

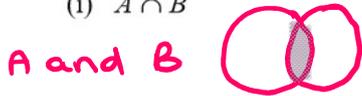
DO NOT WRITE IN THIS AREA

- 3  $\mathcal{E} = \{21, 22, 23, 24, 25, 26, 27, 28, 29, 30\}$   
 $A = \{22, 24, 26, 28, 30\}$   
 $B = \{21, 24, 27, 30\}$

	21	22	23	24	25	26	27	28	29	30
A	x	✓	x	✓	x	✓	x	✓	x	x
B	✓	x	x	✓	x	x	✓	x	x	✓

(a) List the members of the set

(i)  $A \cap B$



24

(ii)  $A'$

not A

21, 23, 25, 27, 29

(2)

$C = \{23, 25, 29\}$

(b) Using set notation, find an expression for  $C$  in terms of  $A$  and  $B$ .

23, 25, 29 are not in A or B

C is  $(A \cup B)'$

(1)

(Total for Question 3 is 3 marks)

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- 3  $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$   
 $A = \{2, 3, 5, 7\}$   
 $B = \{4, 6, 8, 10\}$

(a) Explain why  $A \cap B = \emptyset$

$A \cap B = \emptyset$  means A and B is not possible or there are no values in both A and B

(1)

$x \in \mathcal{E}$  and  $x \notin A \cup B$

(b) Write down the **two** possible values of  $x$ .

$x \notin A \cup B \rightarrow x$  is not part of A or B

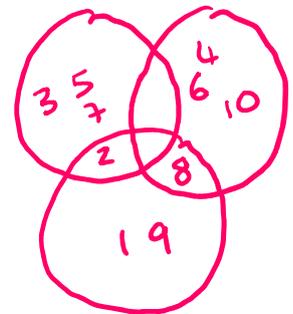
1, 9 (1)

Set C is such that

- $A \cup B \cup C = \mathcal{E}$   
 $A \cap C = \{2\}$   
 $B \cap C' = \{4, 6, 10\}$

(c) List all the members of set C.

	1	2	3	4	5	6	7	8	9	10
A	x	✓	✓	x	✓	x	✓	x	x	x
B	x	x	x	✓	x	✓	x	✓	x	✓
C	✓	✓	x	x	x	x	x	✓	x	x



1 2 8 9 (2)

(Total for Question 3 is 4 marks)

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P 5 8 3 7 1 A 0 5 2 8

DO NOT WRITE IN THIS AREA

- 3  $\mathcal{E} = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$   
 $A = \{\text{even numbers}\}$   
 $B = \{\text{multiples of 3}\}$

List the members of the set

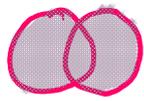
- (i)  $A \cap B$



A and B  
even and multiple of 3

12, 18

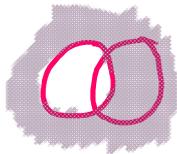
- (ii)  $A \cup B$



A or B  
even or multiple of 3

12, 14, 16, 18, 15

- (iii)  $A'$



not A  
odd

11, 13, 15, 17, 19

(Total for Question 3 is 3 marks)

DO NOT WRITE IN THIS AREA



P 6 0 2 6 0 A 0 5 2 4

- 4  $\mathcal{E} = \{9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$   
 $A = \{\text{multiples of 3}\}$   
 $B = \{\text{odd numbers}\}$

(a) List the members of the set

(i)  $A \cap B$  **A and B**

**multiple of 3 and odd**

**9, 15**

(1)

(ii)  $A \cup B$  **A or B**

**multiple of 3 or odd**

**9, 12, 15, 18, 11, 13, 17, 19**

(1)

(b) Is it true that  $24 \in A$ ?

Tick one of the boxes below.

Yes

No



Give a reason for your answer.

**24 is not part of the set (9 → 20)**

(1)

Set  $C$  has 4 members such that  $C \cap B' = \{10, 18\}$  **in C and not in B**

(c) List the members of one possible set  $C$

**not in B (10) 12 14 16 (18) 20**

**members of C anything other than 12, 14, 16, 20**

**9, 10, 11, 18**

(2)

(Total for Question 4 is 5 marks)



# January 2020 Paper 1HR

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4  $B = \{b, l, u, e\}$

$G = \{g, r, e, y\}$

$W = \{w, h, i, t, e\}$

(a) List all the members of the set

(i)  $B \cup G$  **B or G**

**bluegry**

(ii)  $W \cap G'$

**w and not G**

**whit**

(2)

Serena writes down the statement  $B \cap G \cap W = \emptyset$

(b) Is Serena's statement correct?

You must give a reason for your answer.

**No because e is in all sets**

(1)

(Total for Question 4 is 3 marks)

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4  $\mathcal{E} = \{20, 21, 22, 23, 24, 25, 26, 27, 28, 29\}$

$A = \{\text{odd numbers}\}$

$B = \{\text{multiples of 3}\}$

List the members of the set

(i)  $A \cap B$

A and B

odd and multiple of 3

21 27

(1)

(ii)  $A \cup B$

A or B

odd or multiple of 3

21 23 24 25 27 29

(1)

(Total for Question 4 is 2 marks)

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4  $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$   
 $A = \{\text{factors of } 6\}$   
 $B = \{\text{prime numbers}\}$

	1	2	3	4	5	6	7	8	9	10
A	✓	✓	✓	x	x	✓	x	x	x	x
B	x	✓	✓	x	✓	x	✓	x	x	x

(a) List the members of the set

(i)  $A \cup B$       A or B

factor of 6 or prime

1, 2, 3, 5, 6, 7

(1)

(ii)  $A'$       not A

not factor of 6

4, 5, 7, 8, 9, 10

(1)

Harpreet states that  $A \cap B = \emptyset$

Harpreet is incorrect.

(b) Explain why.

Possible to be A and B, for example 2 is prime and a factor of 6.

(1)

C is a set with 4 members such that

the set  $A \cap C$  has 2 members

the set  $B \cap C$  has 2 members

Set  $A \cap C$  and set  $B \cap C$  have no members in common.

(c) List the 4 members of set C

Can't be 2, 3, 4, 8, 9, 10 as already have 2 or 0 members.

1 5 6 7

(2)

(Total for Question 4 is 5 marks)



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4  $\mathcal{E} = \{\text{letters of the alphabet}\}$   
 $B = \{\text{b, r, a, z, i, l}\}$   
 $I = \{\text{i, r, e, l, a, n, d}\}$

(a) List the members of the set

(i)  $B \cup I$     **B or I**

**b r a z i l e n d**

(ii)  $B \cap I'$

**B and not I**

**b z**

(2)

DO NOT WRITE IN THIS AREA

$K = \{\text{k, e, n, y, a}\}$

**B = b r a z i l**

Cody writes down the statement  $B \cap K = \emptyset$   
Cody's statement is wrong.

(b) Explain why.

**It is possible a is in both Set A and set C**

(1)

(Total for Question 4 is 3 marks)

DO NOT WRITE IN THIS AREA



P 6 5 9 1 8 A 0 5 2 8

- 7  $E = \{23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34\}$   
 $A = \{\text{even numbers}\}$   
 $B = \{23, 29, 31\}$   
 $C = \{\text{multiples of 3}\}$

	23	24	25	26	27	28	29	30	31	32	33	34
A	x	✓	x	✓	x	✓	x	✓	x	✓	x	✓
B	✓	x	x	x	x	x	✓	x	✓	x	x	x
C	x	✓	x	x	✓	x	x	✓	x	x	✓	x

(a) List the members of the set

(i)  $B \cup C$

B or C

23, 24, 27, 29, 30  
 31, 33 (1)

(ii)  $A' \cap C$

not A and C

27 33 (1)

(b) Is it true that  $B \cap C = \emptyset$ ?

Tick (✓) one of the boxes below.

Yes

No



Give a reason for your answer.

No members are in set B and set C

(1)

The set  $D$  has 4 members and is such that  $D \cap (A \cup C) = \emptyset$

(c) List the members of set  $D$

D and (A or C) is empty / impossible

23, 25, 29, 31

(2)

(Total for Question 7 is 5 marks)



# November 2020 P2H

	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
A	✓	✓	✓	✓	✓	✓	✓	✓	×	×	×	×	×	×	×	×
B	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	×	×	×

14  $\mathcal{E} = \{\text{integers } x \text{ such that } 10 \leq x \leq 25\}$   
 $A = \{x : x < 18\}$   
 $B = \{x : 13 \leq x < 22\}$

(a) Write down  $n(A)$

$10 \leq A < 18$

10, 11, 12, 13, 14, 15  
16, 17

8

(1)

(b) List the members of the set  $(A \cup B)'$

not (A or B)

22 23 24 25

(2)

(c) List the members of the set  $A' \cap B$

not A and B

18 19 20 21

(2)

$C \subset A, C \subset B$  and  $n(C) = 5$

(d) List the members of the set  $C$

13 14 15 16 17

(1)

(Total for Question 14 is 6 marks)

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14  $\mathcal{E} = \{\text{positive integers less than 20}\}$

$A = \{x : x < 12\}$

$B = \{x : 7 \leq x < 16\}$

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B	✗	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗

(a) List the members of  $A \cap B$

A and B

7 8 9 10 11

(2)

C is a set such that  $C \subset A$  and  $n(C) = 3$

Given that all members of C are even numbers,

(b) list the members of one possible set C.

C is subset of A

3 even numbers in C less than 7

2 4 6

(1)

(Total for Question 14 is 3 marks)

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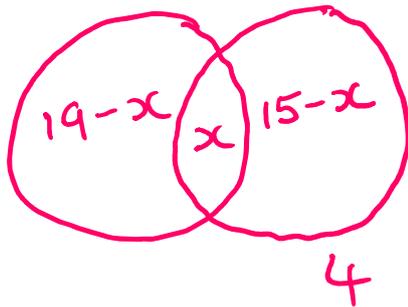
19 30 adults booked to stay in a hotel.

- 19 adults booked breakfast
- 15 adults booked dinner
- 4 adults did not book breakfast or dinner

Some adults booked breakfast **and** dinner.

Meihui chooses at random two of the 30 adults.

Work out the probability that these two adults each booked breakfast **and** dinner.



$$19 - x + x + 15 - x + 4 = 30$$

$$38 - x = 30$$

$$x = 8$$

$$\begin{aligned} \text{Just Breakfast} &= 19 - 8 \\ &= 11 \end{aligned}$$

$$\begin{aligned} \text{Just dinner} &= 15 - 8 \\ &= 7 \end{aligned}$$

$$\text{Both} = 8$$

Bath booked B & D

(Total for Question 19 is 4 marks)

$$\frac{8}{30} \times \frac{7}{29} = \frac{28}{435}$$

