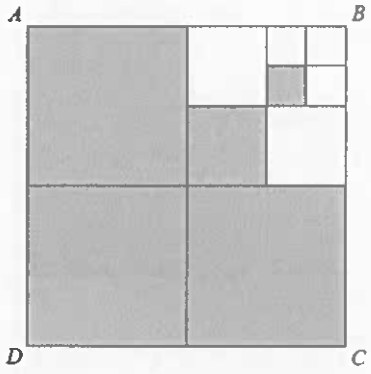
Question #1

a) ABCD is a square. The diagram is drawn accurately.



What fraction of the square ABCD is shaded ? **(2 marks)**

b) Here are five fractions:

$$\frac{2}{8}, \frac{10}{40}, \frac{12}{48}, \frac{5}{24}, \frac{20}{80}$$

Circle the fraction that is **NOT** equivalent to $\frac{1}{4}$. **(1 mark)**

c) Write the fractions below in order of size, starting with the **smallest.** **(2 marks)**

$$\frac{1}{2}, \frac{17}{24}, \frac{3}{4}, \frac{5}{12}$$

d) There are **800 people** at a football match. 10% of these 800 people are children. $\frac{3}{8}$ of these people are women and the rest are men.

Calculate;

i) the number of **children** at the football match. **(2 mark)**

ii) Work out the number of **women** at the football match. **(2 marks)**

iii) Calculate the number of **men** at the football match. **(2 marks)**

iv) **320 out of the 800 people at the match are under 21 years old**. work out the percentage of the people at the football match who are under 21 years old.

(2 marks)

Question #2

a) Sarah has started reading a new book.

On Saturday she reads $\frac{2}{15}$ of the book.

On Sunday she reads a further $\frac{1}{3}$ of the total number of pages in the book.

On Monday she reads another $\frac{1}{5}$ of the total number of pages in the book.

On Tuesday she finishes the book.

What fraction of the book did she read on Tuesday?
Write your answer in its simplest form. **(3 marks)**

b) Find the exact value of:

$$\frac{8}{11} \times \left(\frac{5}{9} - \frac{1}{6}\right) \div 1\frac{5}{9}$$ **(3 marks)**

Question #3

a) The sum of money of $3 500 is divided among Adrian, Sean and James. Sean received half, Adrian received $850 and James received the remainder. Calculate;

i) Sean's share **(1 mark)**

ii) James share **(1 mark)**

iii) The ratio in which the $3 500 was divided among the three persons, in its simplest form. **(2 mark)**

b) Write the following as a ratio in its **simplest term.** **(2 marks)**

30 minutes : 1 ½ hours

c) The ratio of the distance of school from Lisa's home to the distance of school from John's home is 3:2.

i) Who lives closer to the school? .....

ii) Complete the table below which shows some possible distance that Lisa and John could live from the school.

Distance from Lisa's home to school (km)	9			27
Distance from John's home to school (km)		12	20	

(3 marks)

d) A sum of money is to be divided among Anna, Brian and Clara in the ratio **4 : 6 : 5.** The largest share amounts to $2400. calculate:

i) the total sum of money to be shared. **(2 marks)**

ii) Anna's share. **(2 marks)**

iii) The percentage of the total amount that Brian receives. **(2 marks)**

Question #4

a) **Shown below is a recipe for stuffed turkey.**

Stuffed Turkey

Serves 4

Turkey	500g
Red Onion	1
Garlic Cloves	2
Chestnut Mushrooms	150g
Spinach	140g
Chicken Stock	300ml

Mary wants to make Stuffed Turkey for **10 people**. How much of each ingredient is needed? **Include units!** **(3 marks)**

Turkey .....

Red Onions .....

Garlic Cloves .....

Chestnuts Mushrooms .....

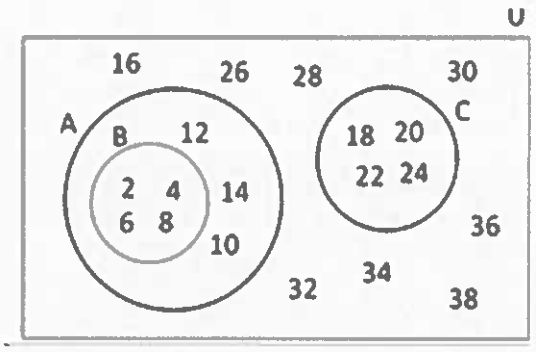
Spinach .....

Chicken Stock .....

b) The time taken to build a house is inversely proportional to the number of builders. If there are 6 builders, it takes 80 days to complete the house. How many builders must be employed to build the house in just 16 days? **(2 marks)**

Question #5

Use the diagram below to answer the questions that follow.



a) Describe the universal set, in words. **(1 mark)**

U = {.....}

b) Describe set A, in words. **(1 mark)**

A = {.....}

c) Using the Venn diagram above, state whether each of the following statements is TRUE or FALSE. **(8 marks)**

i) Set B and Set C are equivalent. .....

ii) $n(A) = 3$ .....

iii) $A \subset B$ .....

iv) $A \cup B = A$ .....

v) $A \cap B = \emptyset$ .....

vi) $A \cap B = B$ .....

vii) $8 \in A$ .....

viii) There are 8 possible subsets of set B .....

Question #6

a) Given that $S = \{ 2, 3, 5\}$, List all the possible subsets of S. **(4 marks)**

b) Given that;

$U = \{ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16\}$
$A = \{\text{Even numbers}\}$
$B = \{ \text{Multiples of 3}\}$

i) List the elements of A. **(1 mark)**

A = { .....}

ii) List the elements of B. **(1 mark)**

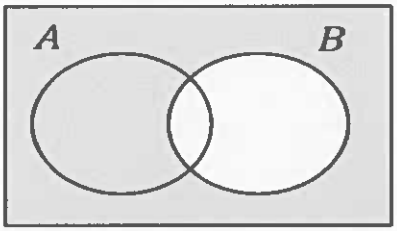
B = { .....}

iii) Draw a suitable Venn diagram to show the relationship among U, A and B.
(5 marks)

iv) On the Venn diagram drawn in part (iii) above, shade the region that represents $A \cap B$. **(1 mark)**

c) Use set notation to describe the shaded region in each of the following. **(3 marks)**

i)



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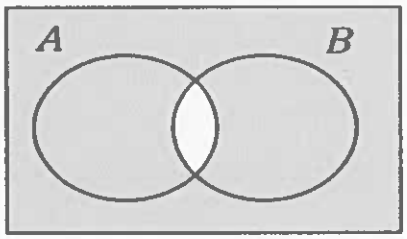
ii)



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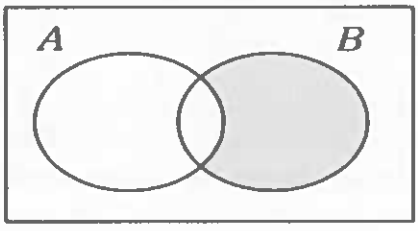
iii)



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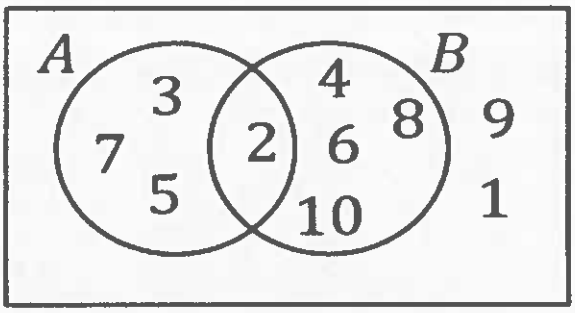
d)

Use the Venn diagram below to list the members of each set given. **(5 marks)**



i) $A' = \{$ .....$\}$

ii) $(A \cap B)' = \{$ .....$\}$

iii) $(A \cup B)' = \{$ .....$\}$

iv) $A' \cap B = \{$ .....$\}$

v) $B' \cup A = \{$ .....$\}$

Question #7

a) Circle three numbers which do not represent numbers in base 6. **(3 marks)**

245	332	461	212	371	829	345	123

b) Determine the value of p, q and r in the following. **(3 marks)**

$$375_8 = \left(3 \times 8^{p}\right) + \left(q \times 8^{1}\right) + \left(r \times 8^{0}\right)$$

$p =$ .....

$q =$ .....

$r =$ .....

c) Arrange the following numbers in order from smallest to largest. **(4 marks)**
Show working!

415_6 3321_4 110111111_2

Answer: ..... , ... , ...

d) Convert the following numbers to the base stated. (4 marks)

i) 142_{10} to **base 3**

ii) 12101_3 to **base 2**

e) Perform the following calculations in the base stated. (4 marks)

i) $11111_2 + 10111_2$

ii) $11101_2 - 1111_2$

iii) $1202_3 - 222_3$

iv) $3425_6 + 3324_6$