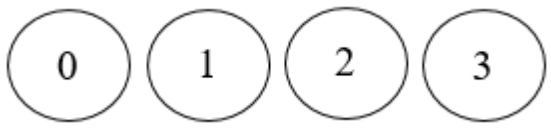
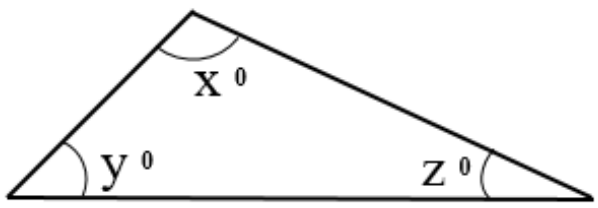
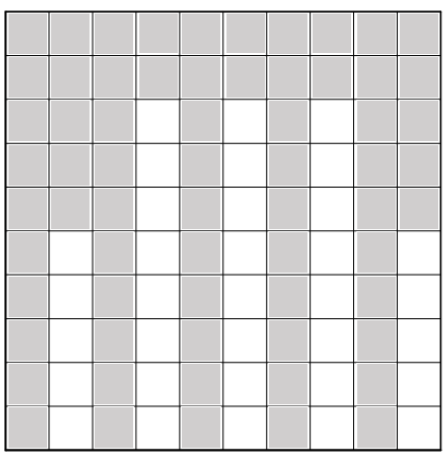
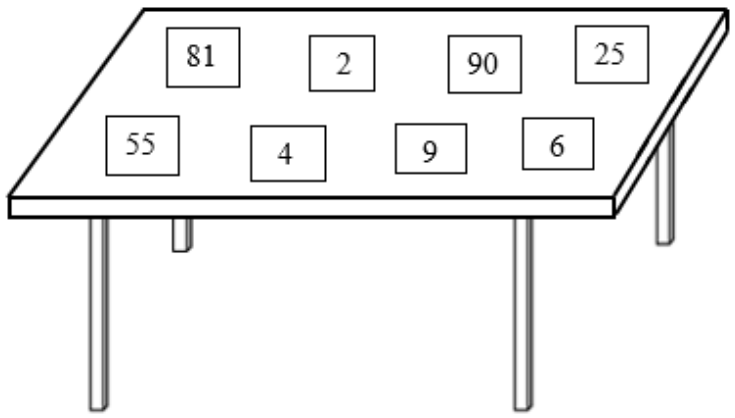
SECTION A [30 MARKS] ANSWER **ALL** QUESTION	**Full mark**
Question 1	**[30]**
a) **For each question, there are FOUR responses: A, B, C, and D. Choose the corresponding letter of your response and CIRCLE it neatly. NO score will be awarded, if you circle more than ONE letter.**	
i. The common factor of any natural number from the number cards below is  	[2]
A 0. **B 1.** C 2. D 3.	
Sample Response: *1 is the common factor for all the natural number*	
ii. The sum of the angles in the given diagram is  	[2]
A 60^0. B 90^0. **C 180^0.** D 360^0.	
Sample Response: *The sum of the interior angle measures of a triangle always adds up to 180°.*	
iii. A student shaded the grid as given.  Which one represents the shaded parts of the gird?	[2]
A 0.34 **B 0.66** C 34 D 66	

Sample Response:

66 squares out of 100 squares is shaded

$$= \frac{66}{100} = \underline{0.66}$$

iv. Identify all the square numbers from the cards displayed on the table. [2]



A 2, 6, 55, 90

B 4, 9, 25, 90

C 4, 9, 55, 81

D 4, 9, 25. 81

Sample Response:

The product of a number multiplied by itself is a square number.

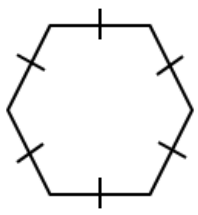
$4 = 2 \times 2$

$9 = 3 \times 3$

$25 = 5 \times 5$

$81 = 9 \times 9$

v. The order of rotational symmetry of the given shape is [2]



A 1.

B 2.

C 6.

D 12.

Sample Response:

The given shape is a regular hexagon. Regular hexagons will have the order of 6 rotational symmetry.

vi. Sangay, Manju, Dema, and Kinley calculated the mean for the data set: [2]

4, 6, 2, 7, 3, 2

Name	**Calculation**
Sangay	4 + 6 + 2 + 7 + 3 + 2 = **24**
Manju	2, 2, <u>3, 4</u>, 6, 7 = $\frac{3+4}{2}$ = **3.5**
Dema	<u>2, 2</u>, 3, 4, 6, 7 = **2**

Karma	$2+2+3+4+6+7=\frac{24}{6}=\mathbf{4}$

Who calculated the mean correctly?

A Dema

B Karma

C Manju

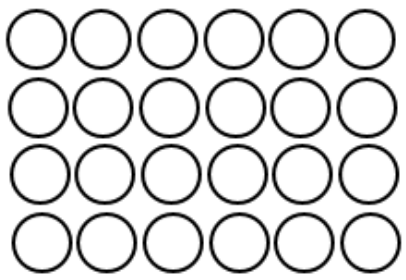
D Sangay

Sample Response:

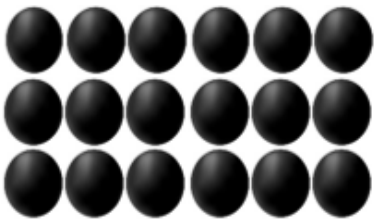
A mean in Math is the average of a data set, found by adding all the data and then dividing the sum of the data by total number of data. .

Therefore, Karma calculated the mean correctly as per the rule.

vii. What is the ratio of **Black Marbles** to **White Marbles** in the simplest form? [2]



White Marbles



Black Marbles

A 24:18

B 18:24

C 4:3

D 3:4

Sample Response:

18 black marbles and 24 white marbles

Ratio = 18:24

Simplest form = 3:4 (Each term is divided by 6)

viii. Study the pattern below and answer the question. [2]

Position	Square number	Triangular number
1st	1	1
2nd	4	3
3rd	9	6
4th	16	10
5th	…	…
6th	…	…

What is the sum of the 5th square number and the 6th triangular number?

A 46

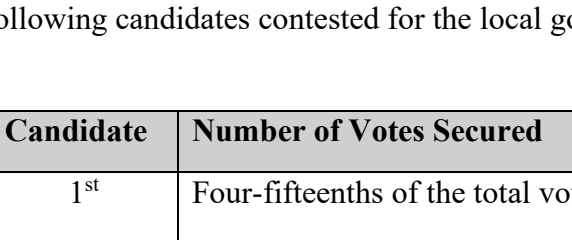
B 40

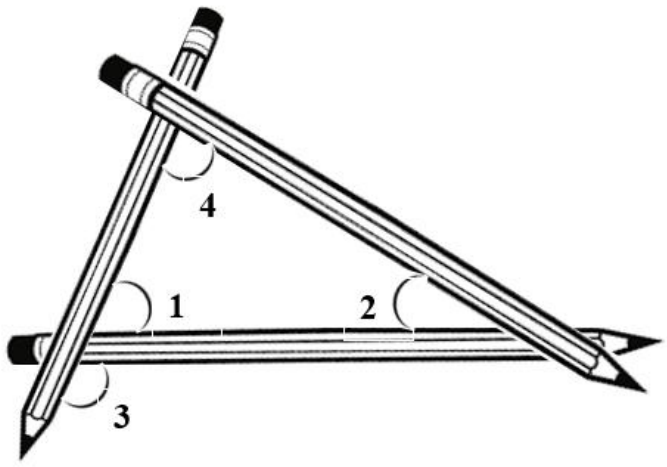
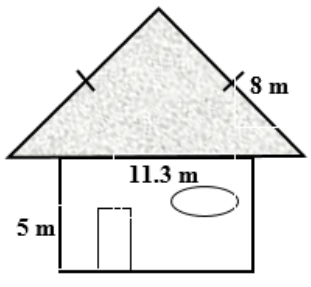
C 25

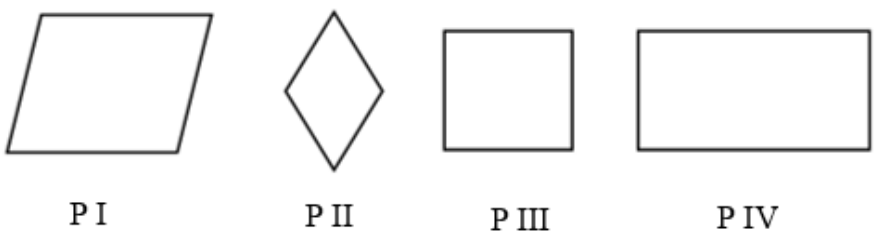
D 21

Sample Response:

5th square number is 25

6^{th} triangular number is 21 *Their sum is 25 + 21 = 46*	
ix. Identify the common properties of the given nets.  I. Both can be folded to make 3-D shapes. II. Both have polygonal bases. III. Their shape and number of bases are the same. IV. None of them have round sides.	[2]
A I, II, III **B I, II, IV** C I, III, IV D II, III, IV	
Sample Response: *Figures given are 3_D shapes (Solid).* *Prism will have rectangular faces, whereas pyramid will have triangular faces.* *Prism will have two identical polygonal bases and pyramid will have one polygonal base.*	
x. Following candidates contested for the local government election. **Candidate** / **Number of Votes Secured** 1^{st} — Four-fifteenths of the total votes 2^{nd} — One-third of the total votes 3^{rd} — Two-fifths of the total votes How many more votes did 3^{rd} candidate secure than 1^{st} candidate?	[2]
A $\frac{10}{15}$ B $\frac{6}{10}$ C $\frac{2}{10}$ **D** $\frac{2}{15}$	

xi. Which of these angles is closest to the size of the right angle?  	[2]
A 4 B 3 C 2 D 1	
Sample Response: *Angle 1 is about 60^0* *Angle 2 is about 45^0* *Angle 3 is about 120^0* *Angle 4 is about 90^0*	
xii. Shopkeeper A earned a profit of Nu 2,350,000 and Shopkeeper B earned a profit of Nu 0.235 million in a month. Which of the following justifications best describe the statement?	[2]
A **Shopkeeper A earned more profit because 2 million in Nu. 2,350,000 is greater than 0 million in 0.235 million.** B Shopkeeper B earned more profit because 0.235 million is greater than Nu. 2,350,000 C Shopkeeper B earned more profit because the ngultrum given in millions is greater. D Shopkeepers A and B earned the equal profit.	
Sample Response: *Shopkeeper A = Nu 2,350,000* *Shopkeeper B = Nu 0.235 million (Rename it into a standard form)* *Nu 0.235 million = 235,000* *Therefore, 2 million in 2,235,000 is greater than 0 million in 235,000* *(Option A is the best comparison made in identifying who earned more)*	
xiii. Deepak designs the house with an isosceles right triangle.  What is the area of the roof?	[2]
A $90.4\ m^2$ B $64.0\ m^2$ C $45.2\ m^2$ **D $32.0\ m^2$**	

Sample Response: *Area of a triangle = (b × h) ÷ 2* *Base = 8 m* *Height = 8 m* *= (8 m × 8 m) ÷ 2* *= 64 m^2 ÷ 2* *= 32 m^2*	
xiv. Which of the following polygons has all the properties given below? - The diagonals bisect each other. - Both diagonals are lines of symmetry. - It has four congruent right isosceles triangles.  	[2]
A P I B P II **C P III** D P IV	
Sample Response: *P I (Parallelogram) will have only one property given above. "The diagonals bisect each other"* *P II (Rhombus) will have two of the given properties above. "The diagonals bisect each other and Both diagonals are lines of symmetry"* ***P III (Square) will have all the properties given above.*** *P IV (Rectangle) will have two of the given properties above. "The diagonals bisect each other and Both diagonals are lines of symmetry"*	
xv. Four teams of students surveyed the favorite subjects of students in a school. Team I: It involved students' leaders. Team II: It involved parents and teachers only. Team III: It involved a maximum number of students from each class. Team IV: It involved all the members of the school. Which team collected the data with the correct sample?	[2]
A Team I B Team II **C Team III** D Team IV	
Sample Response: *Sampling means selecting the group from which you will collect data in your research. The sample you choose must represent the population. "It involved a maximum number of students from each class".*	

SECTION B (30 MARKS)

ANSWER **ALLTHE** QUESTIONS

Question 2

a) The number cards are drawn from a bag. [3]

9	11	16	29

Sort out the numbers and fill in the table.

Prime Numbers	**Composite Numbers**

Write one difference between the prime number and the composite number.

Sample Response:

Sorting:

- *Prime numbers 11 and 29 ----------[0.5 mark + 0.5 mark]*
- *Composite numbers 9 and 16 ----------[0.5 mark+0.5 mark]*

Difference between prime and composite numbers

Prime numbers have only two factors and Composite numbers have more than two factors ---------- ---- [1 mark]

OR

Can only be divided evenly by 1 and itself

Can be divided evenly by at least one other number besides 1 and itself --------[1 mark]

b) Kinley has 8 more stickers than Leela. Together they have 26 stickers. [2]

How many stickers does Leela have?

Sample Response:

Let Leela's stickers be 'x'

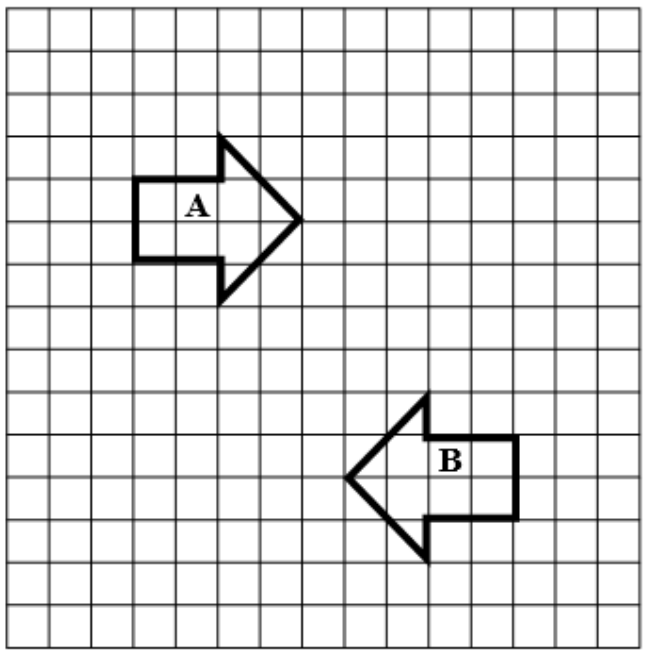
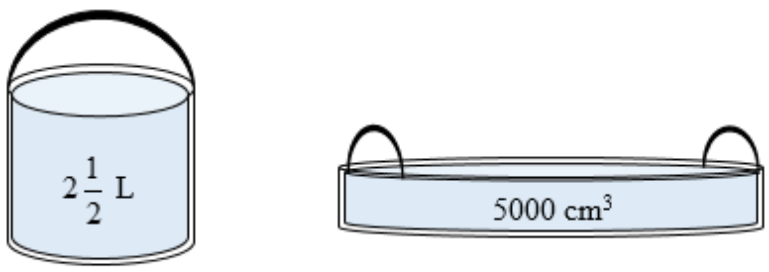
Kinley's stickers: 8 + x ---------- *[0.5 mark]*

8 + x + x = 26 ***OR*** *8 + 2x = 26 ---------- [0.5 mark]*

2x = 26 – 8 ----------[0.5 mark]

x = 18 ÷ 2 = 9 (Leela's Stickers)----------[0.5 mark]

Question 3

a) A student transformed Shape **A** to **B** as shown in the diagram.  (**Show and)** Write down the transformations used to move Shape **A** to Shape **B**.	[3]
Sample Response: *Reflection and Translation ----------[1.5 mark + 1.5 mark]* ***OR*** *Rotation and Translation ----------[1.5 mark + 1.5 marks]*	
b) A farmer filled the containers with milk.  **Container A** **Container B** Which container holds more milk? Justify your answer.	[2]
Sample Response: *1 L = 1000 mL* $2\frac{1}{2}$ L = *2500 mL ---------- [0.5 mark]* *1 cm^3 = 1 mL* *5000 cm^3 = 5000 mL ----------[0.5 mark]* *2500 mL < 5000 mL* ***OR*** *Container B holds more milk.----------[1 mark]* ***OR*** *1 L = 1000 mL = 1000 cm^3* $2\frac{1}{2}$ *L = 2500 mL = 2500 cm^3 ----------[1 mark]* *2500 cm^3 < 5000 cm^3* ***OR*** *Container B holds more milk.----------[1 mark]*	
Question 4	
a) The table shows the import of goods in year 2020.	[3]

Goods	Price (Nu)
Coke	1,717,380,000
Cooking Oil	968 million
Rice	2.38 billion

Which goods was imported least in the country? Show your work.

Sample Response:

(Converting to standard form)

Cooking oil: Nu 968 million = Nu 968,000,000 ----------[1 mark]

Rice: Nu 2.35 billion = Nu 2,350,000,000 ----------[1 mark]

Cooking oil is imported least ----------[1 mark]

OR

Cooking oil: Nu 0.968 billion ----------[1 mark]

Coke: 1.71738 billion ----------[1 mark]

Cooking oil is imported least ----------[1 mark]

OR

Coke: Nu 1,717.38 million ---------- [1 mark]

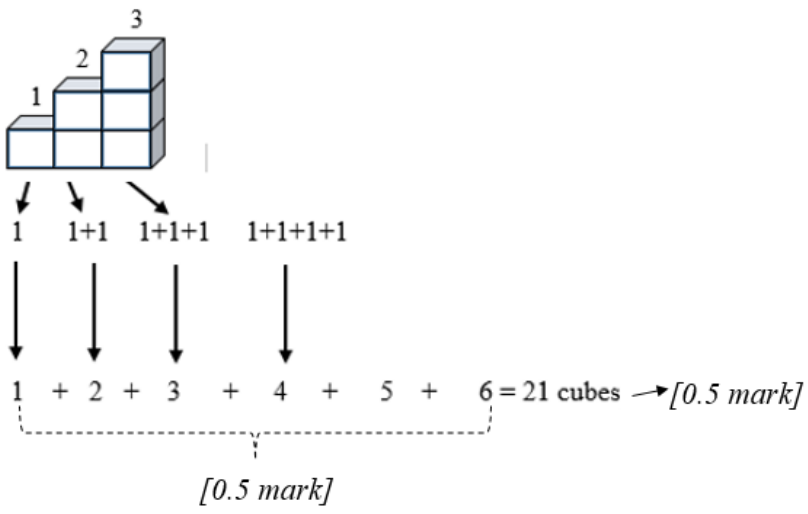
Rice: Nu 2,380 million ---------- [1 mark]

Cooking oil is imported least ---------- [1 mark]

b) Dorji used 6 cubes to build a staircase with three steps. He says that he needs 20 cubes to build a staircase with six steps. Do you agree with him? Justify. [2]

Sample Response:

No ---------- [1 mark]



OR

No ---------- [1 mark]

Since Dorji used 6 cubes to build the staircase with three steps, the number of steps increases by one. ---------- [0.5 mark]

Therefore:

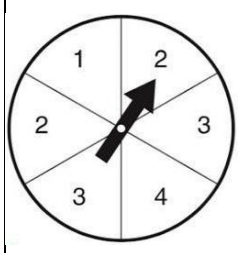
1st step: 1 cube

2nd step: 2 cubes

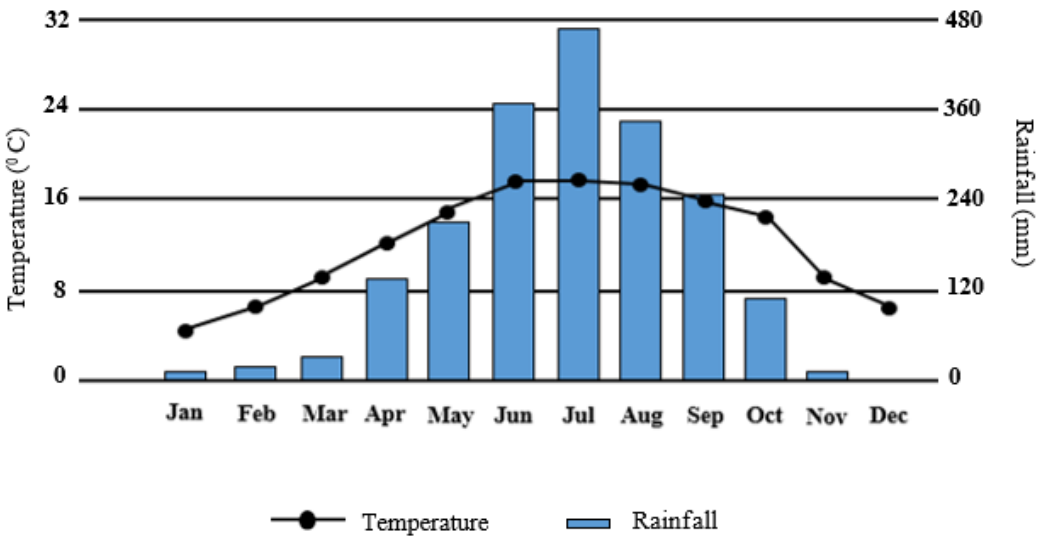
3rd step: 3 cubes

4th step: 4 cubes

5^{th} step: 5 cubes *6^{th} step: 6 cubes* *Dorji needs to use 21 cubes. ---------- [0.5 mark]*	
Question 5	
a) A home science club in a school is knitting hats for 5 members. They want each member to get 2 red hats and 3 green hats.	[3]
i. How many hats does the club need to knit?	[2]
Sample Response: *1 member = 5 hats (2 red + 3 green) ---------- [0.5 mark]* *5 members = 5 × 5 ---------- [0.5 mark]* *= 25 hats ---------- [1 mark]* ***OR*** *5 members = 5 × 5* *[0.5 + 0.5 mark]* *= 25 hats ---------- [1 mark]*	
ii. If there are 20 members, how many hats do they need to knit?	[1]
Sample Response: *1 member = 5 hats* *20 members = 20 × 5 ---------[0.5 mark]* *= 100 hats ----------[0.5 mark]*	
b) During Annual School Concert, the students performed different types of dances as shown in the table. **Types of dance** / **Number of students** Rigsar / 40% Boedra / $\frac{1}{4}$ Others / 0.35 Which type of dance did most students prefer to perform? Justify.	[2]
Sample Response: *(Converting into percent)* *Rigsar: 40%* *Boedra:* $\frac{1\times25}{4\times25}=\frac{25}{100}=25\%$ *---------- [0.5 mark]* *Others*: $0.35=\frac{35}{100}=35\%$ *----------[0.5 mark]* *Therefore, most students prefer Rigsar, since 40% is greater than 25% and 35%. ---------- [1 mark]* ***OR*** *(Converting into fraction)* *Boedra:* $\frac{1}{4}$ *Rigsar: 40%* $=\frac{40}{100}=\frac{4}{10}=\frac{2}{5}$ *---------- [0.5 mark]* *Others: 0.35* $=\frac{35}{100}=\frac{7}{20}$ *---------- [0.5 mark]*	

Therefore, most students prefer Rigsar, since $\frac{40}{100}$ *or* $\frac{4}{10}$ *or* $\frac{2}{5}$ *is greater than* $\frac{1}{4}$ *and* $\frac{7}{20}$ *---------- [1 mark]* ***OR*** *(Converting into decimal)* *Others: 0.35* *Rigsar: 40%* $= \frac{40}{100} = 0.40$ *---------- [0.5 mark]* *Boedra:* $\frac{1}{4} = \frac{25}{100} = 0.25$ *---------- [0.5 mark]* *Rigsar: 0.40 is greater than 0.25 and 0.35. ---------- [1 mark]*	
Question 6	
a) During a Tshechu, a group of players predicted events based on the probabilities given in the table. Complete the given table. **Theoretical Probability** / **Event** $\frac{1}{6}$ / 50% / Very likely /	[3]
Sample Response: $\frac{1}{6}$ *: Rolling a die and getting 1 (six faces die)----------[1 mark]* *50%: Tossing a coin and getting head ---------- [1 mark]* *Very likely: Spinning a spinner and landing on prime numbers. --------[1 mark]*  ***OR*** $\frac{1}{6}$ *: <u>Paper slips marked with number 1 to 6 or letter A to F placed inside the bag , and drawing any one number for 1 to 6 OR a letter from A to F from the bag. ----- [1mark]</u>* *50%: <u>Spinning a spinner divided into two equal halves and marked with two different colours (Red/Blue)/numbers (1 & 2)/letters (A & B) and so on and getting Red/2/B ---------- [1 mark]</u>* *Very likely: <u>Rolling a six faced die numbered from 1 to 6 and landing on 5 different numbers. ---------- [1 mark]</u>*	
b) The graph shows average monthly temperature and rainfall in Bhutan in the year 2022.	[2]

Write two findings between temperature and rainfall.



Sample Response:

Monthly average rainfall is shown in the form of single bar graph, whereas temperature is in the form of single line graph. ---------- [1 mark]

Patterns for the bar and the line graphs is similar, that is it increases and then decreases. ---------- [1 mark]

OR

The maximum rainfall and the temperature is in the month of June, July, and August. ---------- [1 mark]

The minimum rainfall and the temperature is in the month of December, January, and February. ---------- [1 mark]

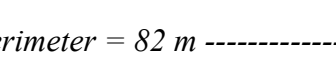
Question 7

a) There are two rectangular gardens. The area of the Garden A is 40 m^2 and the perimeter of Garden B is 40 m. Will they have same side lengths? Explain. [3]

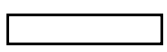
Sample Response:

(Diagram)

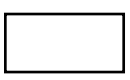
Possible side length having area of 40 m^2 and calculating its perimeter:



Perimeter = 82 m ---------- [0.5 mark]

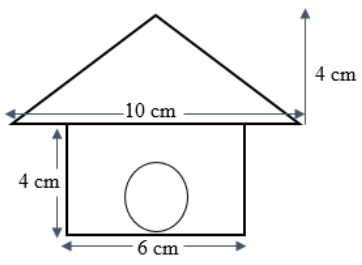


Perimeter = 44 m ----------[0.5 mark]



Perimeter = 28 m ----------[0.5 mark]

Perimeter = 26 m ---------- [0.5 mark]

No, if the area is 40 m^2, the perimeter will never be 40 m. ---------- [1 mark] ***OR*** *Possible side length having perimeter of 40 m and calculating its area:* 10 m 10 m *Area = 100 m^2 ---------- [0.5 mark]* 9 m 11 m *Area = 99 m^2 ---------- [0.5 mark]* 8 m 12 m *Area= 96 m^2 ----------[0.5 mark]* 7 m 13 m *Area= 91 m^2 ---------- [0.5 mark]* *No, if the perimeter is 40 m, the area will never be 40 m^2. ---------- [1 mark]*	
b) Draw an outline of a house and calculate its area.	[2]
Sample Response: *"Award mark for the appropriateness on the drawing" ---------- [0.5 mark]*  *Area of a rectangle: 6 cm × 4 cm* *= 24 cm^2 ----------[0.5 mark]* *Area of a triangle: (10 cm × 4 cm) ÷ 2* *= 40 cm^2 ÷ 2* *= 20 cm^2 ---------- [0.5 mark]* *Area of the pet house = 24 cm^2 + 20 cm^2* *= 44 cm^2 ---------- [0.5 mark]*	