither subject

4. In a class of 28 students, 17 have a dog, 12 have a cat and 3 have both of these animals.

Draw a Venn Diagram to illustrate the above information.



Use this Venn Diagram to find:

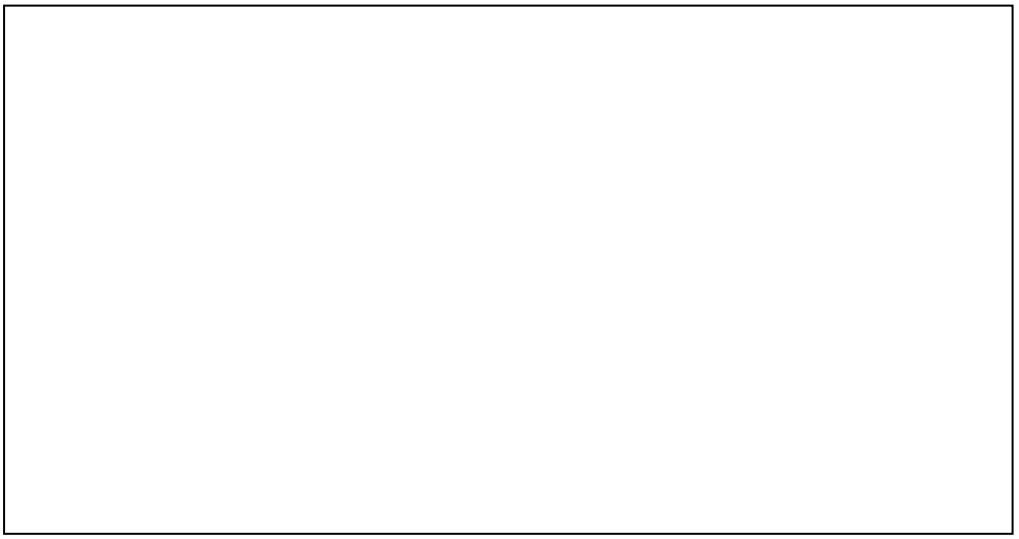
(a) the number of students who have a dog only

(b) the number of students who have a cat only

(c) the number of students who have neither animal

5. In a Youth Club of 42 members, 28 enjoy swimming, 22 enjoy reading and 10 play both activities.

Draw a Venn Diagram to illustrate the above information.



Use this Venn Diagram to find:

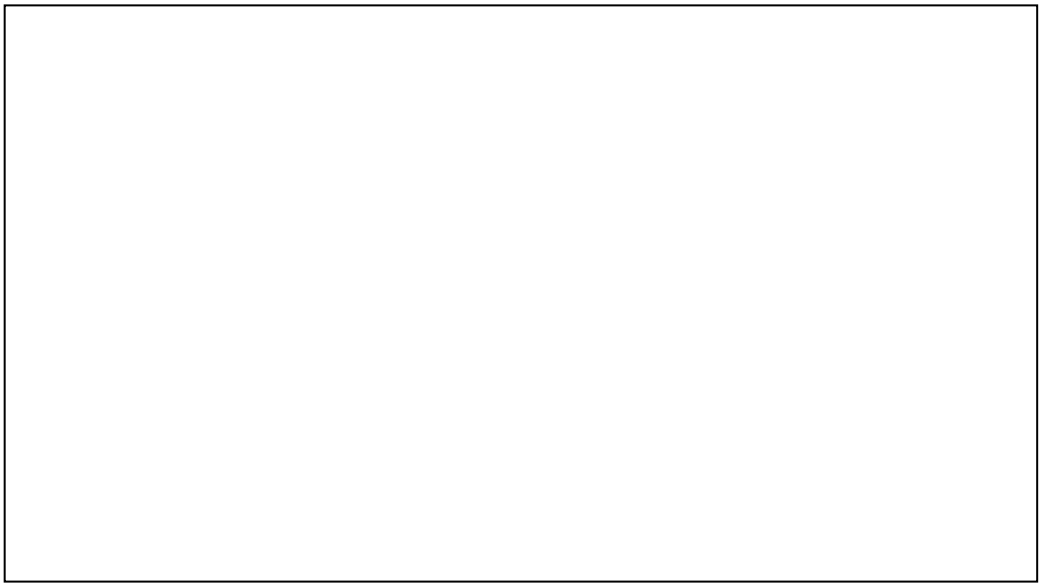
(a) the number of members who enjoy swimming only

(b) the number of members who enjoy reading only

(c) the number of members who enjoy neither of these activities

6. In a class of 22 students, 10 support Liverpool, 12 support Chelsea and 3 support both of these teams.

Draw a Venn Diagram to illustrate the above information.



Use this Venn Diagram to find:

(a) the number of students who support Liverpool only

(b) the number of students who support Chelsea only

(c) the number of students who support neither of these two teams

7. In a class of 32 students, 20 support Manchester United, 17 support Glasgow Celtic and 10 support both of these teams.

Draw a Venn Diagram to illustrate the above information.

Use this Venn Diagram to find:

(a) the number of students who support Manchester United only

(b) the number of students who support Glasgow Celtic only

(c) the number of students who support neither of these two teams

8. In a class of 27 students, 18 students own an iPod, 13 students own a music centre and 5 students own both of these electronic goods.

Draw a Venn Diagram to illustrate the above information.

Use this Venn Diagram to find:

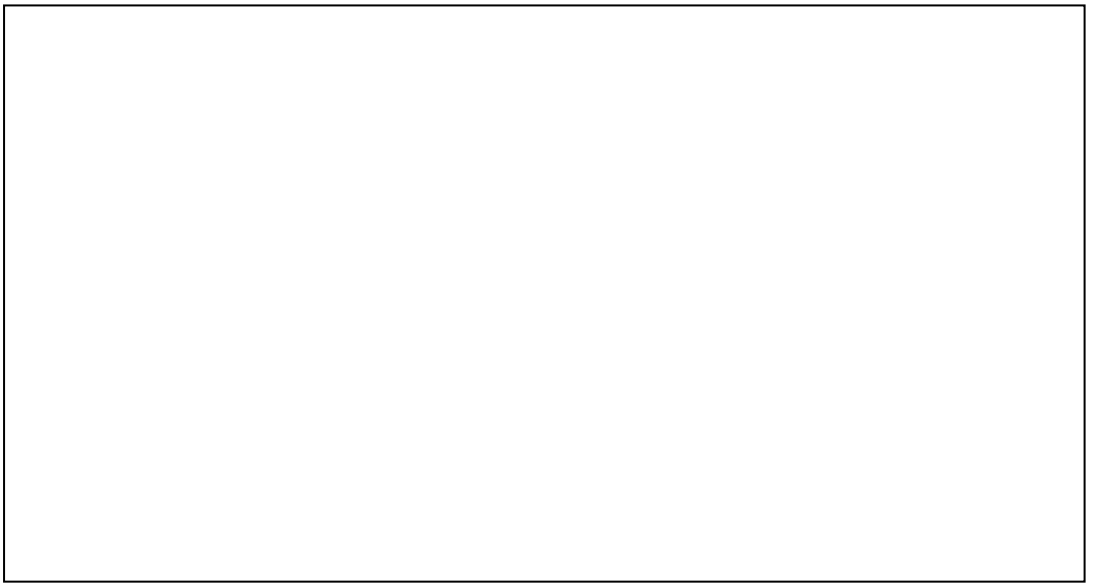
(a) the number of students who own an iPod only

(b) the number of students who own a music centre only

(c) the number of students who own neither of these electronic goods

9. In a class of 26 students, 15 students drink Coca Cola, 13 drink Pepsi and 7 students drink both of these soft drinks.

Draw a Venn Diagram to illustrate the above information.



Use this Venn Diagram to find:

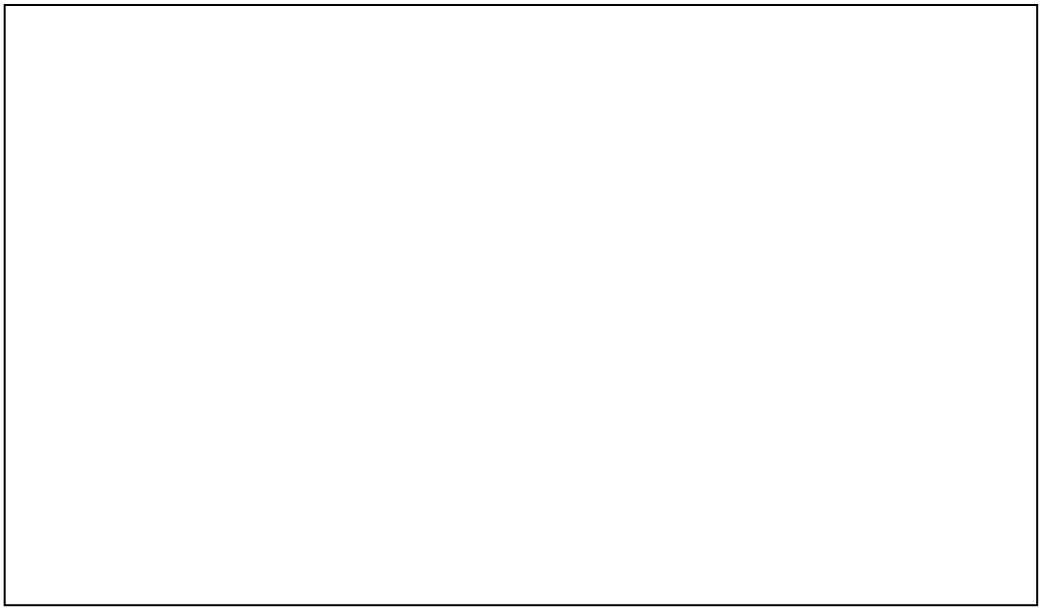
(a) the number of students who drink Coca Cola only

(b) the number of students who drink Pepsi only

(c) the number of students who drink neither of these soft drinks

10. In a school of 33 teachers, 15 teachers buy the "Irish Examiner", 13 buy the "Irish Times" and 7 teachers regularly buy both of these newspapers.

Draw a Venn Diagram to illustrate the above information.



Use this Venn Diagram to find:

(a) the number of students who buy the "Irish Examiner" only

(b) the number of students who buy the "Irish Times" only

(c) the number of students who buy neither of these newspapers.

11. In a class of 25 students, 18 students have a music centre, 13 students have an iPod and 10 students have both.

Draw a Venn Diagram to illustrate the above information.

Use this Venn Diagram to find:

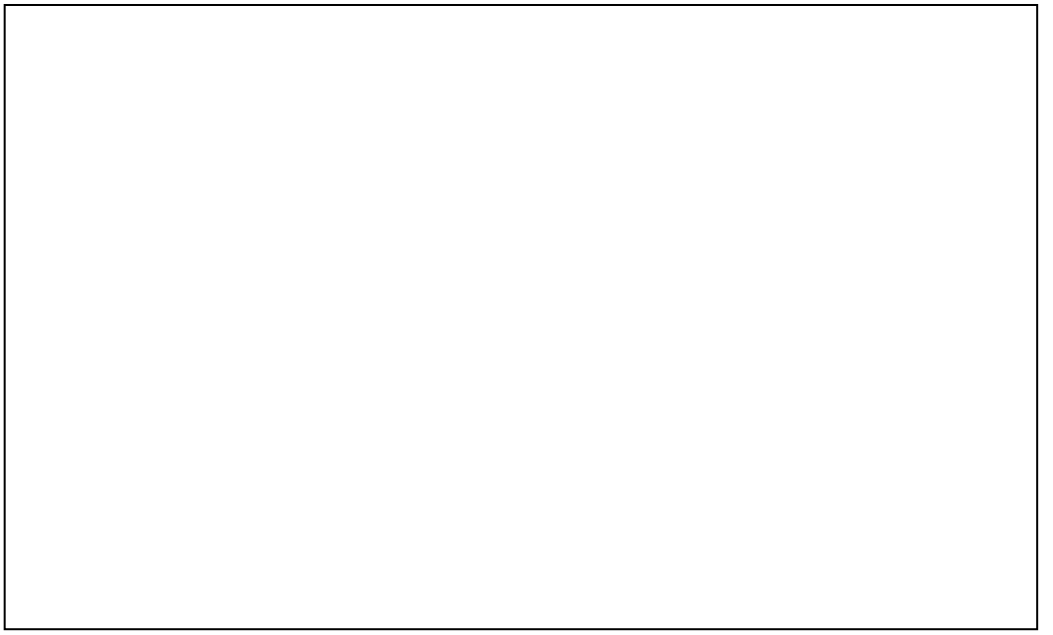
(a) the number of students who have a music centre only

(b) the number of students who have an iPod only

(c) the number of students who have neither of these electronic goods.

12. In a class of 23 students, 6 students went to Spain on their holidays, 4 students went to Portugal and 1 student went to both of these locations.

Draw a Venn Diagram to illustrate the above information.



Use this Venn Diagram to find:

(a) the number of students who had went to Spain only

(b) the number of students who went to Portugal only on their holidays

(c) the number of students who went to neither of these destinations

Chapter 7

Union of Two Sets

1. A = {2, 4, 6, 8} B = {3, 5, 7}

   List the elements of A ∪ B.

2. C = {3, 6, 9, 12} D = {4, 7, 10, 13}

   List the elements of C ∪ D.

3. E = {1, 2, 3, 4} F = {3, 4, 5, 6}

   List the elements of E ∪ F.

4. A = {John, Pat, Daniel} B = {Bobby, Mark, Thomas}

   List the elements of A ∪ B.

5. G = {0, 2, 4, 6} H = {1, 2, 3, 4}

List the elements of G ∪ H.

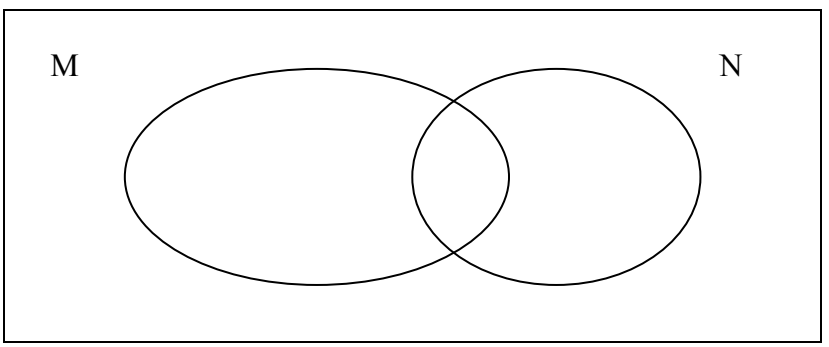
6. I = {a, e, i, o, u} J = {a, b, c}

List the elements of I ∪ J.

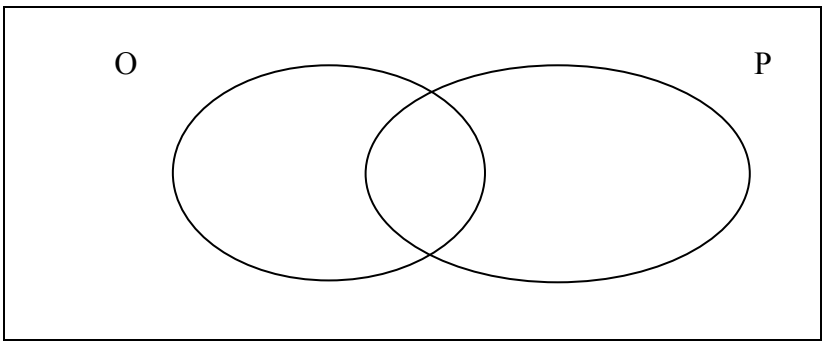
7. K = {M, A, T, H, S} L = {S, U, M}

List the elements of K ∪ L

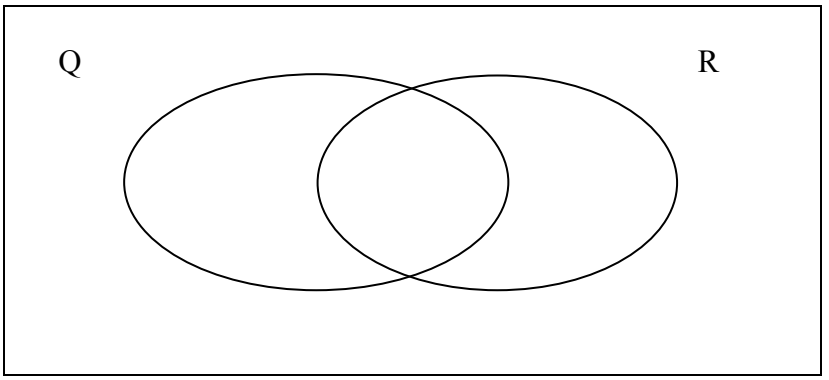
8. Using the Venn Diagram below, shade in the region that represents M ∪ N.



9. Using the Venn Diagram below, shade in the region that represents O ∪ P.



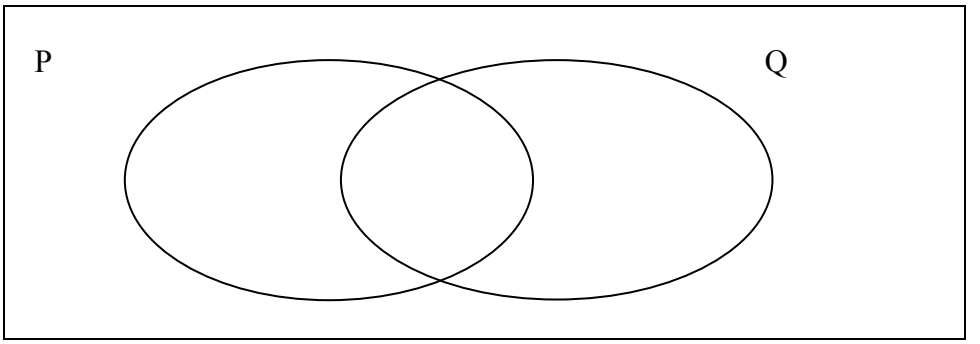
10. Using the Venn Diagram below, shade in the region that represents Q ∪ R.



Chapter 8

Intersection of Two Sets

1. Using the Venn Diagram below, shade in the region that represents P ∩ Q.



2. A = {a, e, i, o, u} B = {a, n, t}

List the elements of A ∩ B.

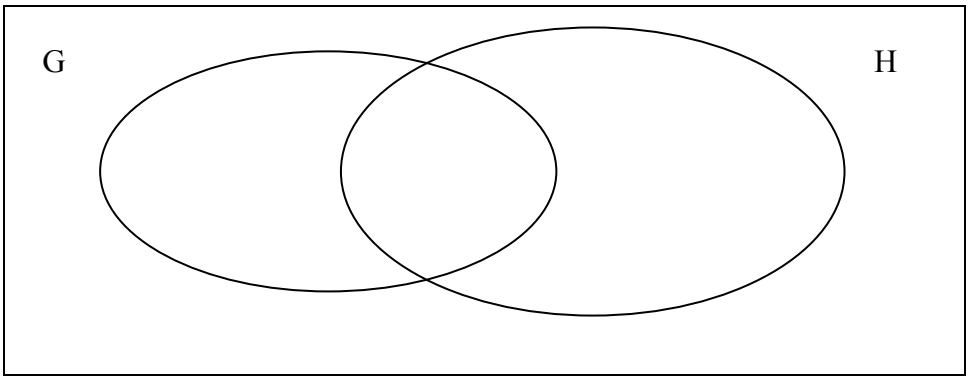
3. C = {1, 3, 5, 7,} D = {1, 2, 4, 7}

List the elements of C ∩ D.

4. E = {2, 4, 6} F = {4, 6, 8}

List the elements of E ∩ F.

5. Using the Venn Diagram below, shade in the region that represents G ∩ H.



6. I = {s, u, m} J = {m, o, n, e, y}.

List the elements of I ∩ J.

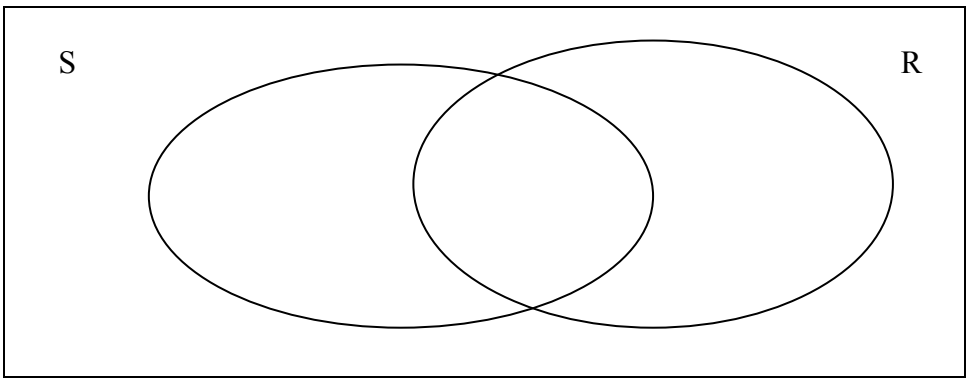
7. K ={1, 3, 5, 7} L = {1, 2, 3, 4, 5}

List the elements of K ∩ L.

8. M = {0, 1, 2, 3} N = {0, 2, 4}

List the elements of M ∩ N.

9. Using the Venn Diagram below shade in the region that represents S ∩ R.



10. $A = \{t, e, a, c, h\}$ $B = \{l, e, a, r, n\}$.

List the elements of $A \cap B$.

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