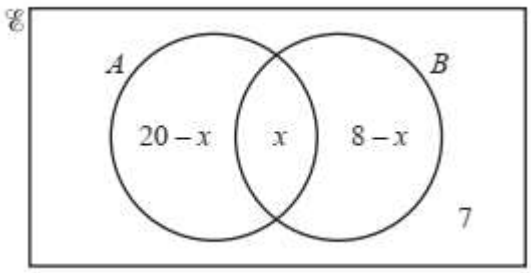
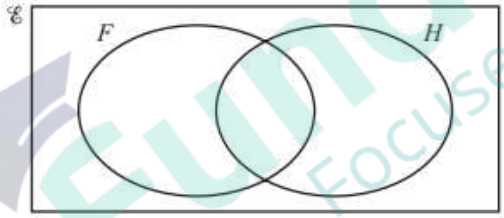
Past Papers Worksheet P4 Sets (Problem Solving) IGCSE Mathematics 0580

1. The Venn diagram shows information about the number of elements in sets A, B and ξ.



(a) n($A \cup B$) , = 23
Find the value of x. [3]
(b) An element is chosen at random from ξ.
Find the probability that this element is in $(A \cup B)'$. [2]
0580/22/M/J/18 Q23)

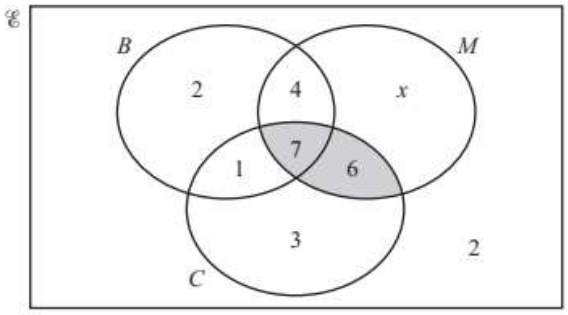
2. In a class of 24 students,
16 students play football (F),
12 students play hockey (H),
3 students do not play either football or hockey.



[In this question you may use the Venn diagram to help you.]
(a) Work out how many students play
(i) football or hockey, [1]
(ii) football and hockey. [1]
(b) Find n (F' ∩ H). [1]
(c) Two students from the class of 24 are chosen at random.
Find the probability that they both play football.
Give your answer as a fraction in its lowest terms. [3]
(d) A student who plays hockey is chosen at random.
Find the probability that this student plays football. [1]
(e) A student who plays football or hockey is chosen at random.
Find the probability that this student plays football. [1]
0580/47/M/J/14 Q8)

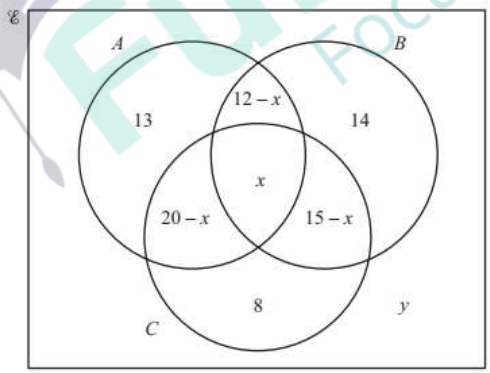
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3. 30 students were asked if they had a bicycle (B), a mobile phone (M) and a computer (C).
The results are shown in the Venn diagram.



(a) Work out the value of x. [1]
(b) Use set notation to describe the shaded region in the Venn diagram. [1]
(c) Find n(C ∩ (M ∪ B)'). [1]
(d) A student is chosen at random.
(i) Write down the probability that the student is a member of the set M'. [1]
(ii) Write down the probability that the student has a bicycle. [1]
(e) Two students are chosen at random from the students who have computers.
Find the probability that each of these students has a mobile phone but no bicycle. [3]
0580/41/M/J/15 Q4)

4. The Venn diagram shows the number of elements in sets A, B and C.



(a) n(A ∪ B ∪ C) = 74 Find x. [2]
(b) n(ξ) = 100 Find y. [1]
(c) Find the value of n((A ∪ B)' ∩ C). [1]
0580/23/M/J/13 Q15

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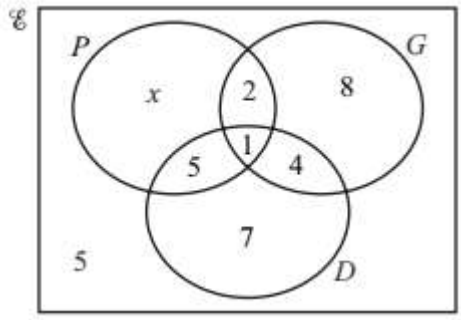
5. A teacher asks 36 students which musical instruments they play.

P = {students who play the piano}

G = {students who play the guitar}

D = {students who play the drums}

The Venn diagram shows the results



(a) Find the value of x. [1]

(b) A student is chosen at random.

Find the probability that this student

(i) plays the drums but not the guitar, [1]

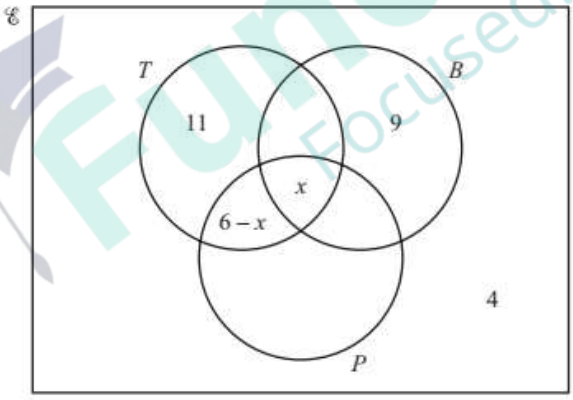
(ii) plays only 2 different instruments. [1]

(c) A student is chosen at random from those who play the guitar.

Find the probability that this student plays no other instrument. [1]

0580/21/M/J/11 Q15)

6. In the Venn diagram, ξ = {children in a nursery}



B = {children who received a book for their birthday}

T = {children who received a toy for their birthday}

P = {children who received a puzzle for their birthday}

x children received a book and a toy and a puzzle.

6 children received a toy and a puzzle.

(a) 4 children received a book and a toy.

5 children received a book and a puzzle.

7 children received a puzzle but not a book and not a toy.

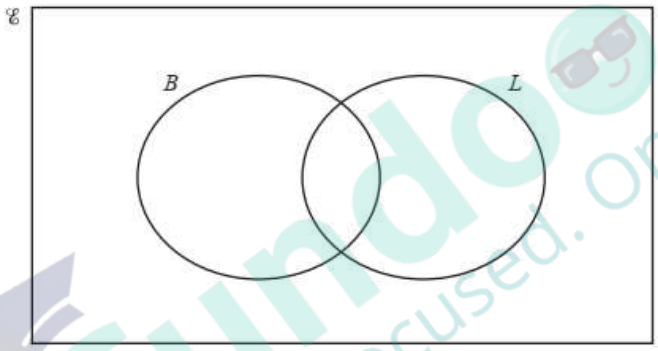
Complete the Venn diagram above. [3]

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(b) There are 40 children in the nursery.
Using the Venn diagram, write down and solve an equation in x.
(c) Work out
(i) the probability that a child, chosen at random, received a book but not a toy and not a puzzle, [1]
(ii) the number of children who received a book and a puzzle but not a toy, [1]
(iii) n(B), [1]
(iv) n(B ∪ P), [1]
(v) n(B ∪ T ∪ P)'. [1]
0580/41/M/J/14 Q4)

7. A total of 20 trucks were tested at a checkpoint.
   - 6 trucks failed the test for brakes (*B*)
   - 7 trucks failed the test for lights (*L*)
   - 9 trucks passed the tests for both brakes and light [2]

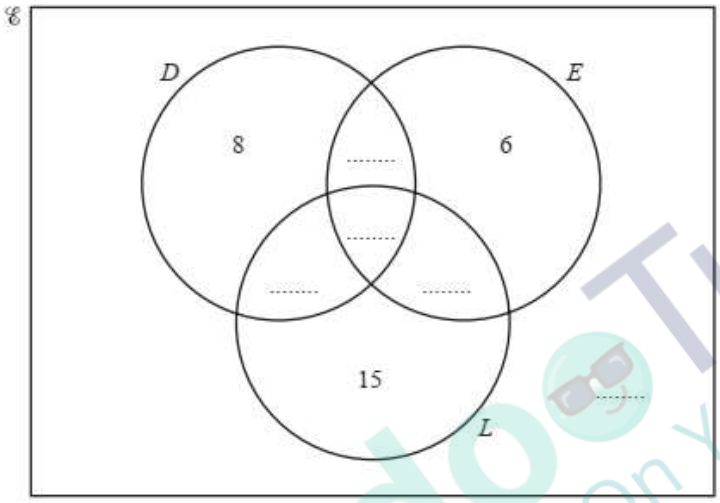


(i) Complete the Venn diagram. [2]
(ii) Find n(B'∩ L'). [1]
0580/22/F/M/17 Q17)

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8. In a survey of 60 cars, 25 use diesel, 20 use liquid hydrogen and 22 use electricity.
No cars use all three fuels and 14 cars use both diesel and electricity.
There are 8 cars which use diesel only, 15 cars which use liquid hydrogen only and 6 cars which use electricity only.
In the Venn diagram below
ξ = {cars in the survey},
D = {cars which use diesel},
L = {cars which use liquid hydrogen},
E = {cars which use electricity}.

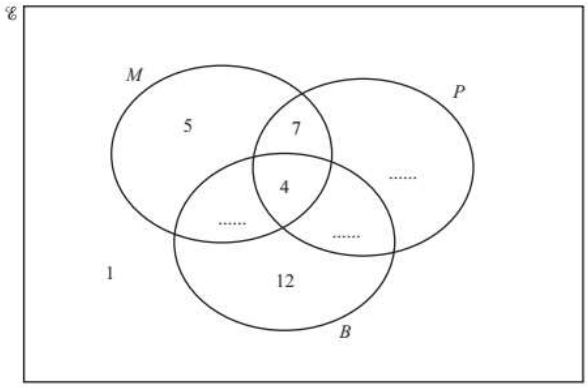


(a) Use the information above to fill in the five missing numbers in the Venn diagram. [4]
(b) Find the number of cars which use diesel but not electricity. [1]
(c) Find n(D'∩ (E ∪ L)). [1]
0580/21/O/N/10 Q22)

9. Davinder asked some people if they ate mangoes, pineapples or bananas last week.
M = { people who ate mangoes }
P = { people who ate pineapples }
B = { people who ate bananas }

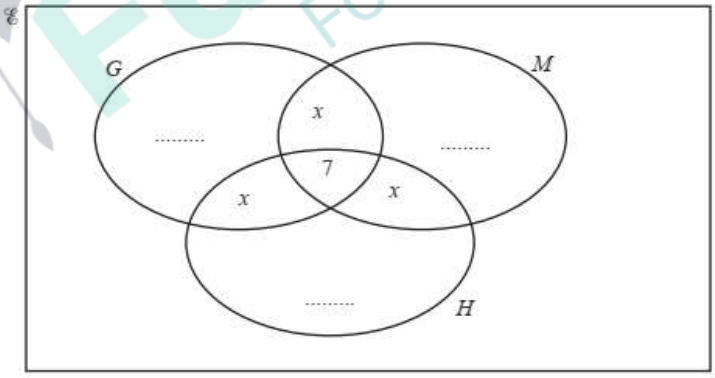
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The Venn diagram shows some of the information



19 people said they ate mangoes.
6 people said they ate **only** pineapples.
18 people said they ate **exactly two** of the three types of fruit.
(i) Write the three missing values in the Venn diagram. [3]
(ii) Find the total number of people Davinder asked. [1]
(iii) Find n(M ∩ P). [1]
(iv) One person is chosen at random from the people who ate mangoes.
Write down the probability that this person also ate bananas. [2]
0580/42/F/M/16 Q3)

10. 50 students study at least one of the subjects geography (G), mathematics (M) and history (H).
18 study only mathematics. 19 study two or three of these subjects. 23 study geography.
The Venn diagram below is to be used to show this information.



(i) Show that x = 4. [2]
(ii) Complete the Venn diagram. [2]
(iii) Use set notation to complete this statement. (G ∪ M ∪ H)' = ... [1]
(iv) Find n((G ∩(M ∪ H)). [1]
0580/42/F/M/19 Q9 (c)

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11. 90 students are asked which school clubs they attend.

D = {students who attend drama club}

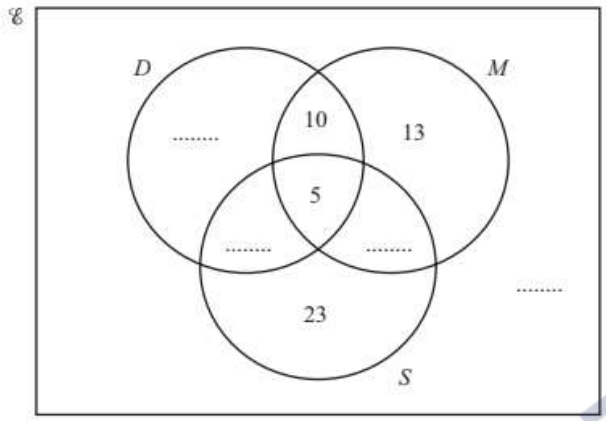
M = {students who attend music club}

S = { students who attend sports club}

39 students attend music club.

26 students attend **exactly two** clubs.

35 students attend drama club. [4]



(a) Write the four missing values in the Venn diagram. [4]

(b) How many students attend

(i) all three clubs, [1]

(ii) one club only? [1]

(c) Find

(i) n(D ∩ M), [1]

(ii) n((D ∩ M) ∩ S'). [1]

(d) One of the 90 students is chosen at random.

Find the probability that the student

(i) **only** attends music club, [1]

(ii) attends **both** music and drama clubs. [1]

(e) Two of the 90 students are chosen at random without replacement.

Find the probability that

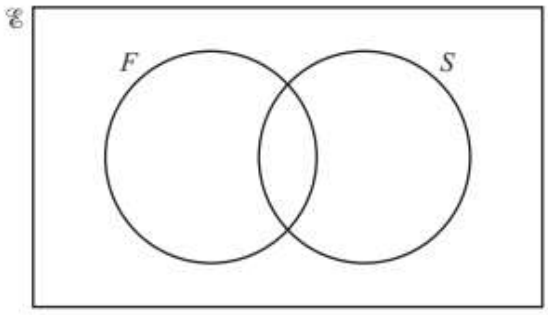
(i) they **both** attend all three clubs, [2]

(ii) one of them attends sports club only and the other attends music club only.

0580/41/O/N/12 Q3)

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12. In this part, you may use this Venn diagram to help you answer the questions.

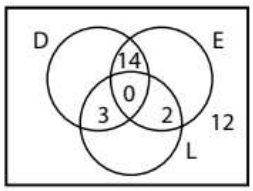
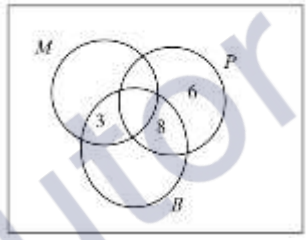
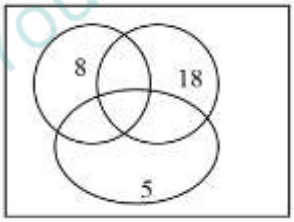
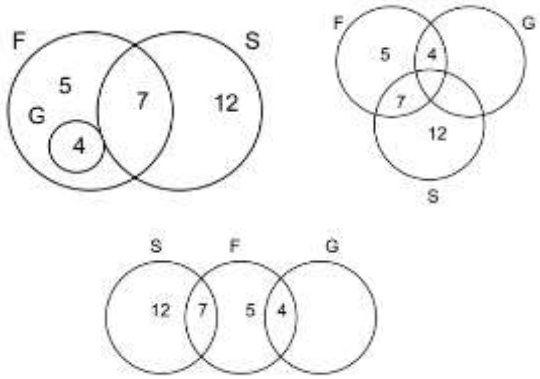


In a class of 30 students, 25 study French (F), 18 study Spanish (S).
One student does not study French or Spanish.
(i) Find the number of students who study French and Spanish. [2]
(ii) One of the 30 students is chosen at random.
Find the probability that this student studies French but not Spanish. [1]
(iii) A student who does not study Spanish is chosen at random.
Find the probability that this student studies French. [1]
0580/23/M/J/15 Q16 (a)

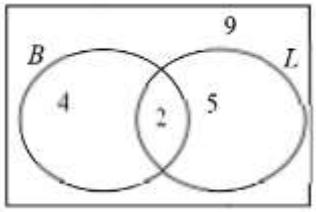
13. In another class the students all study at least one language from French, German and Spanish. No student studies all three languages.
The set of students who study German is a proper subset of the set of students who study
French. 4 students study both French and German.
12 students study Spanish but not French. 9 students study French but not Spanish.
A total of 16 students study French.
(i) Draw a Venn diagram to represent this information. [4]
(ii) Find the total number of students in this class. [1]
0580/42/O/N/12 Q9(b)

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Answers

1) (a) 5 (b)7/30	**8)(a)**  **(b) 11 (c) 23**
2) (a) (i) 21 (ii) 7 (b) 5 (c)10/23 (d) 7/12 (e)16/21	**9) (i)**  **(ii) 46 (iii) 11 (iv) 7/19**
3) (a) 5 (b) C ∩ M (c) 3 (d)(i) 8/30 (ii)14/30 (e) 15/136	**10) (i) 3 x + 7 = 19** **(ii)**  **(iii) Ø or { } (iv) 15**
4) (a)4 (b)26 (c)8	**11) (a)15 , 5 , 11,8 (b) (i) 5 (ii) 51 (c) (i) 15 (ii) 10 (d) (i)13/90 (ii)15/90 (e)(i)2/801 (ii)299/4005**
5) (a) 4 (b)(i)12/36 (ii)11/36 (c)8/15	**12) (i) 14 (ii)11/30 (iii)11/12**
6) (a) 4 – x correctly placed, 5 – x correctly placed ,7 correctly placed (b) 4 + 11 + (6 – x) + x + 9 + (4 – x) + (5 – x) + 7 = 40 and x = 3(c)(i)9/40 (ii)2 (iii)15 (iv)25 (v)4	**13) (i)Answer at the end (ii) 28** 

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7) (a)(i)  **(ii)9**	

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