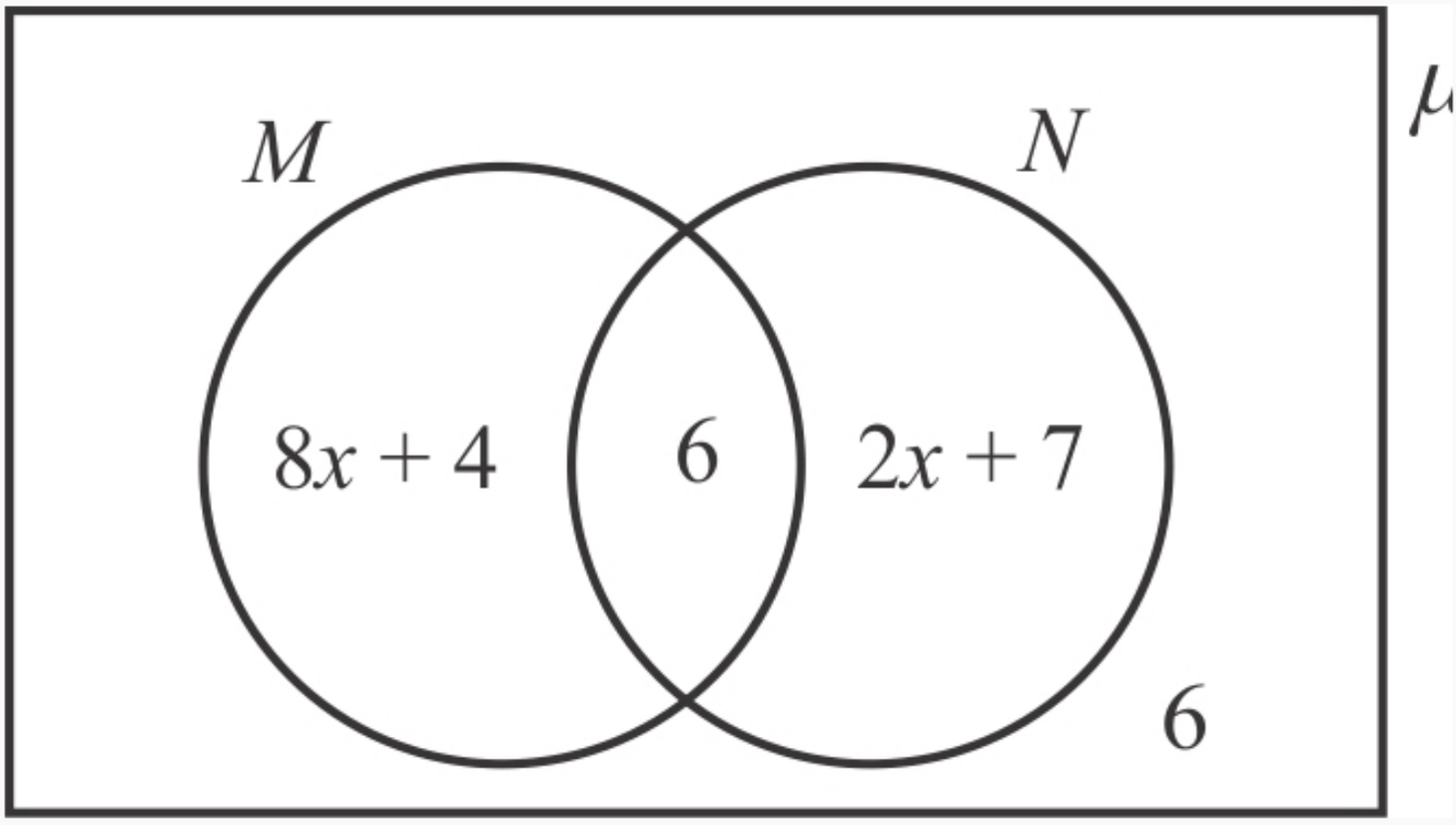

) In the Venn diagram,
M and N are intersecting sets in the universal set μ.

a) Express $n(M)$ and $n(N)$ in terms of x.

b) Given that $n(M) = n(N)$, find the:

i. value of x

ii. $n(\mu)$

c) Simplify: $2^6 \div (2^2 \times 2^1) \div 2^5$

2.

a) Factorize the expression $5ay - by + 15a - 3b.$

b) Solve: $\frac{6}{4p-1} = \frac{4}{3(p+4)}$

c) Esi and Kofi shared an amount of GH¢21,000.00 in the ratio 2:5 respectively. How much more did Kofi receive than Esi?

3.

a) If $\mathbf{r} = \begin{pmatrix} -4 \\ -5 \end{pmatrix}$ and $\mathbf{m} = \begin{pmatrix} -1 \\ -2 \end{pmatrix}$, find $\mathbf{p}$ given that $\mathbf{p} = \mathbf{r} - \mathbf{m}.$

b) The sum of two numbers is 81. If the second number is twice the first, find the second number.

c) The floor of a rectangular hall is of length 9m and width 4m. How many tiles of 20cm by 30cm can be used to cover the floor completely.

4.

a) Antwiwaa bought 25 mangoes, 7 of which were unripe. What percentage of the mangoes were ripe?

b)

x	1	2	3	4 ...	8...	n
↓	↓	↓	↓	↓	↓	↓
y	-1	2	5	8	m	29

. The mapping shows the relationship x and y. Find the:

i. rule for the mapping;

ii. values of m and n

c) A bus left town **X** at 6:30am and arrived at town **Y** at 1:00pm. If the bus travelled at an average speed of 100km per hour, calculate the distance from town **X** to town **Y**.

5.

a) Simplify:
$(4x + 2)(x - 2) - 3x^2$

b) The following are the angles formed at the centre of a circle:
$40°, 60°, 100°, 3x°$ and $5x°$.
Find the value of x.

c) The cost (C) in Ghana Cedis of producing a book of x pages is given by
$C = 25 + 0.6x$

i. Find the cost of producing a book with 220 pages.

ii. How many pages are in a book produced at a cost of $\mathrm{GH¢}145$?

6. The table shows the number of marbles students sent to class for Mathematics lesson.

Number of marbles	*Number of students*	*fx*
1	4	-
2	5	-
3	-	42
4	9	-
5	-	30
6	2	12

a) Copy and complete the table.

b) How many:

i. students were in the class?

ii. marbles were brought altogether?

iii. marbles did **most** of the students bring?

c) Calculate, correct to the **nearest** whole number, the mean number of marbles brought for the lesson.

1.

a) $n(M) = 8x + 4 + 6 = 8x + 10$

$n(N) = 2x + 7 + 6 = 2x + 13$

b)

i. $n(M) = n(N)$

$8x + 10 = 2x + 13$

$8x + 10 = 2x + 13$

$8x - 2x = 13 - 10$

$6x = 3$

$x = \frac{1}{2}$

ii. $n(\mu)$

$= (8x + 4) + 6 + (2x + 7) + 6$

$= 10x + 23$

$10(\frac{1}{2}) + 23$

$= 5 + 23$

$= 28$

c) $2^6 \div (2^2 \times 2^1) \div 2^5$

$= 2^6 \div (2^3) \div 2^5$

$= 2^{6-3-5}$

$= 2^{-2}$

b)

i. $n(M) = n(N)$

$8x + 10 = 2x + 13$

$8x + 10 = 2x + 13$

$8x - 2x = 13 - 10$

$6x = 3$

$x = \frac{1}{2}$

ii. $n(\mu)$

$= (8x + 4) + 6 + (2x + 7) + 6$

$= 10x + 23$

$10(\frac{1}{2}) + 23$

$= 5 + 23$

$= 28$

c) $2^6 \div (2^2 \times 2^1) \div 2^5$

$= 2^6 \div (2^3) \div 2^5$

$= 2^{6-3-5}$

$= 2^{-2}$

$= \frac{1}{2^2}$

$= \frac{1}{4}$

2.

a) $5ay - by + 15a - 3b$

$= y(5a - b) + 3(5a - b)$

$= (y + 3)(5a - b)$

b) $\frac{6}{4p-1} = \frac{4}{3(p+4)}$

$\Rightarrow 6 \times 3(p + 4) = 4(4p - 1)$

$\Rightarrow 18(p + 4) = 16p - 4$

$\Rightarrow 18p + 72 = 16p - 4$

$\Rightarrow 18p - 16p = -4 - 72$

$\Rightarrow 2p = -76$

$\Rightarrow p = -\frac{76}{2}$

$\Rightarrow p = -38$

c) $\text{Ratio} = \text{Esi} : \text{Kofi} = 2 : 5$

$\text{Total ratio} = 2 + 5 = 7$

Kofi's share

$= \frac{5}{7} \times 21000$

$= 15000$

Esi's share

$= 21000 - 15000$

$= \text{GH¢}6000.00$

b) $\frac{6}{4p-1} = \frac{4}{3(p+4)}$

$\Rightarrow 6 \times 3(p+4) = 4(4p-1)$

$\Rightarrow 18(p+4) = 16p - 4$

$\Rightarrow 18p + 72 = 16p - 4$

$\Rightarrow 18p - 16p = -4 - 72$

$\Rightarrow 2p = -76$

$\Rightarrow p = -\frac{76}{2}$

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c) $\text{Ratio} = \text{Esi} : \text{Kofi} = 2 : 5$

$\text{Total ratio} = 2 + 5 = 7$

Kofi's share

$= \frac{5}{7} \times 21000$

$= 15000$

Esi's share

$= 21000 - 15000$

$= \text{GH¢}6000.00$

How much more Kofi receives
GH¢15,000.00 - GH¢6,000.00
GH¢9,000.00

Kofi received GH¢9,000.00 more than Esi.

3.

a) $\mathbf{p} = \mathbf{r} - \mathbf{m}$

$$= \begin{pmatrix} -4 \\ -5 \end{pmatrix} - \begin{pmatrix} -1 \\ -2 \end{pmatrix}$$

$$= \begin{pmatrix} -4+1 \\ -5+2 \end{pmatrix}$$

$$= \begin{pmatrix} -3 \\ -3 \end{pmatrix}$$

b) Let

$x =$ the first number

$y =$ the second number

$x + y = 81 \ldots.(1)$

$y = 2x \ldots.(2)$

Putting (2) into (1)

$x + 2x = 81$

$3x = 81$

$x = \frac{81}{3} = 27$

Putting $x = 27$ into (2)

$y = 2(27)$

$x + y = 81 \ldots.(1)$

$y = 2x \ldots.(2)$

Putting (2) into (1)

$x + 2x = 81$

$3x = 81$

$x = \frac{81}{3} = 27$

Putting $x = 27$ into (2)

$y = 2(27)$

$y = 54$

The second number is 54

c) Area of rectangular hall

$= 9\text{m} \times 4\text{m}$

$= 36\text{m}^2$

$= 360\,000\text{cm}^2$

Area of square tiles$= 20\text{cm} \times 30\text{cm}$

$= 600\text{cm}^2$

Number of tiles that can cover the room

$= \frac{\text{Area of the rectangular hall}}{\text{Area of the tiles}}$

$= \frac{360000}{600} = 600$

4.

a) Number of ripe mangoes
$= 25 - 7 = 18$

Percentage of ripe mangoes
$= \frac{18}{25} \times 100 = 72\%$

b)

i. General equation is
$y = mx + c$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5-2}{3-2} = 3$

$y = 3x + c$
From the mapping,
when $x = 2, y = 2$
$2 = 3(2) + c$
$c = -4$

Substituting
$y = 3x - 4$

ii. When $x = 8$
$m = 3(8) - 4$
$m = 24 - 4 = 20$

when $x = 2, y = 2$

$2 = 3(2) + c$

$c = -4$

Substituting

$y = 3x - 4$

ii. When $x = 8$

$m = 3(8) - 4$

$m = 24 - 4 = 20$

When $x = n, y = 29$

$29 = 3n - 4$

$3n = 29 + 4$

$3n = 33$

$n = \frac{33}{3} = 11$

c) Time used to travel
= 1:00 pm - 6:30 am
= 13:00 pm - 6:30 am
= 6 hrs 30 minutes

Distance from x to y

$= 6\text{hrs } 30\text{minutes} \times 100$

$= 6\frac{1}{2} \times 100$

$= \frac{13}{2} \times 100$

$= 650 \text{ km}$

5.

a) $(4x+2)(x-2)-3x^2$

$=4x^2-8x+2x-4-3x^2$

$=4x^2-3x^2-8x+2x-4$

$=x^2-6x-4$

b) $40^\circ+60^\circ+100^\circ+3x^\circ+5x^\circ=360^\circ$

$200+8x=360$

$8x=360-200$

$8x=160$

$x=\frac{160}{8}=20$

c) $C=25+0.6x$

i. When $x=220$

$C=25+0.6(220)$

$C=25+\frac{6}{10}\times 220$

$C=25+132=157$

$C=\text{GH¢}157.00$

ii. $145=25+0.6x$

$0.6x=145-25$

$\frac{6x}{10}=120$

$6x=120\times 10$

$\frac{120\times 10}{6}=200$

b) $40^\circ + 60^\circ + 100^\circ + 3x^\circ + 5x^\circ = 360^\circ$

$200 + 8x = 360$

$8x = 360 - 200$

$8x = 160$

$x = \frac{160}{8} = 20$

c) $C = 25 + 0.6x$

i. When $x = 220$

$C = 25 + 0.6(220)$

$C = 25 + \frac{6}{10} \times 220$

$C = 25 + 132 = 157$

$C = \text{GH¢}157.00$

ii. $145 = 25 + 0.6x$

$0.6x = 145 - 25$

$\frac{6x}{10} = 120$

$6x = 120 \times 10$

$x = \frac{120 \times 10}{6} = 200$

6.

a)

Number of marbles	*Number of students*	*fx*
1	4	**4**
2	5	**10**
3	**14**	42
4	9	**36**
5	**6**	30
6	2	12

b)

i. Number of students in class

$$= 4 + 5 + 14 + 9 + 6 + 2$$

$$= 40$$

ii. Marbles brought to class

$$= 4 + 10 + 42 + 36 + 30 + 12$$

$$= 134$$

iii. \(3 \)

c) Mean $= \frac{134}{40} = 3.35 \approx 3$