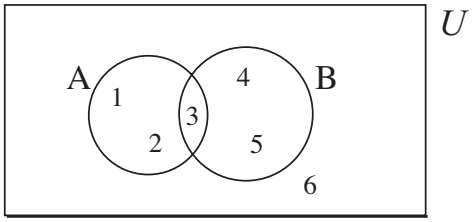
UNIT 10 *Logic and Venn Diagrams* CSEC Revision Test

1. Use this Venn diagram to answer the questions below.



(a) Which numbers are in the set A?

(b) Which numbers are in the set B?

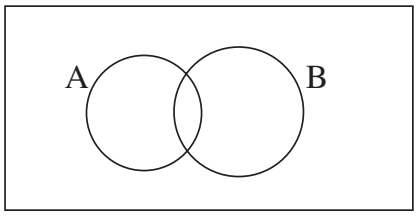
(c) Which number is in set A *and* set B?

(d) Which number is *not* in set A and *not* in set B?

(e) Which numbers are in set A but not in set B?

(5 marks)

2. (a) Copy and complete this Venn diagram.



$A = \{4, 7, 8, 9\}$

$B = \{1, 2, 3, 4\}$

Include all whole numbers from 1 to 9.

(b) What is the intersection of A and B?

(c) What is the union of A and B?

(d) What is the complement of A?

(9 marks)

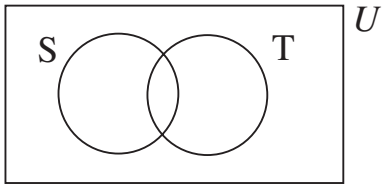
3. In a class of 29 students, each student plays at least one sport.
20 students play football and 18 play cricket.
How many students play cricket *and* football?

(3 marks)

4. The set S represents the number of students who play softball.

The set T represents the number of students who play tennis.

Make 2 copies of this Venn diagram.



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(a) On one diagram, shade the part that represents the students who play both sports.

(b) On the other diagram, shade the part that represents the students who play softball, but not tennis.

(4 marks)

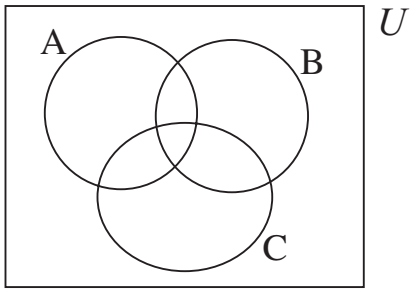
5. Draw a Venn diagram for each pair of sets described below.

(a) Set R contains all those people who own red cars.
Set C contains all those people who own cars.

(b) Set B contains all the boys in a school.
Set G contains all the girls in a school.

(4 marks)

6. (a) Copy and complete this Venn diagram.



A = set of even numbers

B = set of prime numbers

C = set of square numbers

U = set of natural numbers up to and including 30

(b) What is $A \cap B$?

(c) What is $A \cap C$?

(d) What is $A \cap B \cap C$?

(e) What is $(A \cup B \cup C)'$? *(8 marks)*

7. (a) Draw a Venn diagram with

$$U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$$

to illustrate the sets

$$A = \{0, 1, 3, 6, 10, 15\}$$

$$B = \{1, 2, 3, 5, 8, 13\}$$

$$C = \{3, 4, 7, 11\}$$

What is

(b) $A \cap B \cap C$

(c) $(A \cup B \cup C)'$?

(6 marks)

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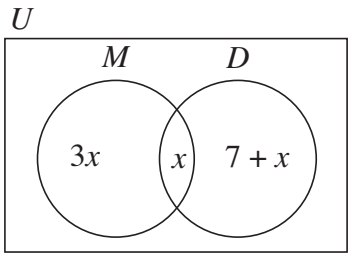
8.



In the diagram shown above, the Universal set (U), represents all the students in a class. The set M represents the students who take Music. The set D represents the students who take Drama. If 24 students take Music, calculate

(a) the number of students who take BOTH Music and Drama,

(b) the number of students who take Drama ONLY.

(4 marks)

9. The Universal set, U, is given as

$$U = \{1, 2, 3, \ldots\ldots 13, 14, 15\}$$

The sets A and B are subsets of U such that

$A = \{\text{Factors of } 12\}$

$B = \{\text{Multiples of } 3\}$.

(a) List the members of the set A.

(b) List the members of the set B.

(c) Represent the sets, A, B and U, on a Venn diagram.

(d) List the members of $(A \cup B)'$.

(6 marks)

10. A club has 160 members, some of whom play tennis (T) or cricket (C) or both.

97 play tennis, 86 play cricket and 10 play neither, x play both tennis and cricket.

(a) Draw a Venn diagram to represent this information.

(b) How many members play both tennis and cricket?

(5 marks)

(54 MARKS)

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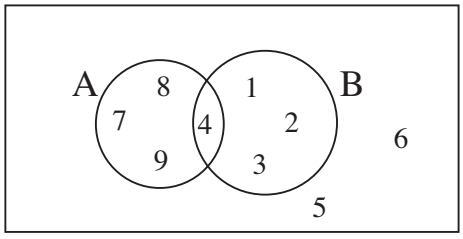
ANSWERS

1. (a) { 1, 2, 3 } B1
   (b) { 3, 4, 5 } B1
   (c) { 3 } B1
   (d) { 6 } B1
   (e) { 1, 2 } B1 *(5 marks)*

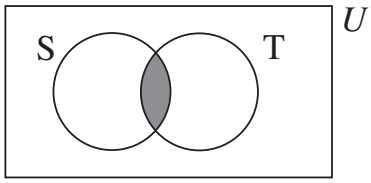
2. (a)



   B4 (–1 for each mistake)
   (b) { 4 } B1
   (c) { 1, 2, 3, 4, 7, 8, 9 } B2
   (d) { 1, 2, 3, 5, 6 } B2 *(9 marks)*

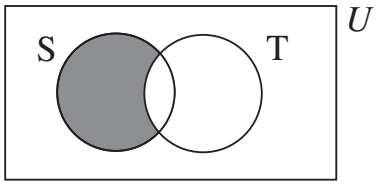
3. 20 + 18 – 29 = 9 students who play football and cricket M1 A1 A1 *(3 marks)*

4. (a)



   B2

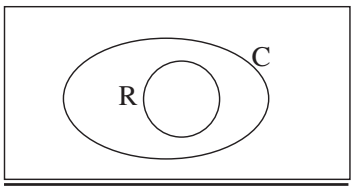
   (b)



   B2

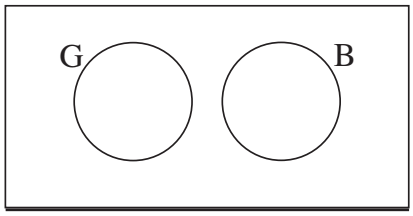
   (4 marks

5. (a)



   B2

   (b)



   B2 *(4 marks)*

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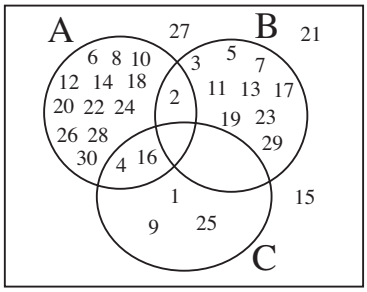
ANSWERS

6. (a)



(−1 for each mistake) B3

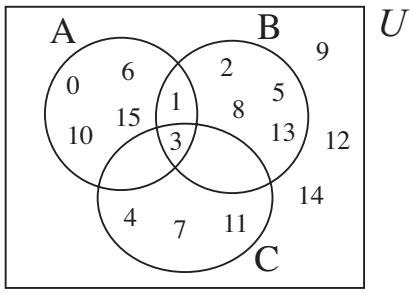
(b) $\{2\}$ B1

(c) $\{4, 16\}$ B1

(d) $\varnothing$ B1

(e) $\{15, 21, 27\}$ B2 *(8 marks)*

7. (a)



(−1 for each mistake) B3

(b) $A \cap B \cap C = \{3\}$ B1

(c) $(A \cup B \cup C)' = \{9, 12, 14\}$ B2 *(6 marks)*

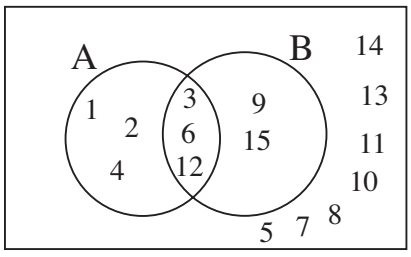
8. (a) $3x + x = 24, \quad x = 6$ M1 A1 B1

(b) 13 B1 *(4 marks)*

9. (a) $A = \{1, 2, 3, 4, 6, 12\}$ B1

(b) $B = \{3, 6, 9, 12, 15\}$ B1

(c)



B2

(d) $(A \cup B)' = \{5, 7, 8, 10, 11, 13, 14\}$ B2 *(6 marks)*

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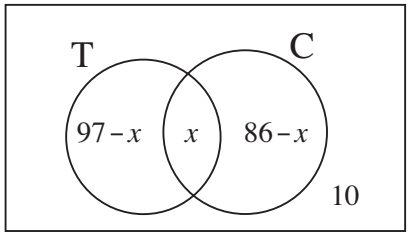
ANSWERS

10. (a)



B2

(b) $10 + (97 - x) + x + (86 - x) = 160$ M1

$193 - x = 160$ A1

$x = 33$ A1 *(5 marks)*

(TOTAL MARKS 54)