འབྲུག་གི་སློབ་གྲྭའི་ཚོས་རྒྱགས་དང་བརྟག་ཞིབ་ཚོགས་སྡེ།
Bhutan Council for School Examinations and Assessment

COMPETENCY BASED ASSESSMENT TEST

Class VIII

STUDENT NAME: _____ **ROLL NO:** _____

SCHOOL NAME: _____ **SECTION:** _____

DZONGKHAG: _____ **GENDER:** _____

MATHEMATICS

Reading Time: 15 Minutes **Full Marks:** 80
Writing Time: 2 **Hours** **Year: 2021**

For teacher's use only

MCQ	i	ii	iii	iv	v	vi	vii	viii	ix	x	xi	xii	xiii	xiv	xv	Total	Signature
Option																30	
Mark Scored																	

Question	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	Total	Signature
Marks	3	2	2	3	2	3	2	3	2	3	25	
Marks Scored												

Question	7a	7b	8a	8b	9a	9b	10a	10b	11a	11b	Total	Signature
Marks	2	3	2	3	3	2	3	2	3	2	25	
Marks Scored												
Final Score												

IMPORTANT: Turn over to read instructions

READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. *First write your **name, roll number, section, name of your school, gender** and **Dzongkhag/Thromde** in the space given on first page.*

2. *There are two sections. Section **A** (30 marks) and **B** (50 marks).*

3. *Read the **questions** carefully and answer **all** questions.*

4. ***Do not** write in the first 15 minutes. This time is to be spent in **reading the** questions.*

5. *Write your answers to each question in the **given space**. The mark for each question is given in the **brackets.***

6. *You have two **hours** to finish the test. Make good use of the given time.*

7. *Use of Calculator and Mobile is not allowed.*

8. *All the rough work should be carried out in the page given at the end of this booklet.*

SECTION A (30 MARKS)

ANSWER **ALL** QUESTIONS

Question 1 **[30]**

Direction: For e*ach question, there are **FOUR** responses: **A, B, C and D**. Choose the corresponding alphabet of your response and **CIRCLE** it neatly. **NO** score will be awarded if you circle more than one.*

i. Bhutan's population is estimated at 771,608 people in 2020 according to UN data.

Which of the following scientific notation represents the above figure?

A 7.71608×10^{-5}

B 7.71608×10^{-6}

(C) 7.71608×10^{5}

D 7.71608×10^{6}

ii. The area of Gaylek's chessboard top is $64cm^2$. His friend Nado wanted to make a chessboard of the same size. What would be the side length of Nado's chessboard?

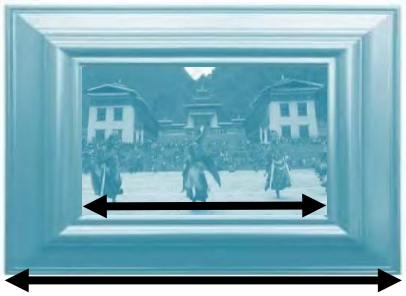
A 4 cm

(B) 8 cm

C 16 cm

D 32 cm

iii. The ratio of the length of the photo to the length of the photo frame shown in the figure below is 2:3.



If the length of the photo frame is 36 cm, what will be the length of the photo?

A 12 cm

B 18 cm

(C) 24 cm

D 72 cm

iv. Which multiplication expression best describes the model given below?

A $3 \times (-8)$

B $8 \times (-3)$

C $3 \times (-24)$

D $24 \times (-3)$

v. Ramesh recorded the temperatures of five different places on a particular day. He ordered the temperature from least to greatest.

Places	Temperature in degree Celsius (°C)
I	- 0.07
II	+1.18
III	-0.03
IV	-0.50
V	+0.06

Which one of these shows the correct order?

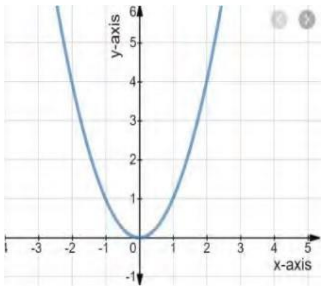
A IV, I, III, V and II

B I, III, IV, V and II

C II, V, IV, III and I

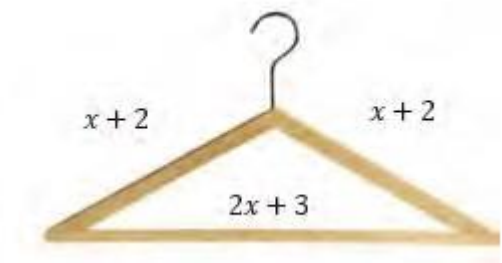
D II, V, III, I and IV

vi. Pema, Karma, Sonam and Dhendup represent a pattern in different ways. Whose pattern describes a linear relationship.

<table>
<tr><th>Pema</th><th>Karma</th><th>Sonam</th><th>Dhendup</th></tr>
<tr>
<td>27,30,34,39…</td>
<td> 
</td>
<td>
<table>
<tr><th>X</th><th>Y</th></tr>
<tr><td>1</td><td>21</td></tr>
<tr><td>2</td><td>24</td></tr>
<tr><td>3</td><td>27</td></tr>
<tr><td>4</td><td>30</td></tr>
</table>
</td>
<td>$y=3x^2+2$</td>
</tr>
</table>

A Pema
B Karma
C Sonam
D Dhendup

vii. Sonam is making a wooden hanger for his new wardrobe. Each dimension measures are shown in the figure given below. How much wood will he need to design the hanger?

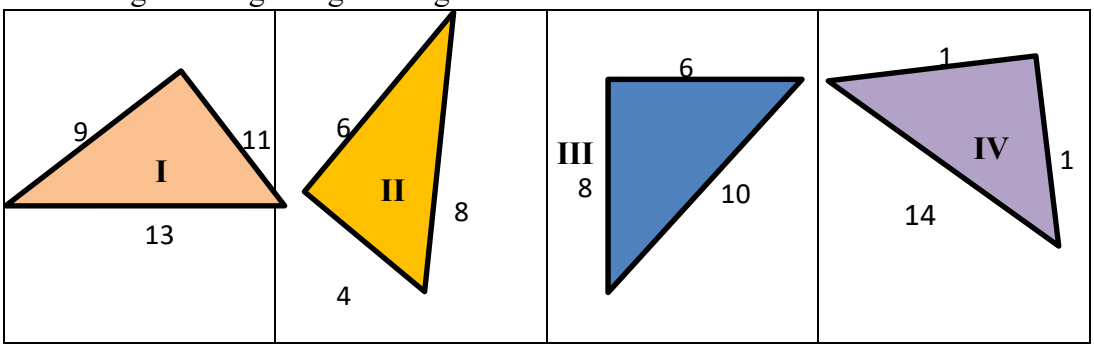


A $2x+4$
B $2x+3$
C $3x+5$
D $4x+7$

viii. What is the missing coordinate of the line passing through **(2, 5)** and **(5, y)** if the slope of the graph is $\frac{2}{3}$?

A -7
B -3
C +3
D +7

ix. The following are the triangles drawn by different groups in a class. Which triangle is a right angle triangle.



A I
B II
C III
D IV

x. A rectangle has an area of $18cm^2$. Which dimensions below will result in same perimeter as its area?

A 1cm ×18cm
B 2cm × 9cm
C 3cm × 6cm
D 9cm × 2cm

xi. A chef is preparing a fruit dessert out of 2cm cubed watermelon. If a watermelon has a volume of 120 cm^3, how many cubes can be made from it?

A 8
B 15
C 60
D 240

xii. If the largest container is the dilated image of the smallest container, what could be the possible scale factor?

A $\frac{1}{2}$

B $1\frac{1}{4}$

C $1\frac{1}{2}$

D $2\frac{1}{2}$

Explanation on back page

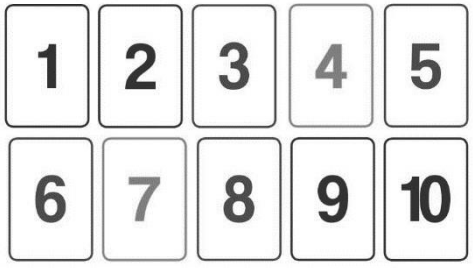
xiii. Ten cards numbered 1 to 10 are placed in a box, mixed up thoroughly and then one card is drawn randomly. What is the probability that it is an even number, if it is known that the number on the drawn card is more than 3?

A $\frac{4}{5}$

B $\frac{4}{7}$

C $\frac{5}{10}$

D $\frac{7}{10}$



.

xiv. The table below shows the number of students in different levels of schools in Haa Dzongkhag.

Schools	**Number of students**
Primary School	832
Lower Secondary School	728
Middle Secondary School	946
Higher Secondary School	854

What percent of students are from Primary and Lower Secondary Schools?

A 46.3%

B 53.6%

C 63.6%

D 76.3%

xv. The following processes are used during data collection and data organization.

I. Identify a problem/situation
II. Collect Data
III. Generate Samples
IV. Formulate data collection tools

Which one of the following is arranged in correct order for data collection and organization?

A II, III, IV and I

B III, II, I and IV

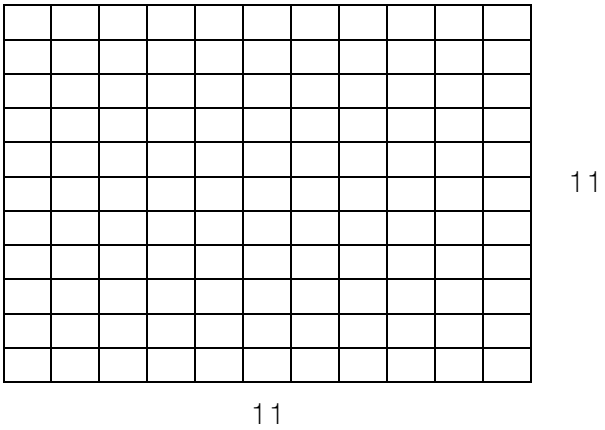
C I, IV, III and II

D I, II, III and IV

SECTION B (50 MARKS)
ANSWER ALL QUESTIONS

Question 2

a. i. Draw a diagram to show that the square root of 121 is 11. **[1]**



ii. Pema says when she doubles the side length of a square, the area of the square will also be doubled. Do you agree? Explain your thinking. **[2]**

Ans:-

No, I don't' agree with her. Doubling the sides length of a square makes quadruples the area, not doubles it.

b. The diameter of a red blood cell is 0.00074 cm. Write the diameter in the expanded form and in the exponential form. **[2]**

Ans:-

Expanded form: $7\times0.0001 + 4\times0.00001$

Exponential form: $7\times10^{-4} + 4\times10^{-5}$

Question 3

a. Jyenkhana Primary School is planning to go for a school picnic. Sonam was asked to collect a data to see how many students were vegetarian and non-vegetarian. The table below shows the information collected by Sonam. **[2]**

Item	Male	Female
Vegetarian	100	130
Non-vegetarian	85	185

What percent of the students are vegetarian?

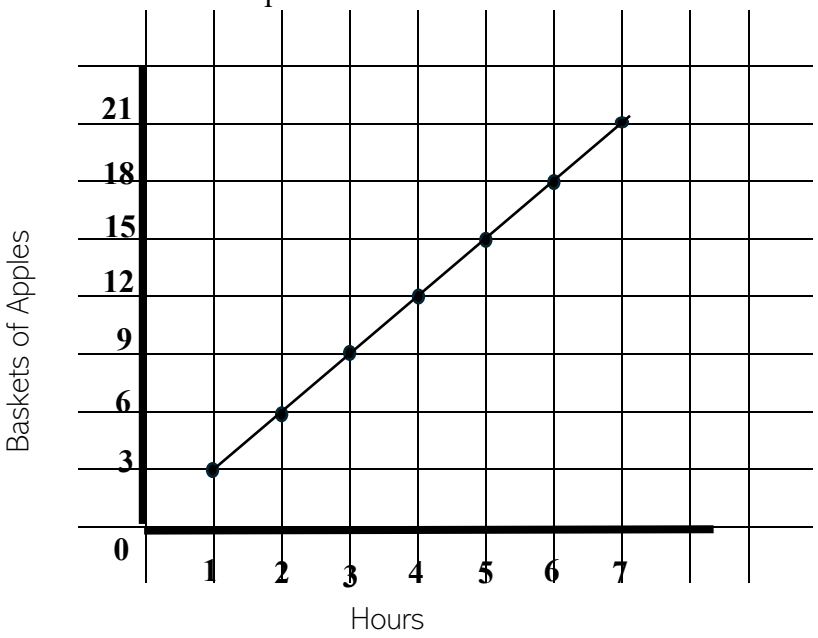
Total Student = 500
Total Vegetarian = 230

Ans:-

$\frac{230}{500} \times 100 = 46\%$

The percent of the student's vegetarian are 46%

b. Dema is working in an apple orchard in Paro. During the harvesting season he collected apples in equal sized baskets. He could finish collecting **three** baskets of apples in **one** hour. Draw a graph to show how many baskets of apples he can collect in **seven** hours at the same pace. **[3]**



Question 4

a. Penjor wants to buy a laptop online for his college going daughter. He found that a laptop that was usually sold for Nu 35,000 is on sale for Nu 28,000. What is the percent discount offered on the sale? **[2]**

Ans:-

$$dp = \frac{35000 - 28000}{35000}$$

$$dp = \frac{7000}{35000} \times 100$$

dp = 0.2×100 = 20

=Discount percent is 20%

~~Nu.35,000~~ Nu.28,000

Discount percent = $\frac{Original\ Price - Sale\ Price}{Original\ Price} \times 100$

b. Ngawang and Dorji works in a Sales. **[3]**

- Ngawang earns a salary of Nu 12,000 a month and a commission of 5% on a sale.
- Dorji earns a salary of Nu 12,500 a month and a commission of 3% on a sale. In January, both sold Nu 32,000 worth of goods. Who earned more money in that month? Show your work.

Ngawang:-	Dorji:-
Salary = 12,000	Salary = 12,500
Commission=5% of 32,000	Commission = 3% of 32,000
$\frac{5}{100} \times 32{,}000$	$\frac{3}{100} \times 32{,}000$
5×320=1600	3×320=960
=salary + commission	=salary + commission
=12000+1600 = 13600	=12500 + 960 = 13460

= Ngawang earned more money in that month

Question 5

a. LeBron James is a basketball player from America. The ratio of the match played and baskets he scored is 2:54. If he had played 5 matches, find the number of baskets he would have scored. **[2]**

Ans:-

2 : 5 = 54 : 135

×27

b. The glass portion of the window shown below has a height to width ratio 3:2. **[3]**

The height of the glass portion is represented as **3 x** and the width of the glass portion is represented as **2 x**. The wood trim adds 4 cm total to the width and 5 cm total to the height.

Write a polynomial expression that represents the total perimeter of the window.

Ans:-

=3x + 2x = 5x

=4cm + 5cm = 9cm

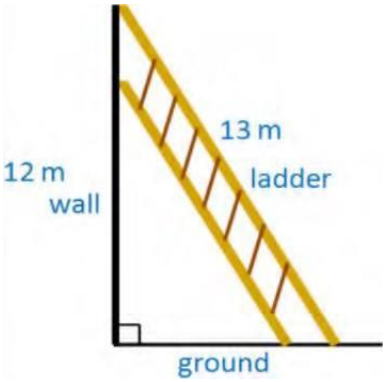
=5x + 9

Question 6

a. A ladder 13 m long is placed on the ground in such a way that it touches the top of a vertical wall 12 m high. Find the distance of the foot of the ladder from the bottom of the wall. **[2]**

Ans:-

$$a^2 + b^2 = c^2$$
$$12^2 + b^2 = 13^2$$
$$144 + b^2 = 169$$
$$144 - 144 + b^2 = 169 - 144$$
$$b^2 = 25$$
$$b = \sqrt{25} = 5 \text{ m}$$



b. Kinley wants to paint the front portion of a house as shown below. How many liters of paint does she need to buy, if 1litre of paint can paint $1m^2$. **[3]**

Ans:-

A= 6×4

= 24

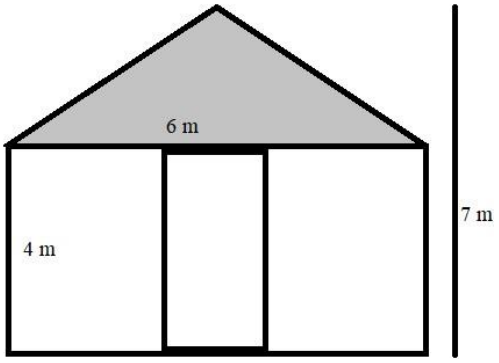
A= b×h÷2

= 6×3

= 18÷2

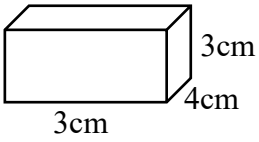
= 9

24 + 9 = 33L



Question 7

a. Draw **two** different rectangular prisms that has a volume of $36cm^3$. Label its sides. **[2]**

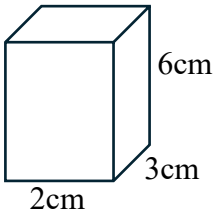


Ans:-

V = L×W×H

= 3×4×3

= $36cm^2$



Ans:-

V = L×W×H

= 2×3×6

= $36cm^2$

b. Rinzin wants to fill the aquarium given below with water. **[3]**

Find the volume and the mass of the water that is required.

V = L×W×H

= 40×20×30

=24000cm³

M= *V* ×density of water

=24000×1=24000g

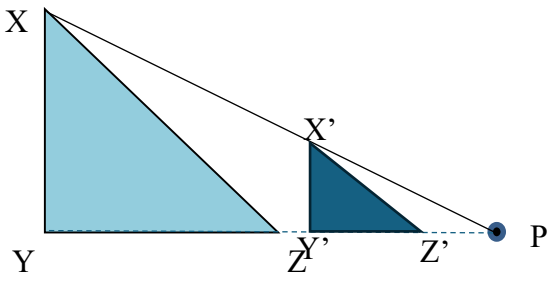
So, 24kg

The density of water is 1 g/cm³. This means 1 cm³ of water has a mass of 1 gram.

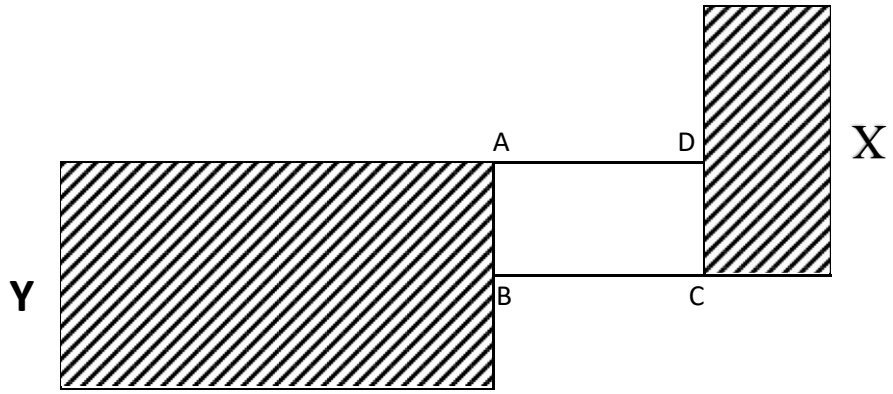
Question 8

a. Reduce ΔXYZ by a scale factor of $\frac{1}{2}$ using dilatation center at P. **[2]**

Ans:-



b. The figure below shows a combination of transformation. **[3]**



i) Which shaded rectangle above could be an image of rectangle ABCD?

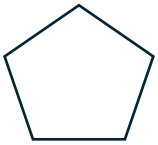
Ans:-
X should be an image of rectangle

ii) Describe the combination of transformations that would transform rectangle ABCD to the shaded rectangle you chose in **part i**.

Ans:-
= The combination of transformations that would transform rectangle A B C D to the should rectangle.
= I chose in part (i) is dilatation

Question 9

a. What are the interior and exterior angle of a regular pentagon? Show your work. **[3]**



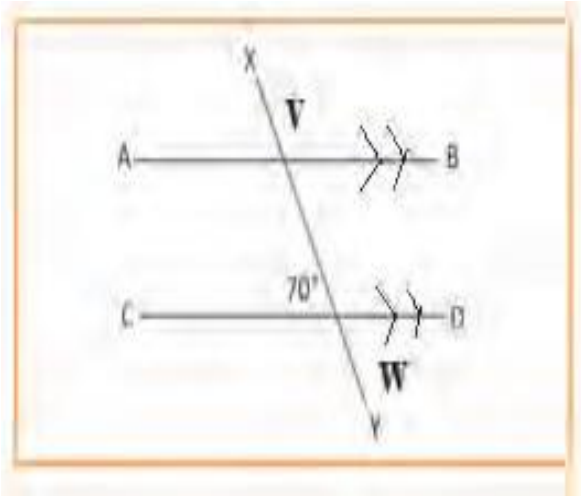
Ans:-

Interior Angle= $\frac{180°\times(n-2)}{n}$

$= \frac{180\times(5-2)}{5} = 108°$

Exterior Angle = 180°-108° = 72°

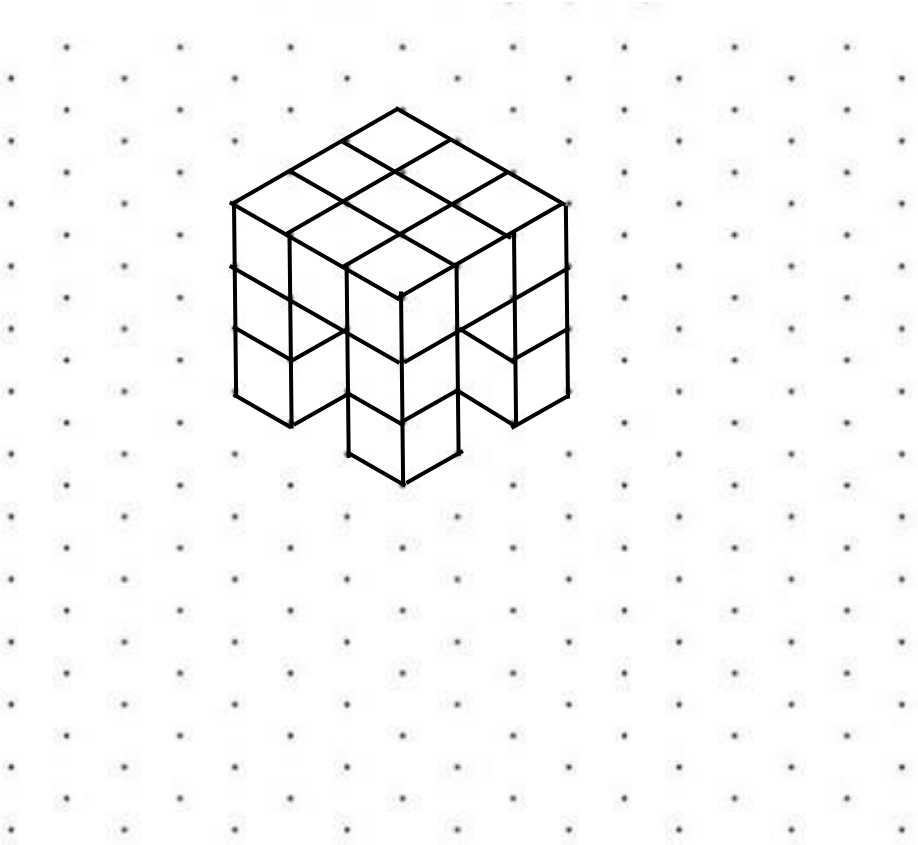
b. Find the measure of each angle without measuring. Explain to support your answer. **[2]**



i. ∠XVB = 110°
ii. ∠DWY = 70°

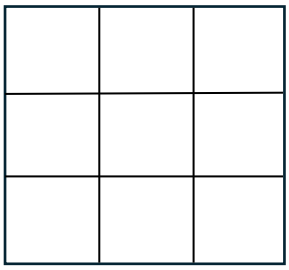
Question 10

a. Kuenga wanted to make a study table in his room. If you were asked to help Kuenga to design the model of the table using at least 15 cubes, how would you draw it on an isometric dot paper? Show the work. **[3]**

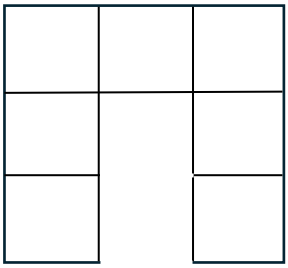


Ans:-

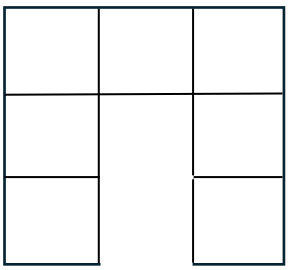
b. Draw all **four** face views of the structure in **part a.** **[2]**



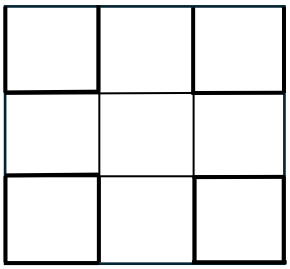
Top view



Right view



Left view



Bottom view

Question 11

A Gewog administration officer recorded the ages of 50 people in a village to see how many people from his Gewog are eligible for COVID-19 vaccination as shown below.

Ages of People (years)

17	57	12	35	18
13	10	69	8	42
11	20	14	58	13
62	13	11	62	19
15	35	14	27	22
36	16	36	55	28
32	46	7	8	9
10	12	11	24	19
29	28	52	46	14
31	17	25	32	13

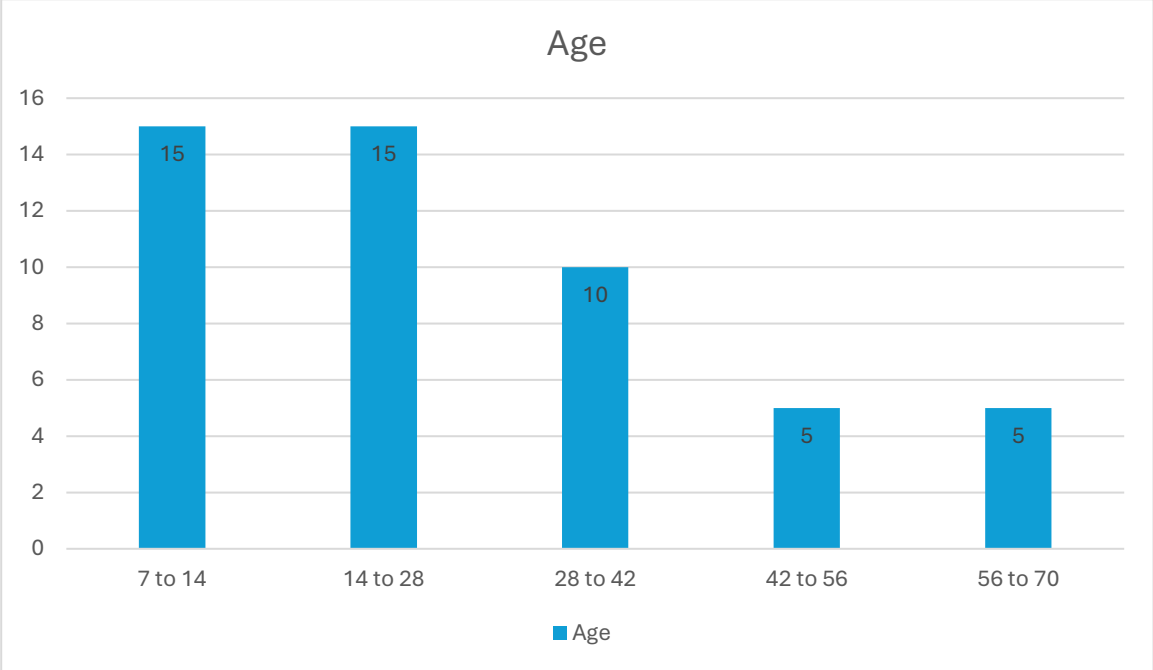
a. Create a **frequency table** and **histogram based** on the data.

[3]

Ages of people	Frequency
7 - 14	15
14 - 28	15
28 - 42	10
42 - 56	5
56 - 70	5

[2]

b. What does the histogram tell you about the data? Write any **two**.



ROUGH WORK

Multiple choice Questions

Xii.

1. **Option B ($1\frac{1}{4}$) or ($\frac{5}{4}$):** This would imply the largest container is only slightly bigger than the smallest.

2. **Option C ($1\frac{1}{2}$) or ($\frac{3}{2}$):** This would imply a 50% increase in size.

3. **Option D ($2\frac{1}{2}$) or ($\frac{1}{2}$):** This would imply a much larger scale factor, which seems more likely based on the visual in the image.

   So D, as this scale factor best matches the size difference between the largest and the smallest containers in the image