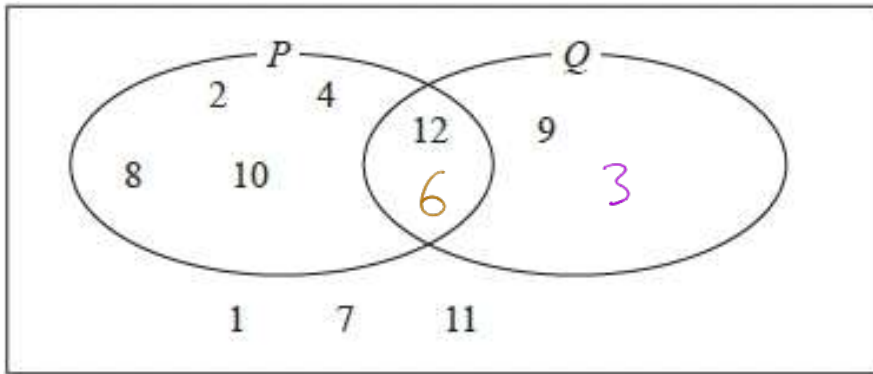


## FULL MODEL ANSWERS

### Q1. NON-CALCULATOR

The numbers 1, 2, 4, 7, 8, 9, 10, 11 and 12 are put into a Venn diagram.



The number 3 is in set Q but not in set P.

The number 6 is in both set P and set Q.

(a) Complete the Venn diagram.

(2)

A student chooses at random a number in the completed Venn diagram.

(b) Write down the probability that this number is **not** in Set Q.

$$\frac{\text{Number of values not in } Q}{\text{Total number of values}}$$

$$\frac{7}{11}$$

(2)

(Total for question = 4 marks)

**Q2. CALCULATOR ALLOWED**

There are 60 students at a college.

$$60 - 13 - 20 - 23 =$$

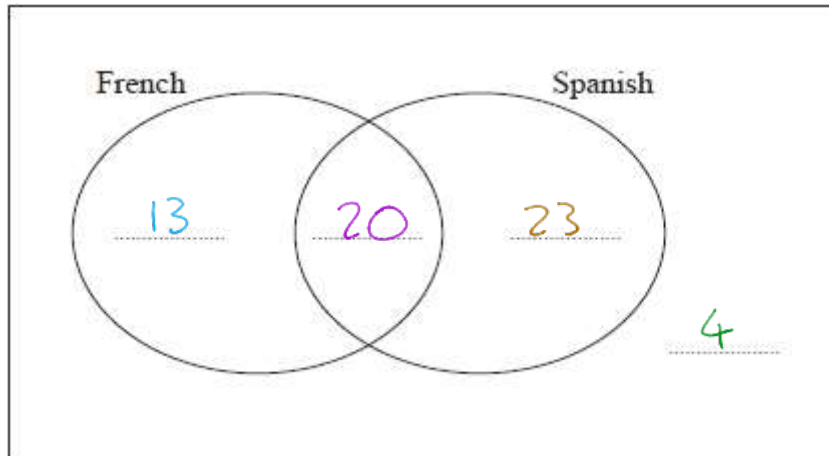
20 students study both French and Spanish.

13 students study French but not Spanish.

A total of 43 students study Spanish.

$$43 - 20 = 23$$

(a) Complete the Venn diagram for this information.



(3)

One of the students at the college is to be selected at random.

(b) Write down the probability that this student studies neither French nor Spanish.

$$\frac{\text{Number of students studying neither}}{\text{Total number of students}} = \frac{4}{60}$$

$$\frac{1}{15}$$

(1)

(Total for question = 4 marks)

**Q3. CALCULATOR ALLOWED**

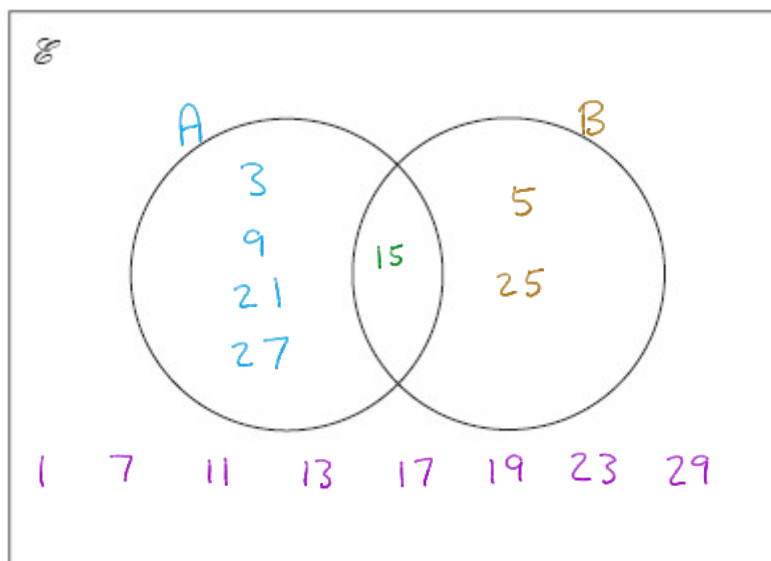
$\mathcal{E}$  = odd numbers less than 30

$A = 3, 9, 15, 21, 27$

$B = 5, 15, 25$

(15 is in both)

(a) Complete the Venn diagram to represent this information.



(4)

A number is chosen at random from the universal set,  $\mathcal{E}$ .

(b) What is the probability that the number is in the set  $A \cup B$ ? <sup>OR</sup>

$$\frac{\text{Number of values in } A \text{ OR } B \text{ OR BOTH}}{\text{Total number of values}}$$

$$\frac{7}{15}$$

(2)  
(Total for question = 6 marks)

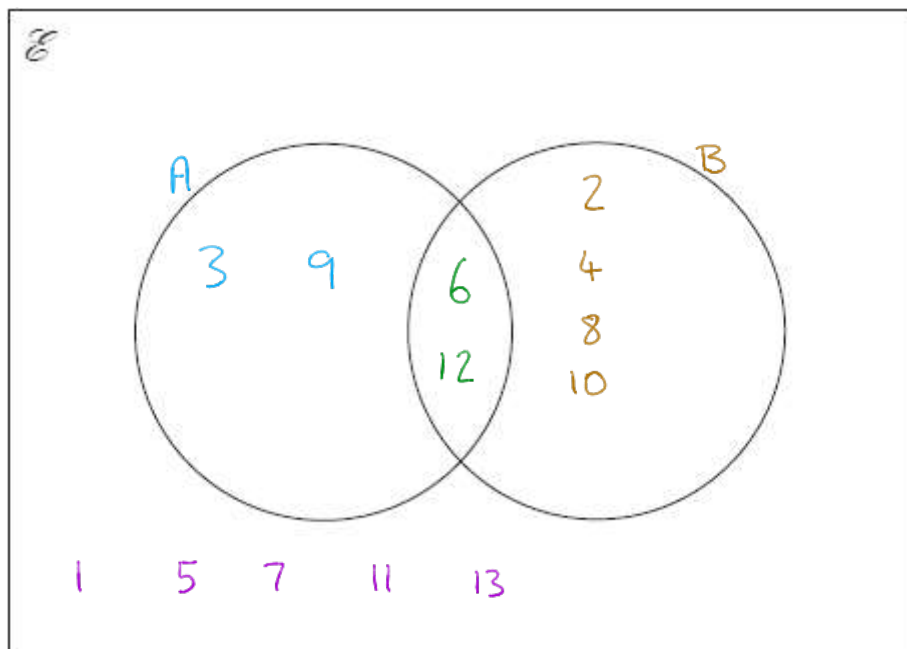
**Q4. CALCULATOR ALLOWED**

$\mathcal{E} = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13$

$A = \text{multiples of } 3$

$B = \text{even numbers}$

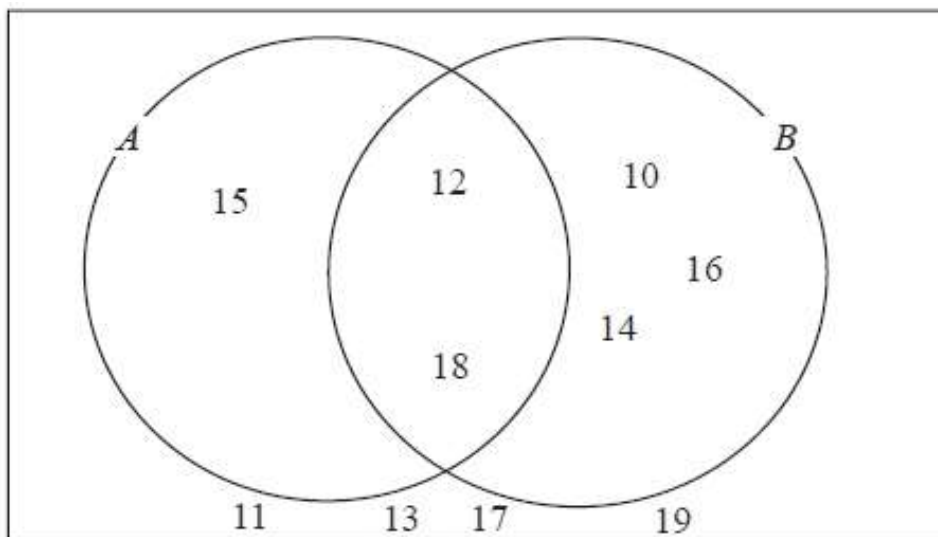
Complete the Venn diagram for this information.



(Total for question = 4 marks)

**Q5. CALCULATOR ALLOWED**

Here is a Venn diagram.



(a) Write down the numbers that are in set

(i)  $A \cup B$

A OR B OR BOTH

10 12 14 15 16 18

(ii)  $A \cap B$

A AND B

12 18

(2)

One of the numbers in the diagram is chosen at random.

(b) Find the probability that the number is in set  $A'$  not A

$$P(A') = \frac{\text{Number of values not in A}}{\text{Total number of values}}$$

$$\frac{7}{10}$$

(2)

(Total for question = 4 marks)

**Q6. CALCULATOR ALLOWED**

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

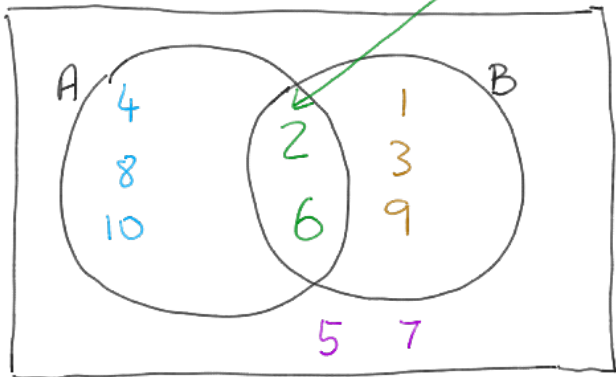
$A = \{\text{multiples of 2}\}$

$A \cap B = \{2, 6\}$

$A \cup B = \{1, 2, 3, 4, 6, 8, 9, 10\}$

Draw a Venn diagram for this information.

start by populating the central section



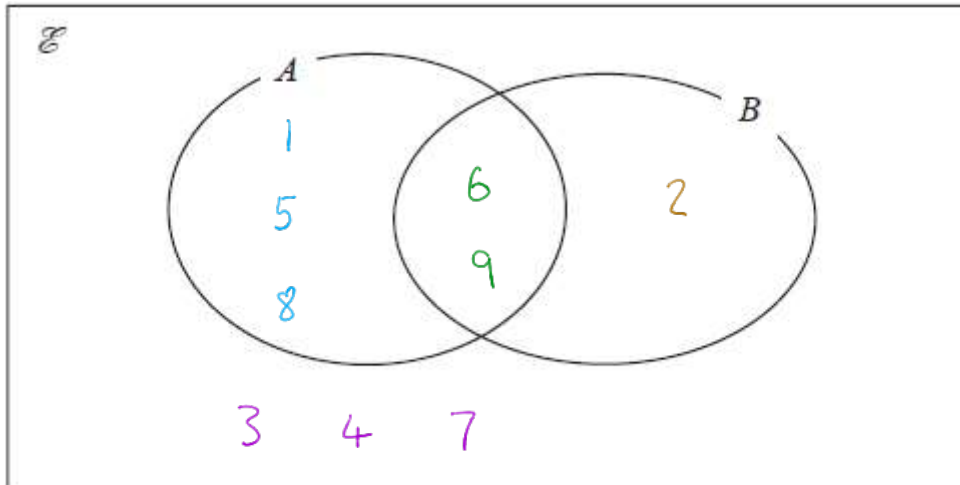
(Total for question is 4 marks)

**Q7. CALCULATOR ALLOWED**

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

$A = 1, 5, 6, 8, 9$

$B = 2, 6, 9$



(a) Complete the Venn diagram to represent this information.

(3)

A number is chosen at random from the universal set  $\mathcal{E}$ .

(b) Find the probability that the number is in the set  $A \cap B$

$$P(\text{set } A \cap B) = \frac{\text{Number of values in } A \text{ AND } B}{\text{Total number of values}} = \frac{2}{9}$$

(2)

(Total for question = 5 marks)

**Q8. CALCULATOR ALLOWED**

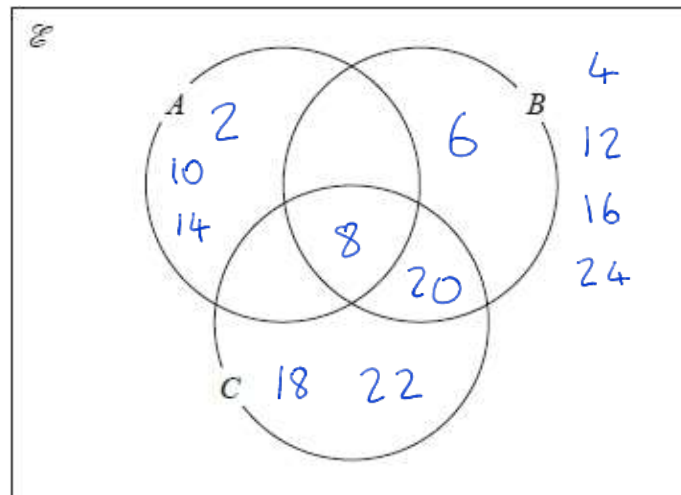
$\mathcal{E} =$  even numbers between 1 and 25

$A = 2, 8, 10, 14$

$B = 6, 8, 20$

$C = 8, 18, 20, 22$

(a) Complete the Venn diagram for this information.



Use a pencil initially.

Start with central region.

(4)

A number is chosen at random from  $\mathcal{E}$ .

(b) Find the probability that the number is a member of  $A \cap B$ .

$$P(A \cap B) = \frac{\text{Number of values in } A \text{ AND } B}{\text{Total number of values}} = \frac{1}{12}$$

(2)

(Total for question = 6 marks)

**Q9. CALCULATOR ALLOWED**

50 people were asked if they speak French or German or Spanish. *Use this last.*

Of these people,

31 speak French *Do this fifth*  $31 - 2 - 4 - 3 = 22$

2 speak French, German and Spanish *Start with this*

4 speak French and Spanish but not German *Do this second*

7 speak German and Spanish *Do this third*  $7 - 2 = 5$

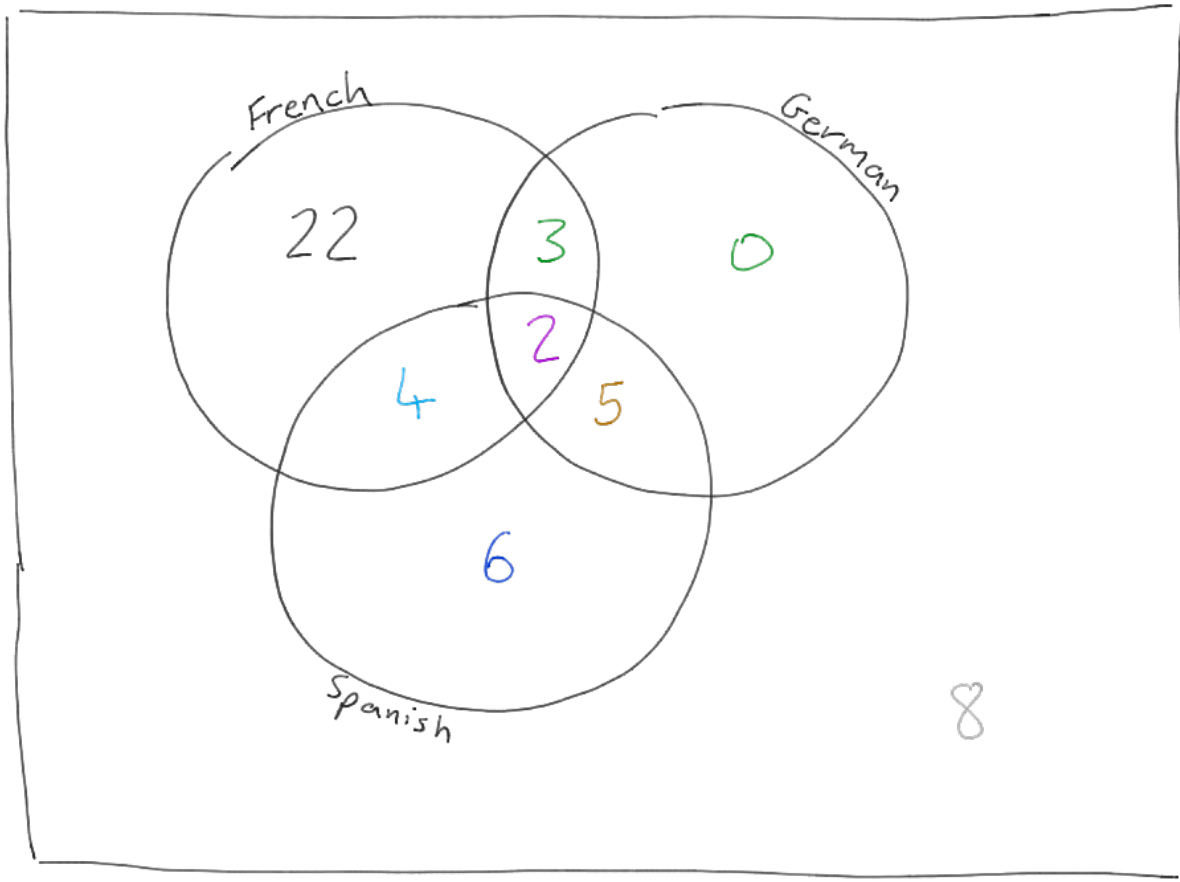
8 do not speak any of the languages all *Do this sixth*

10 people who speak German speak at least one other language

Two of the 50 people are chosen at random.

*Do this fourth*  
 $10 - 2 - 5 = 3$

Work out the probability that they both only speak Spanish.



$$\begin{aligned}
 P(\text{both Spanish}) &= P(\text{first is Spanish}) \times P(\text{second is Spanish}) \\
 &= \frac{6}{50} \times \frac{5}{49} = \frac{3}{245}
 \end{aligned}$$

(Total for question = 5 marks)

**Q10. CALCULATOR ALLOWED**

Sami asked 50 people which drinks they liked from tea, coffee and milk.

All 50 people like at least one of the drinks (7)

19 people like all three drinks. (1)

16 people like tea and coffee but do **not** like milk. (2)

21 people like coffee and milk. (3)

24 people like tea and milk. (4)

40 people like coffee. (5)

1 person likes only milk. (6)

Sami selects at random one of the 50 people.

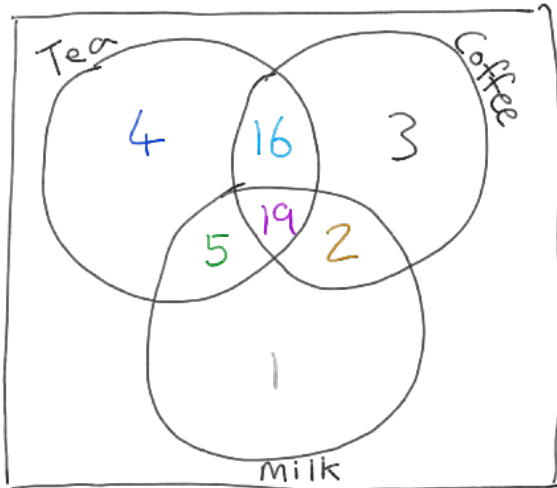
(a) Work out the probability that this person likes tea.

$$50 - 19 - 16 - 2 - 5 - 3 - 1 = 4$$

$$21 - 19 = 2$$

$$24 - 19 = 5$$

$$40 - 16 - 19 - 2 = 3$$



$$P(\text{Tea})$$

$$\frac{44}{50}$$

(4)

(b) Given that the person selected at random from the 50 people likes tea, find the probability that this person also likes exactly one other drink.

$$P(\text{likes only 1 other drink}) = \frac{\text{Number of Tea-drinkers who like 1 other}}{\text{Number of Tea drinkers}}$$

$$= \frac{16 + 5}{44}$$

$$\frac{21}{44}$$

(2)

(Total for question = 6 marks)