JP Maths Revision

Attempt the paper before watching the solutions https://www.youtube.com/@JPMathsRevision

Higher Tier

Venn diagrams

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The marks for **each** question are shown in brackets- *use this as a guide as to how much time to spend on each question.*

Advice

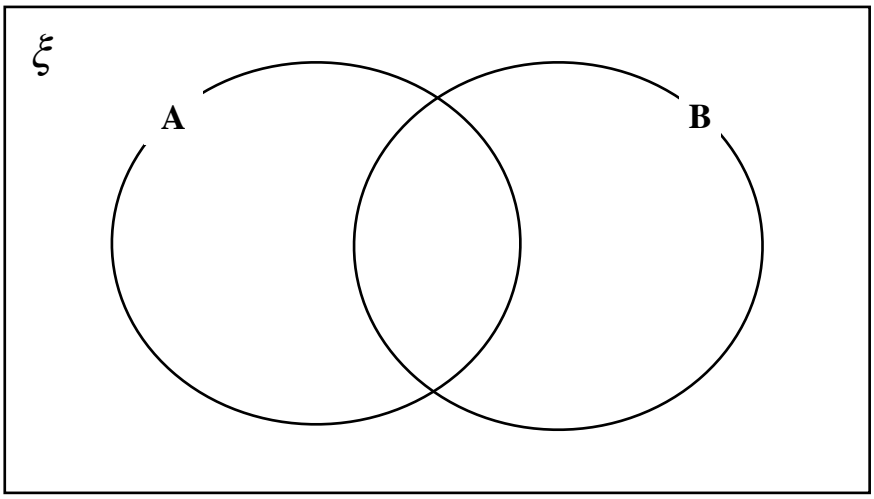
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

1. Let $\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

A = Factors of 12

B = Multiples of 3

(a) Complete the Venn diagram.



(3)

(b) Write down $P(A \cap B)$

.....

(1)

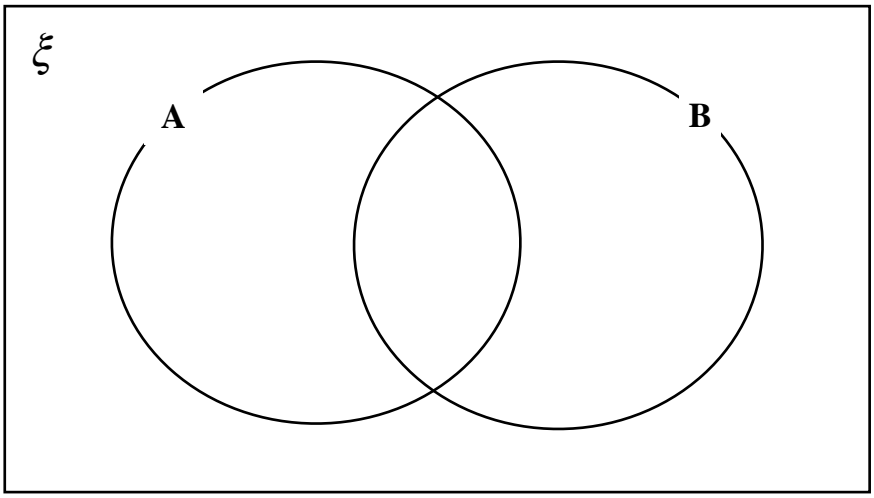
(Total for Question 1 is 4 marks)

2. Let $\xi = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

A = Prime numbers

B = Odd numbers

(a) Complete the Venn diagram.



(3)

(b) Write down $P(A')$

.....

(1)

(b) Write down $P(A \cup B)$

.....

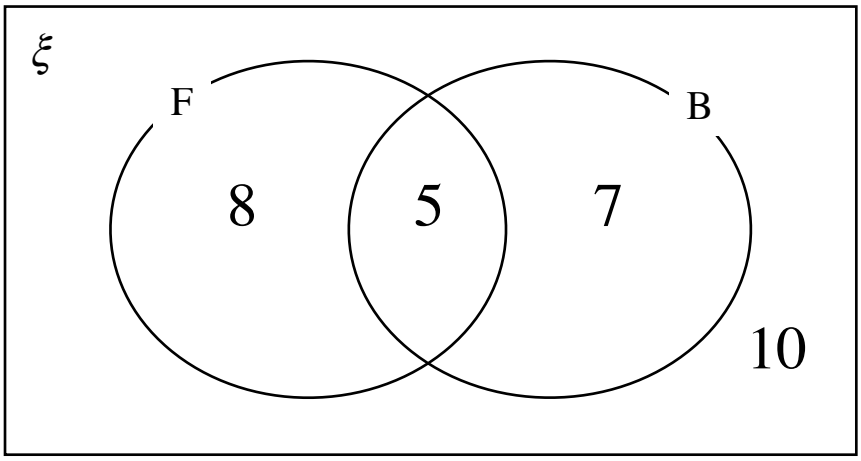
(1)

(Total for Question 2 is 5 marks)

3. The Venn diagram shows information about students in a school who play sports.

F = students who play football.

B = students who play basketball.



(a) How many students play football?

.....

(1)

(b) How many students are in the survey all together?

.....

(1)

(c) How many students play basketball but not football?

.....

(1)

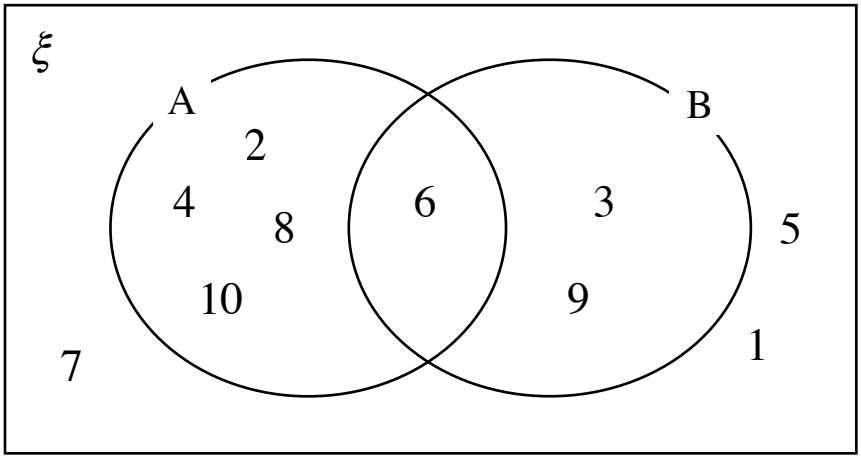
(d) Write down the probability that a randomly selected student plays both sports.

.....

(1)

(Total for Question 3 is 4 marks)

4. Here is a venn diagram



(a) Write down the numbers in set A.

.....

(1)

(b) Write down the numbers in set B'.

.....

(1)

(c) Write down the numbers in set $A \cup B$.

.....

(1)

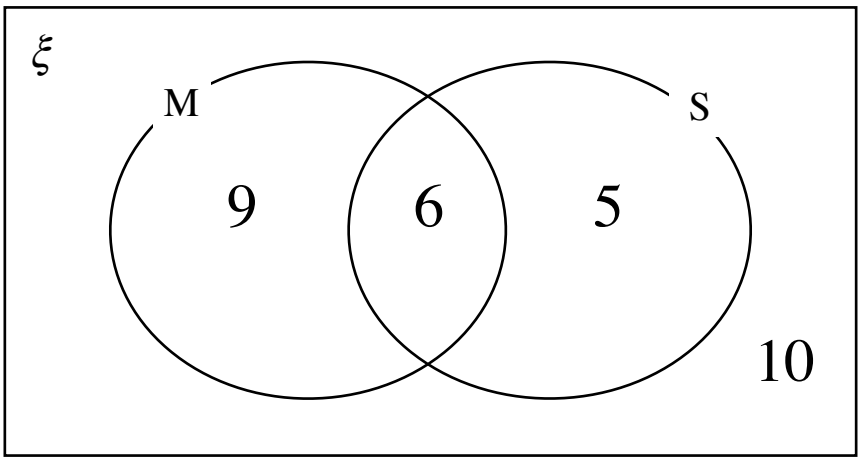
(d) Write down the numbers in set $A \cap B$.

.....

(1)

(Total for Question 4 is 4 marks)

5. The Venn diagram shows information about students in a school who study maths (M) and science (S).



(a) Write down $P(M \cap S)$

.....

(1)

(b) Write down $P(M \cup S)$

.....

(1)

(c) Write down $P(M')$

.....

(1)

(d) Write down $P(M \cap S')$

.....

(1)

(Total for Question 5 is 4 marks)

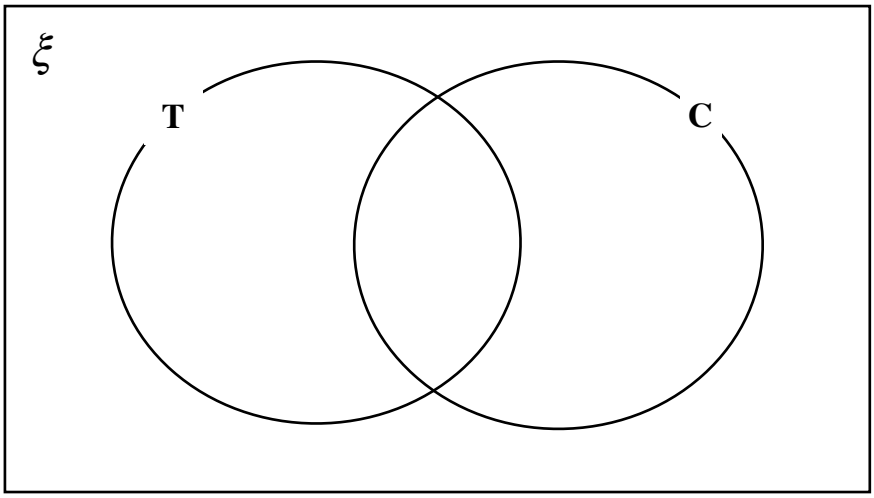
6. A group of 40 people were asked about the drinks they like out of tea (T) or coffee (C).

22 people like tea

18 people like coffee

10 people like both tea and coffee

(a) Complete the Venn diagram



(3)

(b) How many people like neither tea nor coffee?

.....

(1)

(c) Write down the probability that a randomly selected person likes tea but not coffee

.....

(1)

(Total for Question 6 is 5 marks)

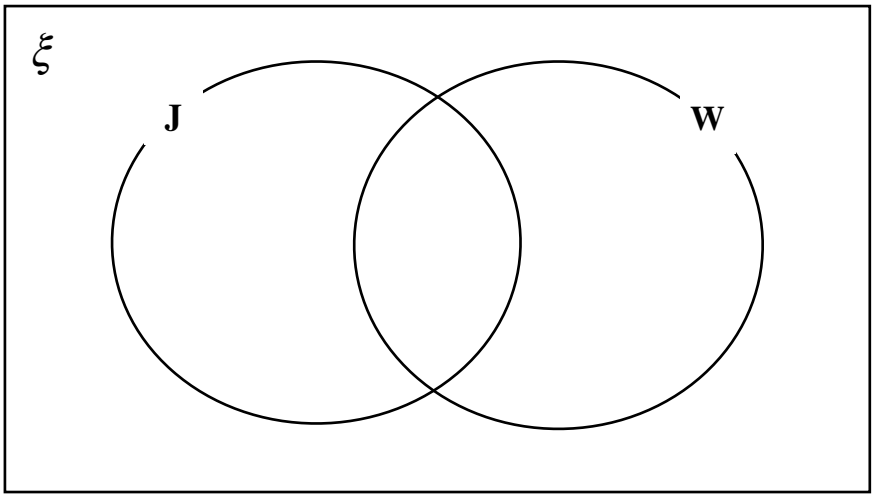
7. A group of 50 people were asked about the drinks they like: juice (J) and water (W).

28 people like juice

24 people like water

12 people like both juice and water

(a) Complete the Venn diagram



(3)

(b) How many people like juice only?

.....

(1)

(c) A student is selected at random. Given they like water, what is the probability they also like juice?

.....

(2)

(Total for Question 7 is 6 marks)

8. A leisure centre runs two classes: yoga (Y) and pilates (P).

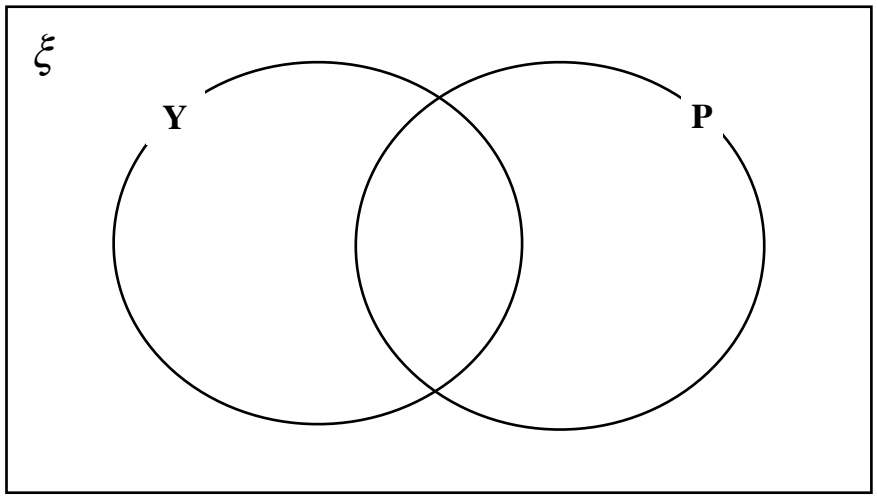
On Sunday, 120 people visited the leisure centre.

40 people attended the yoga class.

15 people attended both yoga and pilates.

50 people did not attend either class.

(a) Complete the Venn diagram



(3)

(b) How many people attended the pilates class?

.....

(1)

(c) How many people attended only one of the classes?

.....

(1)

(Total for Question 8 is 5 marks)

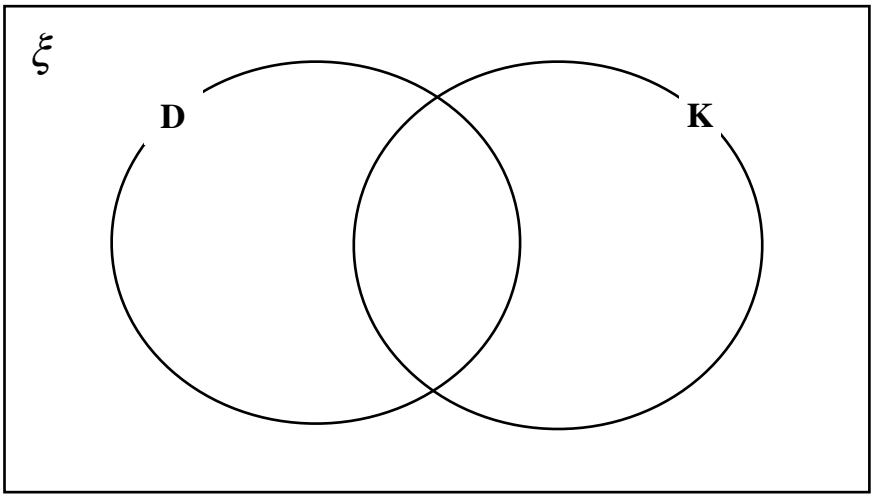
9. In a class of 30 students:

16 students play the drums (D)

14 students play the keyboard (K)

6 students play neither instrument

(a) Complete the Venn diagram



(3)

(b) How many students play both instruments?

.....

(1)

(c) How many students play only one instrument?

.....

(1)

(Total for Question 9 is 5 marks)

10. At a party, 80 people were asked which desserts they like out of cake (C), brownies (B) and ice cream (I).

42 people like cake
38 people like ice cream
30 people like brownies
18 people like both cake and ice cream
15 people like both cake and brownies
12 people like both ice cream and brownies
6 people like all three desserts

(a) Represent this information on a Venn diagram

(3)

(b) How many people like exactly two desserts?

.....

(1)

(Total for Question 10 is 4 marks)

11. At a cinema, 70 people were asked which snacks they like out of popcorn (P), nachos (N) and sweets (S).

35 people like nachos
30 people like sweets
18 people like both popcorn and nachos
15 people like both popcorn and sweets
12 people like both nachos and sweets
5 people like all three snacks
Everyone liked at least one of the snacks

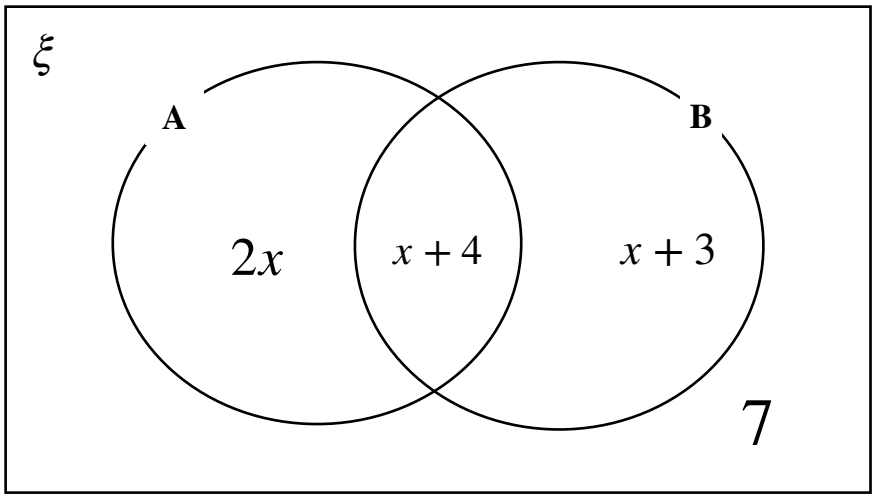
How many people like exactly two snacks?

.....

(Total for Question 11 is 5 marks)

12. 50 people are asked if they like apples (A) or bananas (B).

The Venn digram shows the numbers in each region:



What is the probability that a randomly selected student likes apples, given they also like bananas?

(Total for Question 12 is 5 marks)