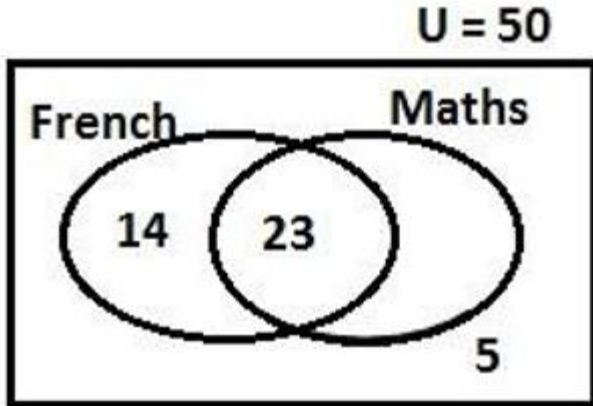


2013 BECE MATHEMATICS 2 SOLUTION  
MATHEMATICS 2

(a) Venn Diagram



(a) (i) Number of students who passed in French (F)  
= F only + Both F and M  
= 14 + 23  
= 37

(a) (ii) Probability of selecting a student who passed in Maths.  
Approach 1

$$\begin{aligned} &= \frac{\text{No. of students who passed in Maths}}{\text{Total no. of students}} \\ &= \frac{50 - (14 + 5)}{50} \\ &= \frac{50 - 19}{50} \\ &= \frac{31}{50} \end{aligned}$$

(a) (ii) Probability of selecting a student who passed in Maths.  
Approach 2

Let  $m$  = number of students who passed in Maths only

$$\text{Then } 14 + 23 + m + 5 = 50$$

$$\Rightarrow 14 + 23 + 5 + m = 50$$

$$\Rightarrow 42 + m = 50$$

$$\Rightarrow m = 50 - 42$$

$$m = 8$$

Therefore, the number of students who passed in Maths

$$= 23 + 8 = 31$$

$$\text{Probability} = \frac{\text{No. of students who passed in Maths}}{\text{Total no. of students}} = \frac{31}{50}$$

$$(b) \text{ Solving } 2x - 1\frac{1}{2} \geq 5x - 6$$

Approach 1

$$= 2x - \frac{3}{2} \geq 5x - 6 \text{ [Changing 1 to } 3/2]$$

$$= 6 - \frac{3}{2} \geq 5x - 2x \text{ [Grouping like terms]}$$

$$= \frac{6}{1} - \frac{3}{2} \geq 5x - 2x \text{ [Expressing 6 as } 6/1]$$

$$= \frac{12-3}{2} \geq 3x \text{ [Simplifying]}$$

$$= \frac{9}{2} \geq 3x$$

$$= \frac{9}{2 \times 3} \geq \frac{3x}{3} \text{ [Dividing both sides by 3]}$$

$$= \frac{3}{2} \geq x \text{ [Simplifying]}$$

$$= x \leq \frac{3}{2} \text{ [Rearranging (Turning around)]}$$

$$= x \leq 1\frac{1}{2} \text{ or } 1.5$$

(b) Approach 2

$$= 2x - \frac{3}{2} \geq 5x - 6 \text{ [Changing 1 to } 3/2]$$

$$= 2 \times (2x) - 2 \times \frac{3}{2} \geq 2 \times (5x) - 2 \times (6) \text{ [Multiplying thro' by 2]}$$

$$= 4x - 3 \geq 10x - 12 \text{ [Simplifying]}$$

$$= 4x - 10x \geq 3 - 12 \text{ [Grouping like terms]}$$

$$= -6x \geq -9 \text{ [Simplifying]}$$

$$= \frac{-6x}{-6} \leq \frac{-9}{-6}$$

2. (a) Converting  $444_{five}$  to base ten

$$(45^2) + (45^1) + (45^0)$$

$$= (4 \times 25) + (4 \times 5) + (4 \times 1)$$

$$= 100 + 20 + 4$$

$$= 124$$

Now, converting 124 to a base 2 numeral

=

2	124	Remainder
	62	0
	31	0
	15	1
	7	1
	3	1
	1	1
	0	1

$$= 1111100_{two}$$

(b) Amount in man's pocket

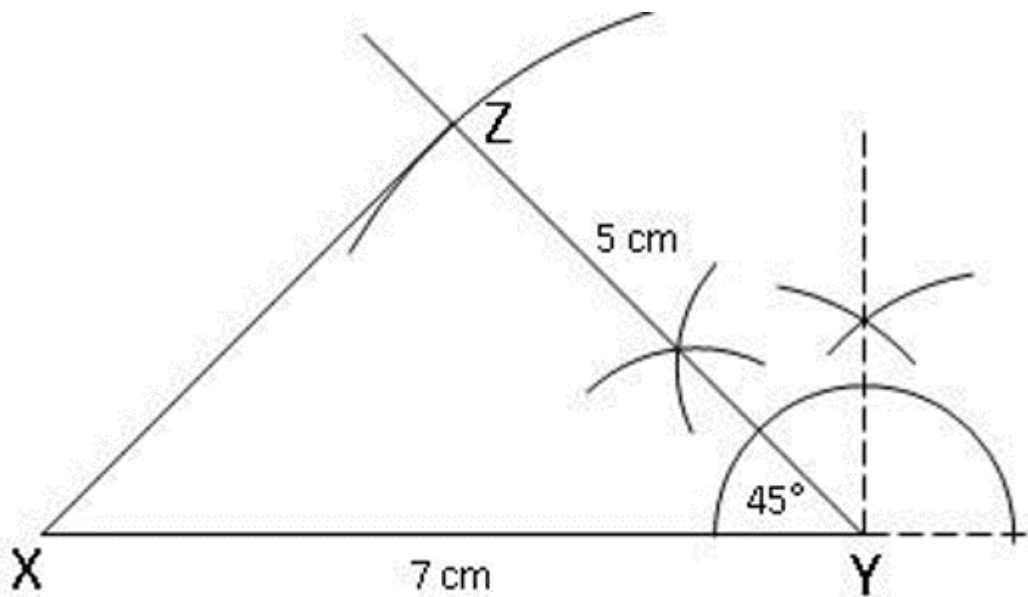
$$\begin{aligned} &= 3 \times (\text{GH}\text{¢ } 50) + 7 \times (\text{GH}\text{¢ } 20) + 5 \times (\text{GH}\text{¢ } 10) \\ &= \text{GH}\text{¢ } 150 + \text{GH}\text{¢ } 140 + \text{GH}\text{¢ } 50 \\ &= \text{GH}\text{¢ } 340 \end{aligned}$$

$$\begin{aligned} \text{Purchases} &= 1 \text{ bicycle} + 2 \text{ mobile phones} \\ &= \text{GHC } 150 + 2 \times \text{GHC } 80 \\ &= \text{GHC } 150 + \text{GHC } 160 \\ &= \text{GHC } 310 \end{aligned}$$

$$\begin{aligned} \text{Amount left} &= \text{GHC } 340 - \text{GHC } 310 \\ &= \text{GHC } 30 \end{aligned}$$

He had one GHC 20.00 and one GHC 10.00 left

3 (a) (i)



(ii)  $|XZ| = 5\text{cm}$  (or  $5.1\text{cm}$  or  $4.9\text{cm}$ )

(b) (i)  $C = 44\text{cm}$ ,  $\pi = 22/7$ ,  $r = ?$

Approach 1

$$C = 2\pi r \Rightarrow 44 = 2 \times \frac{22}{7} \times r \text{ [Substituting]}$$

$$447 = 222r \text{ [Multiplying both sides by 7]}$$

$$\frac{44 \times 7}{2 \times 22} = \frac{2 \times 22 \times r}{2 \times 22} \text{ [Dividing both sides by } 2 \times 22]$$

$$7 = r \text{ [Simplifying]}$$

$$r = 7\text{cm}$$

(b) (i)  $C = 44\text{cm}$ ,  $\pi = 22/7$ ,  $r = ?$

Approach 2

$$C = 2\pi r$$

$$r = \frac{C}{2\pi} [\text{Making } r \text{ the subject}]$$

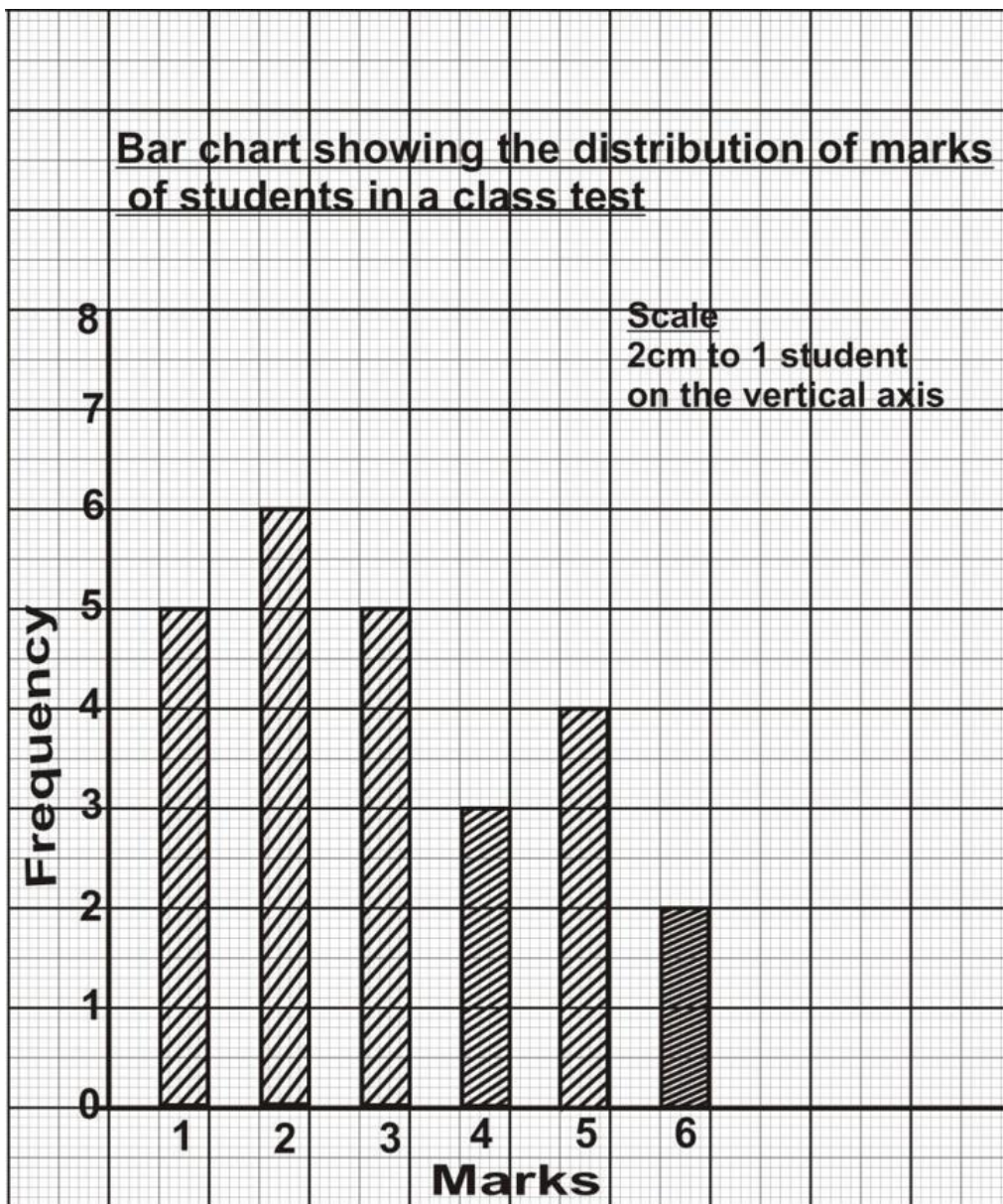
$$r = \frac{44}{2 \times \frac{22}{7}} [\text{Substituting}]$$

$$r = \frac{44 \times 7}{2 \times 22} [\text{Simplifying}]$$

$$r = 7\text{cm}$$

(ii)  $\pi = 22/7$ ,  $r = 7$ , Area = ?

4 (a) Bar chart



(b) Finding the mean (Approach 1)

$$\begin{aligned} \text{Mean} &= \frac{(1 \times 5) + (2 \times 6) + (3 \times 5) + (4 \times 3) + (5 \times 4) + (6 \times 2)}{5 + 6 + 5 + 3 + 4 + 2} \\ &= \frac{5 + 12 + 15 + 12 + 20 + 12}{25} \\ &= \frac{76}{25} \\ &= 3\frac{1}{25} \text{ or } 3.04 \end{aligned}$$

(b) Finding the mean (Approach 2)

Mark (x)	Frequency (f)	fx
1	5	5
2	6	12
3	5	15
4	3	12
5	4	20
6	2	12
	$\Sigma f = 25$	$\Sigma fx = 76$

$$\text{Mean} = \frac{76}{25} = 3\frac{1}{25} \text{ or } 3.04$$

5 (a)

$$\begin{aligned} 6 \left( 3\frac{5}{6} - 1\frac{1}{4} \right) \\ &= 6 \times \left( \frac{23}{6} - \frac{5}{4} \right) \\ &= 6 \times \left( \frac{2(23) - 3(5)}{12} \right) \\ &= 6 \times \left( \frac{46 - 15}{12} \right) \\ &= 6 \times \frac{31}{12} \\ &= \frac{31}{2} \\ &= 15\frac{1}{2} \text{ or } 15.5 \end{aligned}$$

(b) Magic square with magic number 18

9	4	5
2	6	10
7	8	3

(c) Factors of 24 = {1, 2, 3, 4, 6, 8, 12, 24}

Sum of factors =  $1 + 2 + 3 + 4 + 6 + 8 + 12 + 24$   
= 60

(d)  $m + n + r$

6 (a) Relation:  $y=2x-5$

When

$$x = -1, y = 2(-1) + 5 \Rightarrow -2 + 5 = 3$$

$$x = 1, y = 2(1) + 5 \Rightarrow 2 + 5 = 7$$

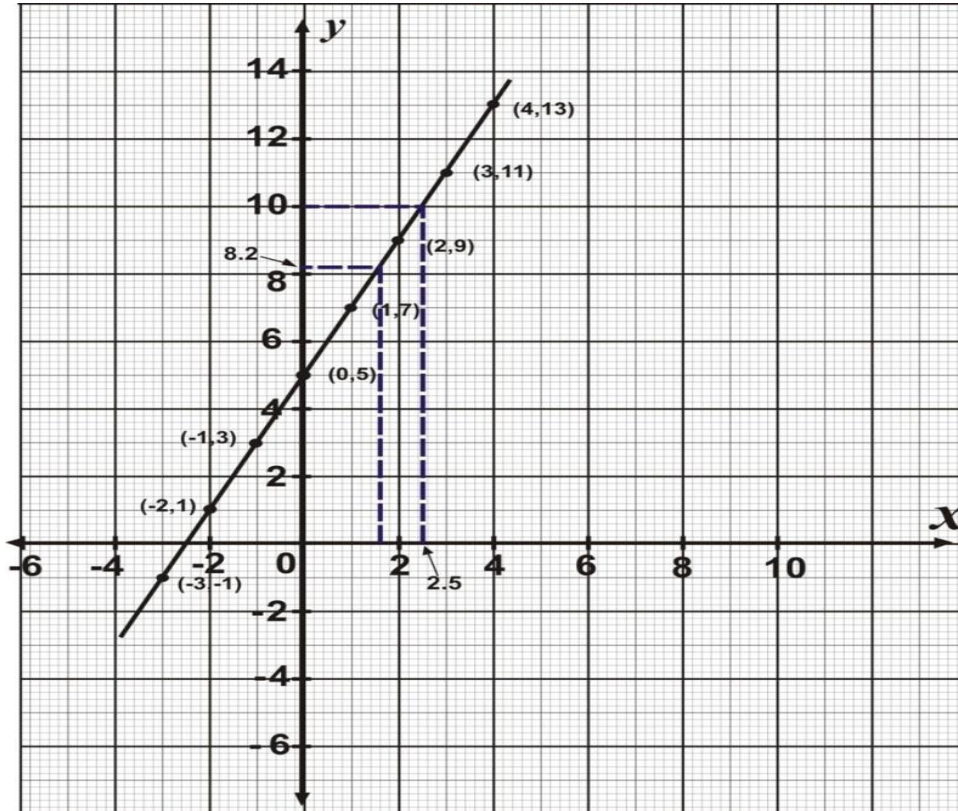
$$x = 2, y = 2(2) + 5 \Rightarrow 4 + 5 = 9$$

$$x = 3, y = 2(3) + 5 \Rightarrow 6 + 5 = 11$$

Table of values

x	-3	-2	-1	0	1	2	3	4
y	-1	1	3	5	7	9	11	13

(b) Graph of the relation  $y=2x-5$



(c) (i) When  $x = 1.6$ ,  $y = 8.2$

(ii) When  $y = 10$ ,  $x = 2 \frac{1}{2}$  or 2.5