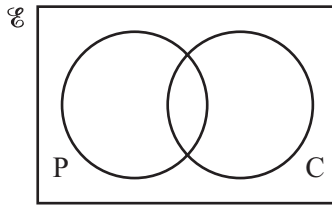


1.5.1

- (a) There are 30 students in a class.
20 study Physics, 15 study Chemistry and 3 study neither Physics nor Chemistry.



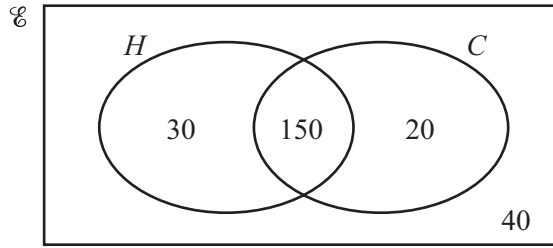
- (i) **Copy and complete** the Venn diagram to show this information. [2]
- (ii) Find the number of students who study both Physics **and** Chemistry. [1]

-----Marking Scheme-----

(i)	Venn Diagram with 12, 8, 7, 3	B2	-1 each error/omission. Condone lack of labels.
	or with 20 - x, x, 15 - x, 3		
(ii)	8	B1	✓ ✓ ft their 8 on diagram, but not x

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1.5.2



$\mathcal{U} = \{240 \text{ passengers who arrive on a flight in Cyprus}\}$

$H = \{\text{passengers who are on holiday}\}$

$C = \{\text{passengers who hire a car}\}$

(a) Write down the number of passengers who

(i) are on holiday,

Answer(a)(i) [1]

(ii) hire a car but are not on holiday.

Answer(a)(ii) [1]

(b) Find the value of $n(H \cup C)$.

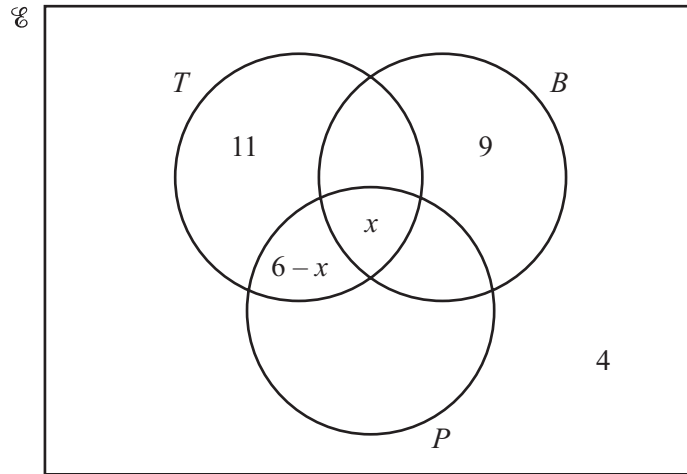
Answer(b) [1]

-----Marking Scheme-----

(a) (i)	180	1	
(ii)	20	1	
(b)	220	1	

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1.5.3



In the Venn diagram, $\mathcal{E} = \{\text{children in a nursery}\}$

- $B = \{\text{children who received a book for their birthday}\}$
- $T = \{\text{children who received a toy for their birthday}\}$
- $P = \{\text{children who received a puzzle for their birthday}\}$

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]

- (b) There are 40 children in the nursery.

Using the Venn diagram, write down and solve an equation in x .

Answer(b)

[3]

(c) Work out

(i) the probability that a child, chosen at random, received a book but not a toy and not a puzzle,

Answer(c)(i) [1]

(ii) the number of children who received a book and a puzzle but not a toy,

Answer(c)(ii) [1]

(iii) $n(B)$,

Answer(c)(iii) [1]

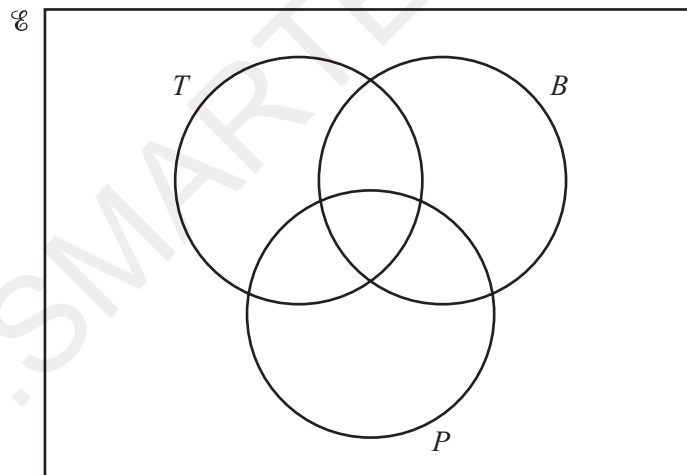
(iv) $n(B \cup P)$,

Answer(c)(iv) [1]

(v) $n(B \cup T \cup P)'$.

Answer(c)(v) [1]

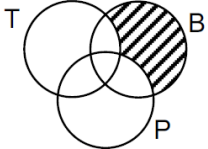
(d)



Shade the region $B \cap (T \cup P)'$.

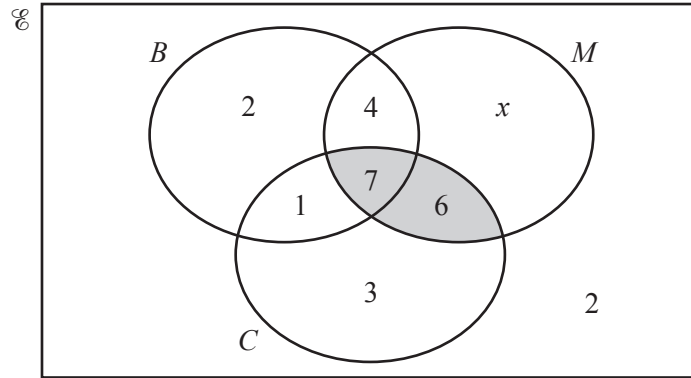
[1]

-----Marking Scheme-----

(a)	$4 - x$ correctly placed $5 - x$ correctly placed 7 correctly placed	1 1 1	SC3 for 1, 2 and 7 all correctly placed instead of expressions in x
(b)	$4 + 11 + (6 - x) + x + 9 + (4 - x) + (5 - x) + 7 = 40$ oe $46 - 2x = 40$ nfw $x = 3$	M1 A1 B1	FT from their Venn diagram, condone omission of one subset Must be in the form $a + bx = c$, ie each side simplified, or better
(c) (i)	$\frac{9}{40}$ or 0.225 or 22.5%	1	ISW cancelling or conversion after correct answer seen
(ii)	2	1FT	FT from their Venn diagram and their x provided $n(B \cap P \cap T) \neq 5$
(iii)	15	1FT	FT from their Venn diagram
(iv)	25	1FT	FT from their Venn diagram
(v)	4	1	
(d)	Correct region shaded. 	1	

1.5.4

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 .

Answer(a) $x = \dots\dots\dots$ [1]

(b) Use set notation to describe the shaded region in the Venn diagram.

Answer(b) $\dots\dots\dots$ [1]

(c) Find $n(C \cap (M \cup B)')$.

Answer(c) $\dots\dots\dots$ [1]

-----Marking Scheme-----

(a)	5	1	
(b)	$C \cap M$ oe	1	Allow e.g. $(B \cap C \cap M) \cup (C \cap M)$
(c)	3	1	

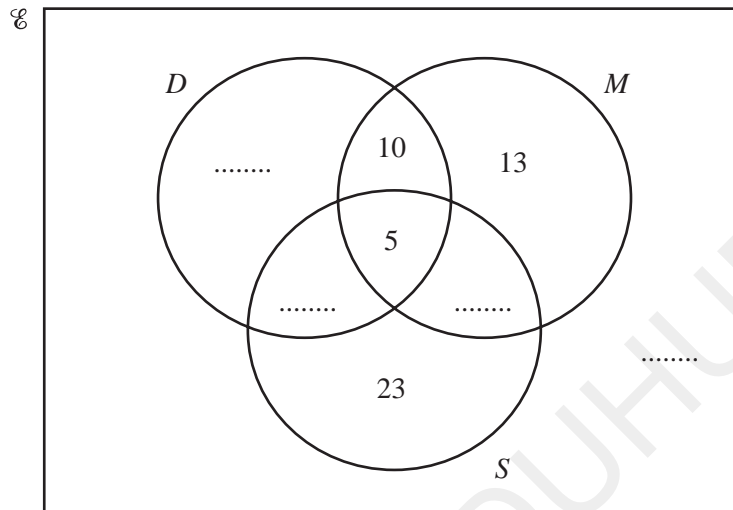
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1.5.5

90 students are asked which school clubs they attend.

- $D = \{ \text{students who attend drama club} \}$
- $M = \{ \text{students who attend music club} \}$
- $S = \{ \text{students who attend sports club} \}$

39 students attend music club.
 26 students attend **exactly two** clubs.
 35 students attend drama club.



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

(b) How many students attend

(i) all three clubs,

Answer(b)(i) [1]

(ii) one club only?

Answer(b)(ii) [1]

(c) Find

(i) $n(D \cap M)$,

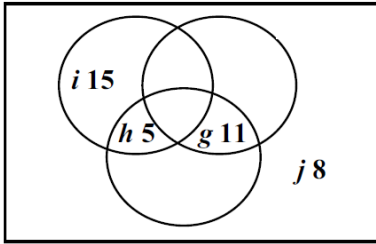
Answer(c)(i) [1]

(ii) $n((D \cap M) \cap S')$.

Answer(c)(ii) [1]

-----Marking Scheme-----

(a)



- (g =)11**
- (h =) 5**
- (i =)15**
- (j =) 8**

- (b) (i) 5**
- (ii) 51**
- (c) (i) 15**
- (ii) 10**

- 1**
- 1ft** ft 16 – their 11
- 1ft** ft 20 – their 5
- 1ft** ft 39 – (their 11 + their 5 + their 15)
- ft for positive integers only

- 1**
- 1 ft** ft 36 + their *i*

- 1**
- 1**

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