

SECTION A [30 MARKS]
ANSWER ALL QUESTIONS

Question 1

[30]

Direction: 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. What is the equivalent value of the expression $2 \times 10^{-6} + 3 \times 10^{-3} + 2 \times 10^2$?
- A 200.003002
 - B 20.003002
 - C 2.020302
 - D 0.023002
- ii. The average distance between the Earth and Mars is about 1.52×10^8 km. It can also be expressed as
- A 15,200,000 km.
 - B 152,000,000 km.
 - C 1,520,000,000 km.
 - D 15,200,000,000 km.
- iii. A square field has an area of $4,900 \text{ m}^2$. What is its perimeter?
- A 49 m
 - B 70 m
 - C 280 m
 - D 298 m

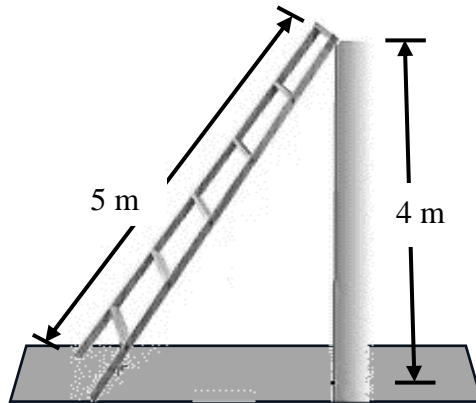
- iv. The average mileage and the distance travelled by different cars are given in the table.

Car	Mileage (km per litre of fuel)	Distance (km)
I	20	240
II	16	208
III	18	252
IV	22	275

Which statement below is true based on the information given?

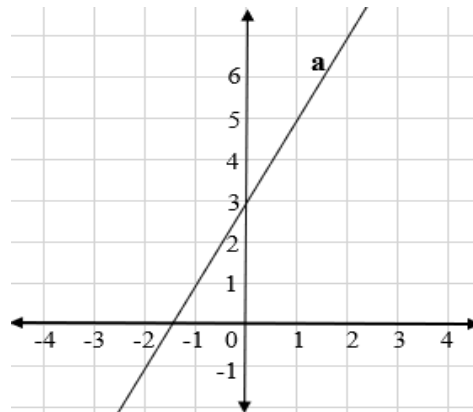
- A Car I consumed more fuel than car II.
- B Car II consumed minimum fuel.
- C Car III consumed maximum fuel.
- D Car IV consumed maximum fuel.
- v. A salesperson is paid a monthly salary of Nu 12,000 with 5% commission on sales up to Nu 30,000 and 3% on the sales exceeding Nu 30,000. The salesperson sets an earning target of Nu 19,500 for the next month. What must be the total sale amount to achieve this target?
- A Nu 9,600
- B Nu 37,500
- C Nu 200,000
- D Nu 230,000

vi. What is the slope of the ladder given in the figure?



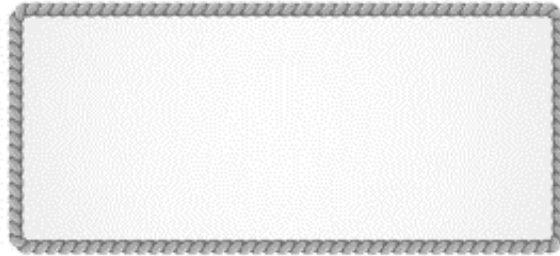
- A $\frac{4}{5}$
- B $\frac{4}{3}$
- C 4
- D 5

vii. Which of the following equations represents line 'a' in the graph?



- A $y = x + 3$
- B $y = 2x + 3$
- C $y = 2x + 1.5$
- D $y = 2x - 1.5$

- viii. A 30 m long rope is used to form a rectangle such that its side lengths are in whole numbers.



Which of the following is the best possible area covered by the rope?

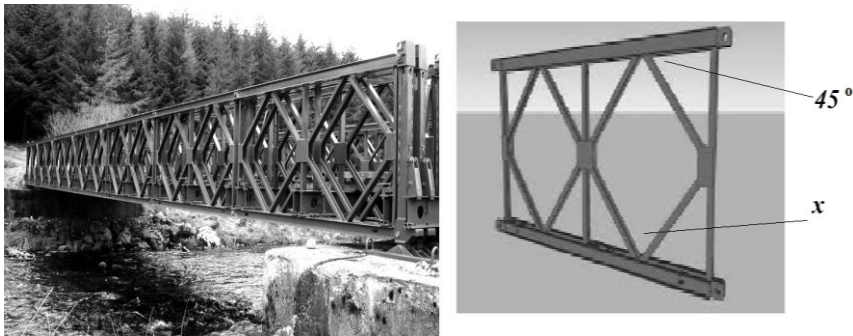
- A 15 m²
 - B 30 m²
 - C 44 m²
 - D 60 m²
- ix. The wheel cover of a car with an area of 154 cm² is damaged as shown in the figure.



What should be the diameter of the cover so it exactly fits into the wheel?

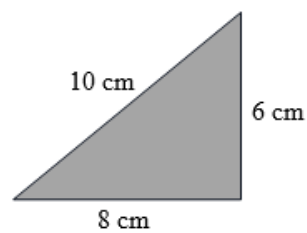
- A 5.5 cm
- B 7.5 cm
- C 12.0 cm
- D 14.0 cm

- x. Which of the following set is the side lengths of a right-angled triangle?
- A 1, 2, 3
 B 3, 5, 9
 C 6, 9, 12
 D 9, 12, 15
- xi. Similar triangles and quadrilaterals are used to build the truss of a baily bridge as shown in the figure.



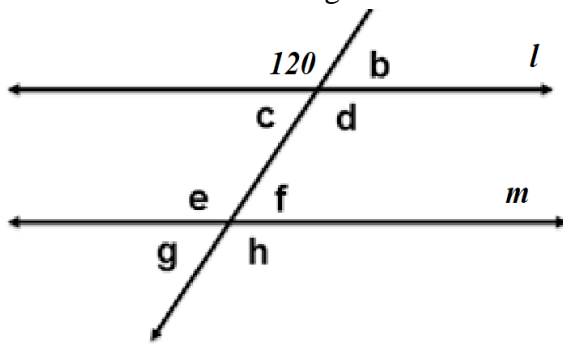
What could be the measure of angle x shown above on the truss?

- A 45°
 B 60°
 C 90°
 D 135°
- xii. The triangle given below is dilated with a scale factor of 1.5. Which set represents the lengths of the sides of the dilated triangle?



- A 6 cm, 8cm, 10cm
 B 9 cm, 12 cm, 15 cm
 C 4 cm, 5.33 cm, 6.67 cm
 D 7.5 cm, 9.5 cm, 11.5 cm

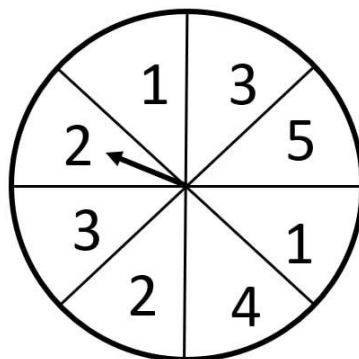
- xiii. Line ' l ' and ' m ' are parallel lines cut by a transversal and one of the angles formed is 120° as shown in the figure.



Which of the following option is true about the other angles?

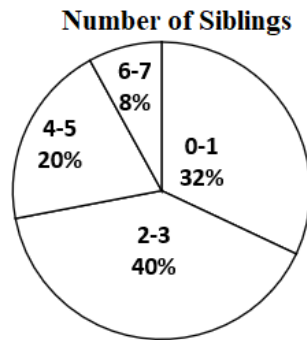
- A $\angle b = 120^\circ$
- B $\angle e = 60^\circ$
- C $\angle d + \angle f = 120^\circ$
- D $\angle b + \angle d = \angle d + \angle f$

- xiv. The complementary probability of spinning 2 in the spinner below is

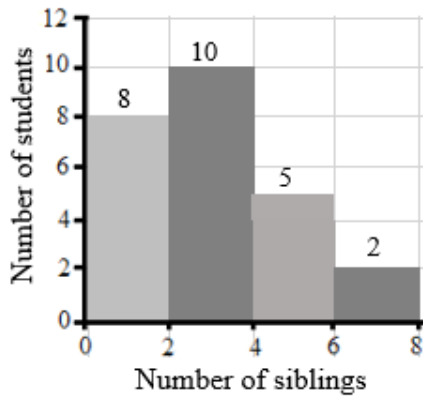


- A $\frac{2}{5}$
- B $\frac{2}{8}$
- C $\frac{4}{5}$
- D $\frac{6}{8}$

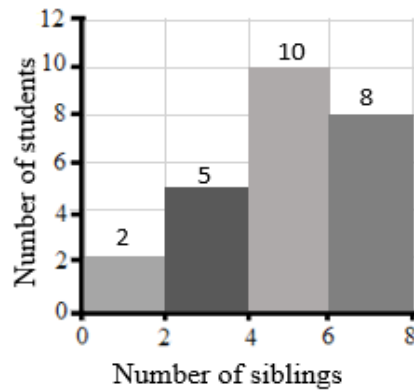
xv. The circle graph below represents a survey conducted in a class.



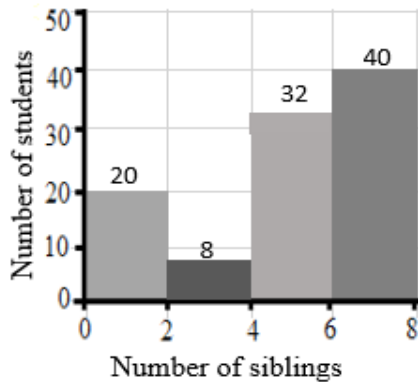
Which of the histograms represents the same data as shown in the circle graph?



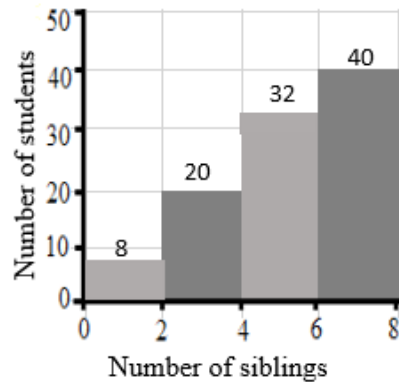
A



B



C



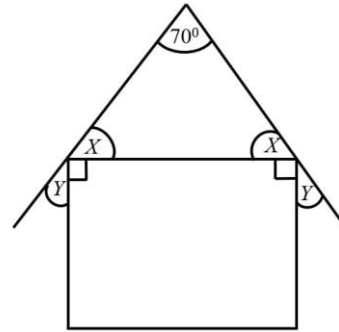
D

SECTION B [50 MARKS]
ANSWER ALL QUESTIONS

Question 2

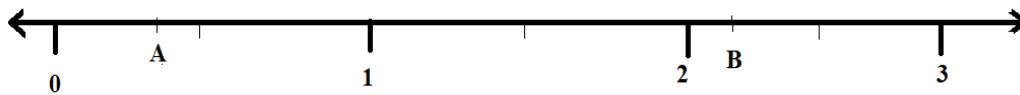
a) Calculate angle X and Y in the given diagram.

[2]



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b) Points A and B were placed in a number line.



The numbers were: $A = \frac{1}{2} \times \frac{3}{6} + \frac{2}{5} \div 4$ and $B = \left(\frac{2}{3} + \frac{1}{5} - \frac{1}{2} \right) + \frac{5}{6}$

i) Solve and find which point is **NOT** in the correct place?

[2]

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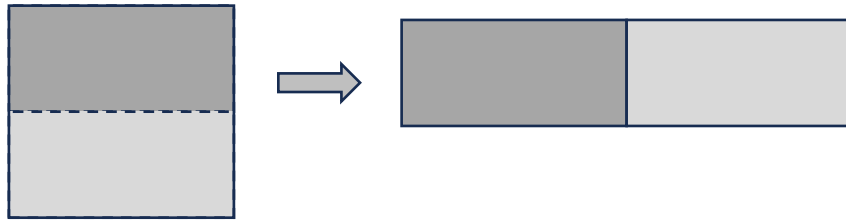
ii) Draw the number line placing both points in the correct place.

[1]

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Question 3

- a) A square sheet with side length of 10 cm is cut in the middle and joined along its side as shown in the figure.



- i) Calculate and find what has happened to its area.

[1]

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- ii) Calculate and find what has happened to its perimeter.

[1]

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- b) Electromagnetic waves are categorized into seven types based on their wavelength. Long exposure to wavelength less than 300 nanometres is usually harmful to humans.

(1 nanometre = 1.0×10^{-9} metre)

Electromagnetic(EM) Waves	Wavelength
Type I	3.0×10^0 to 3.0×10^3
Type II	1.0×10^{-2} to 1.0×10^1
Type III	7.5×10^{-7} to 1.0×10^{-2}
Type IV	4.0×10^{-7} to 7.0×10^{-7}
Type V	1.0×10^{-8} to 4.0×10^{-7}
Type VI	1.0×10^{-10} to 1.0×10^{-8}
Type VII	1.0×10^{-12} to 1.0×10^{-10}

- i) Which type of EM waves should we avoid? How do you know?

[2]

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- ii) EM waves with wavelength of about 500 nanometers are visible to our eyes. Which type is visible? How do you know?

[1]

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Question 4

- a) There are different properties of multiplication which can be applied to get products. What property is applied in each of the multiplications given below?

i) $24 \times -2 = (20 + 4) \times -2$
 $= (-2 \times 20) + (-2 \times 4)$

[1]

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ii) $-25 \times 8 = -50 \times 4$

[1]

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- b) Dorji's saving is Nu 65 and Dhan's saving is Nu 30. Every day from their earning, they save Nu 5 and Nu 10 respectively.

- i) On which day will they have saved the same amount?

[1.5]

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ii) Predict who will have more savings on the 9th day.

[1.5]

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Question 5

a) Two numbers are $(5 \times 10^{-3} + 2 \times 10^{-4} + 3 \times 10^{-2})$ and 0.0052.

[2]

Which number is greater and by how much?

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b) How is the volume affected if the length and width of a rectangular prism is doubled? Show your work with an example.

[3]

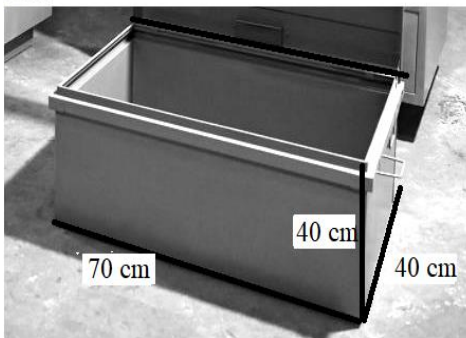
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Question 6

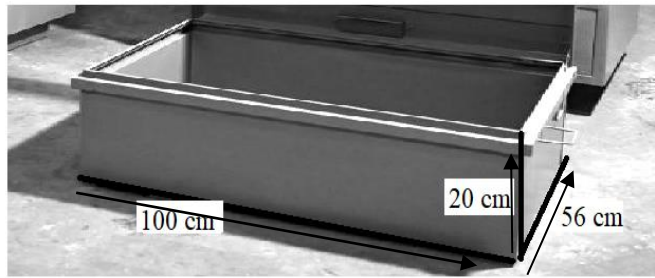
- a) A dealer marks his good 10% above cost price and offers 10% discount. Assume the cost price and calculate profit or loss percent. [2]

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- b) Khandu painted two containers as shown in the figures. Which one of the two containers required less paint? Show your work. [3]



Container A



Container B

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Question 7

- a) A rectangular garden is $(3x + 2)$ m long and $(2x + 5)$ m wide. Find the perimeter of the garden in terms of x . [2]

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- b) A deck of card contains four suits (Club, Diamond, Heart and Spade). In each suit there is one Ace, three face cards and nine number cards.

- i) What is the probability of selecting a face card? [1]

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- ii) What is the probability of **NOT** selecting a face card? [1]

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- iii) What is the complement event of selecting a club? [1]

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Question 8

- a) Subtract $(2x + 4)$ from $(-2x - 6)$. [2]

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b) Construct a triangle ABC with AB= 6 cm, $\angle A = 60^\circ$ and AC= 4 cm.

[3]

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Question 9

a) A boy is operating a set of numbers given below:

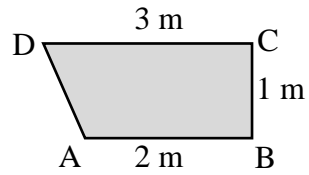
[2]

$$\left(2 + 3\frac{2}{5} + \sqrt{64} - 2\right) \div 5^2$$

He got $11\frac{2}{5}$ as solution. Carry out the operations to check his solution.

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b) A flower bed designed by a landscape architect is as shown in the figure.



i) Enlarge the bed applying the following combination of transformations. [2]

- Step 1: dilate it by a scale factor of 1.5 with dilatation center at A
- Step 2: rotate $\frac{1}{2}$ turn with turn center at C
- Step 3: reflect the flower bed across a longer base

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ii) Describe the changes in the dimensions or orientation of the final shape. [1]

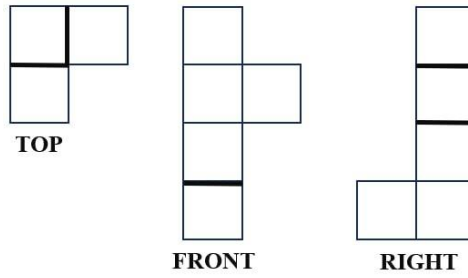
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Question 10

a) A pole is at the center of 18 m by 24 m rectangular play field. How far is the pole from its corner? [2]

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- b) The following are orthographic face views of a structure made from linking cubes. Use the face views and create an isometric drawing. [3]



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Question 11

- a) 200 students sat for a mathematics test, 60% of the participants correctly solved a challenging problem.
- i) Calculate the number of participants who solved the problem correctly. [1]

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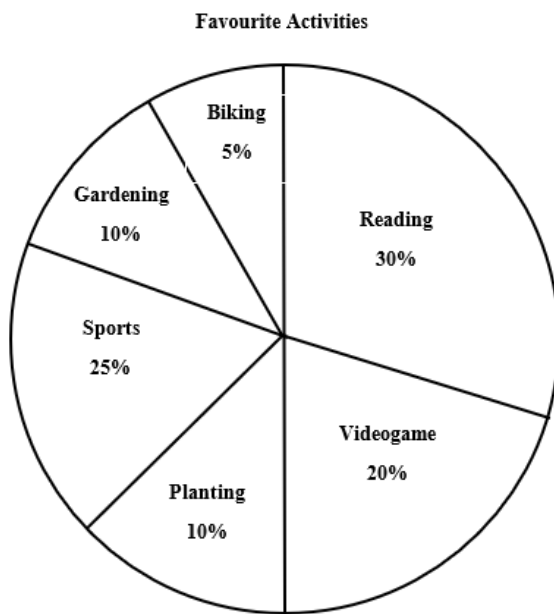
ii) 40 participants did not try the question. What percent of the total participants did this group represent?

[1]

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b) The data collected for 200 students is shown in the circle graph below.

[3]



Write **THREE** interpretations from the graph above.

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Measurement References and Relations

Perimeter and Circumference

Rectangle : $2(\text{length} + \text{width})$

Square : $4 \times \text{side length}$

Circle : πd or $2\pi r$

Area

Triangle : $\frac{1}{2} \times \text{base} \times \text{height}$

Rectangle : $\text{Length} \times \text{width}$

square : $\text{side length} \times \text{side length}$

parallelogram : $\text{base} \times \text{height}$

Trapezoid : $\frac{1}{2} \times (\text{sum of parallel side}) \times \text{height}$

Circle : πr^2

Rectangular Prism : $2 (\text{Length} \times \text{height} + \text{Height} \times \text{width} + \text{Length} \times \text{width})$

Volume

Rectangular prism : $\text{Area of base} \times \text{height}$ **OR** $V = l \times w \times h$

Pythagorean Theorem : $a^2 + b^2 = c^2$

Relation : $1\text{Km} = 100,000 \text{ cm}$

ROUGH WORK