SECTION A [30 MARKS]

ANSWER **ALL** QUESTIONS

Question 1 **[30]**

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. If you write $3 \times 10^2 + 4 \times 10^{-2} + 5 \times 10^{-3}$ in standard form, what will be the place value of 4?

A Tens
B Tenths
C Hundreds
D Hundredths

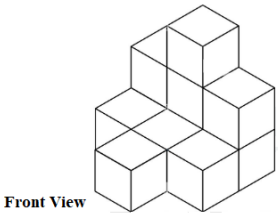
ii. If you were asked to choose a perfect square without calculating, which of the following numbers would you choose?

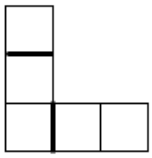
A 112
B 256
C 347
D 398

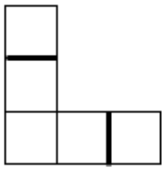
iii. Mr X knows the area of a circle and wants to find its radius. Which equation would help him to find the radius of the circle?

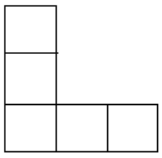
A $r = \pi\sqrt{A}$
B $r = \dfrac{\sqrt{A}}{\pi}$
C $r = \sqrt{\dfrac{A}{\pi}}$
D $r = \dfrac{A}{\pi}$

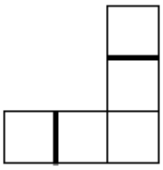
iv. Which of the following is the LEFT view of the image given?



A 

B 

C 

D 

v. Study the clues provided:

- The denominator is 4.
- The numerator is between 10 and 20.
- The fraction is greater than 3 but less than 5.

What is the rational number?

A $\frac{11}{4}$

B $\frac{12}{4}$

C $\frac{16}{4}$

D $\frac{20}{4}$

vi. Jigme bought a notebook for Nu 30 and 4 pens. Kinley bought a notebook for Nu 50 and 3 pens of same type. Both of them paid the same amount. How much did each pen cost?

A Nu 5
B Nu 15
C Nu 20
D Nu 80

vii. Which of the following expressions represents the model given?

A $(3x + 1) + (x - 3)$
B $(3x + 1) - (x - 3)$
C $(3x + 1) + (-x - 3)$
D $(3x + 1) - (-x - 3)$

viii. The circle graph shows the countries who have won the FIFA world cup out of 22 world cups played till date.

How many times did Argentina win the FIFA world cup?

A 3
B 8
C 14
D 22

ix. The perimeter of a rectangle is 24 cm. Four students were asked to calculate the area of a rectangle with the same perimeter. The calculations were as shown:

Dorji: If P=24 cm, length = 13 cm and width = 11 cm, therefore area = 143 cm^2
Sonam: If P=24 cm, length = 9 cm and width = 3 cm, therefore area = 12 cm^2
Padam: If P=24 cm, length = 4 cm and width = 3 cm, therefore area = 12 cm^2
Wangmo: If P=24 cm, length = 7 cm and width = 5 cm, therefore area = 35 cm^2

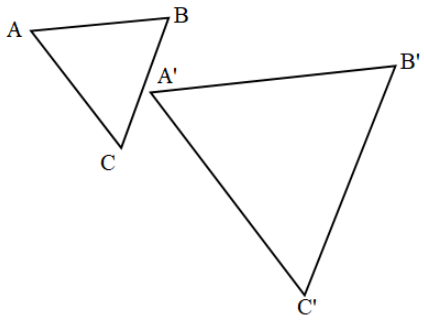
Whose calculation is correct?

A Dorji
B Sonam
C Padam
D Wangmo

x. The ratio of boys to girls in a class is as shown. If there are 30 students in the class, how many students will be boys?

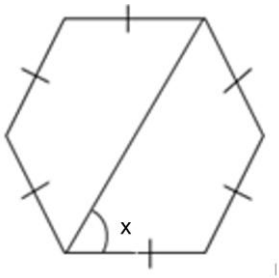
A 12
B 18
C 20
D 24

xi. Which of the following statements is **TRUE** about the transformation shown?



A Triangle $A'B'C'$ is a dilated image of triangle ABC
B Triangle $A'B'C'$ is a rotated image of triangle ABC
C Triangle $A'B'C'$ is a reflected image of triangle ABC
D Triangle $A'B'C'$ is a translated image of triangle ABC

xii. What is the value of $\boldsymbol{x}$ in the image?

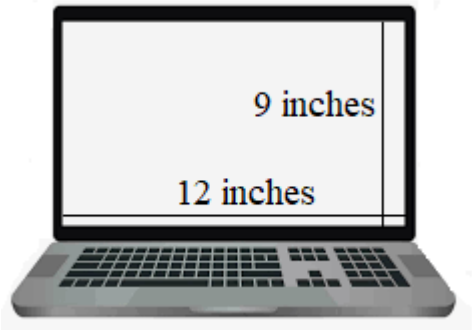


A 120^0
B 90^0
C 60^0
D 30^0

xiii. Sonam paid Nu 1,200 for a shirt that is usually sold at Nu 1,500. What is the discount percentage?

A 300%
B 80%
C 25%
D 20%

xiv. The screen size of a laptop is usually measured diagonally.



What is the size of the laptop shown?

A 18 inches
B 15 inches
C 12 inches
D 9 inches

xv. Dema flipped a fair coin for 40 times and recorded her result in the table.

Event	**Number of trials**
Head	16
Tail	24

What is the difference between the theoretical probability and experimental probability of getting head?

A $\frac{1}{2}$

B $\frac{2}{5}$

C $\frac{3}{5}$

D $\frac{1}{10}$

SECTION B [50 MARKS]

ANSWER **ALL QUESTIONS**

Question 2

a) The state of Colorado covers about 2.67×10^5 square kilometres. The Indian Ocean covers about 7.272×10^7 square kilometres. [3]

i. Which one covers the larger area?

ii. Calculate the differences in the area and write the answer in scientific notation.

b) A submarine is descending at a constant rate of 12 metres per minute. How many minutes did it descend based on the diagram? [2]

Question 3

a) Tashi estimates that the $\sqrt{639{,}000} \approx 60$. Is he correct? Justify your answer. [3]

b) 6% of the cost of a computer was paid as a tax. If the tax was Nu 1800, what was the cost of the computer? [2]

Question 4

a) Bank of Bhutan offers an education loan at the rate of 8.13% per annum. [3]

i. How much interest will you have to pay if you borrow Nu 50,000 for 3 years?

ii. How much amount will you have to pay?

b) The coordinates of a line on the graph are (5, 16), (3, 10), (1, 4). What type of slope does this line have? Explain without calculating the slope. [2]

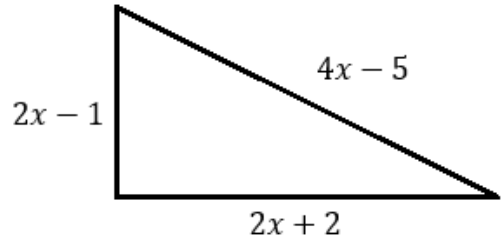
Question 5

a) Dorji walks 3.5 kilometres and Sonam walks 4.5 kilometres every day. What will be the average distance covered by them in a week? [1.5]

b) A school allows students to read a book after class in the library. Gopal reads a book for $1\frac{1}{2}$ hours every day. He completes the entire book in 6 days. How many hours does he take to complete the entire book? [1.5]

[2]

c) Find the perimeter of the triangle given.



Question 6

a) Draw any pattern up to figure number 4 and write an equation to describe the pattern. [3]

b) Construct a triangle ABC with AB = 5 cm, angle B = 45^0, and BC = 6 cm. [2]

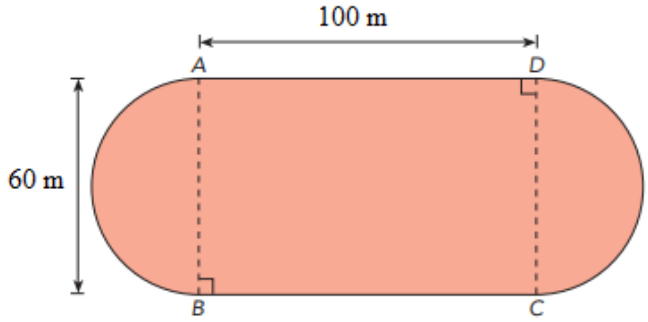
Question 7

a) The bird house is made out of plywood. The nesting box has a volume of 16,000 cm^3. [2]

Calculate the width of a nesting box.

[3]

b) The outer layer of the athletic field is marked as shown.

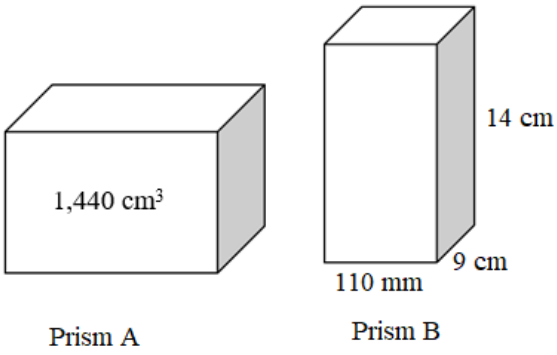


A gardener cuts the grass at an average rate of 20 square meters per minute. How many hours will the gardener take to finish the entire athletic field?

Question 8

a) A ladder measuring 10 metres long is placed against a vertical wall, reaching the top. [3]
The ratio of the height of the wall to the length of the ladder is 3:5.
How far is the base of the ladder placed away from the wall?

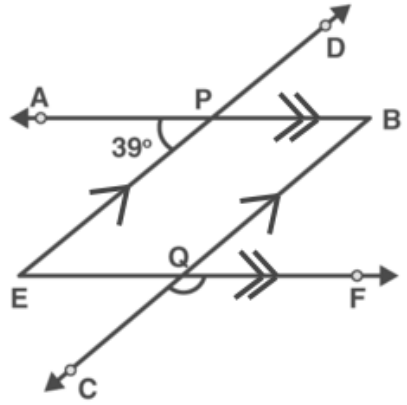
b) Study the rectangular prisms given. [2]



Which rectangular prism has a greater volume? Show your work.

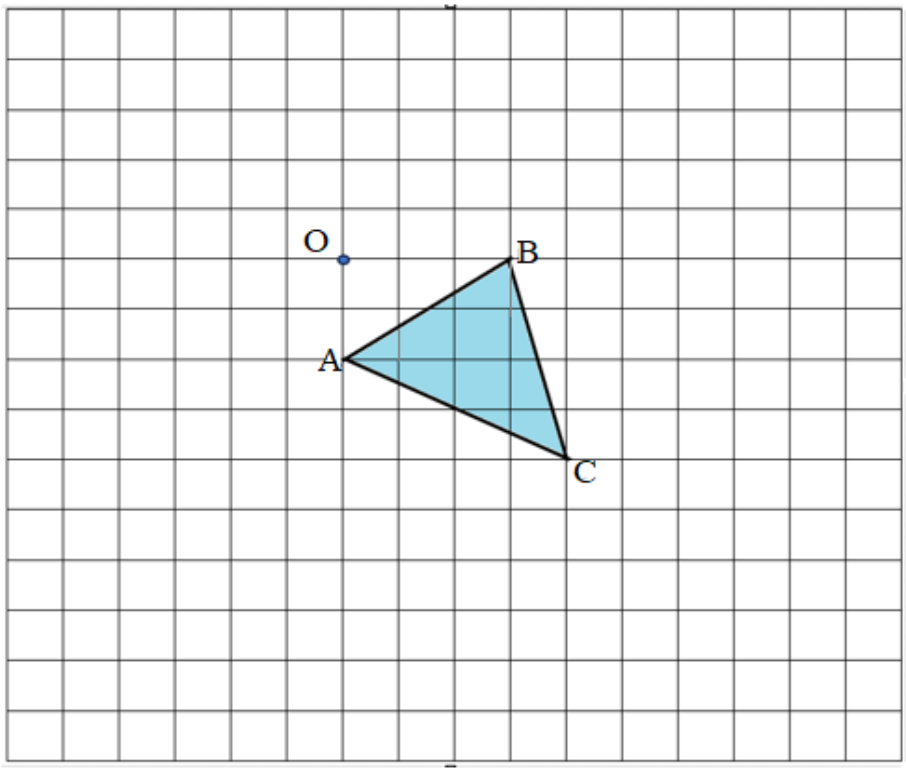
Question 9

a) Study the diagram and fill in the table. [3]



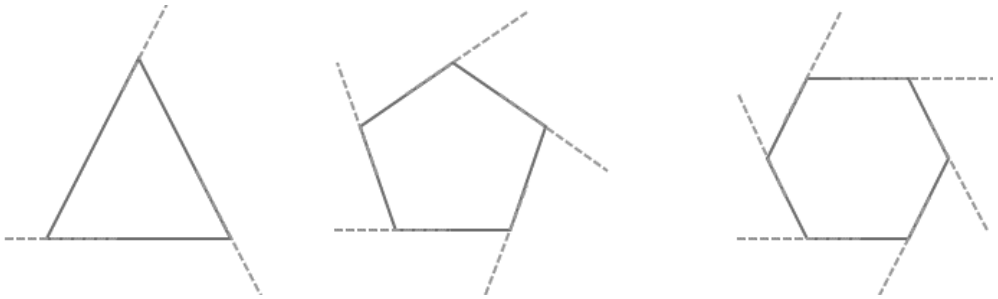
Angle	Degree measure	Reason
$\angle APD$		
$\angle DEF$		
$\angle BQF$		

b) Dilatate triangle ABC by a scale factor of 2 with dilatation centre O. [2]



Question 10

a) What is common in the exterior angles of all these polygons? [2]



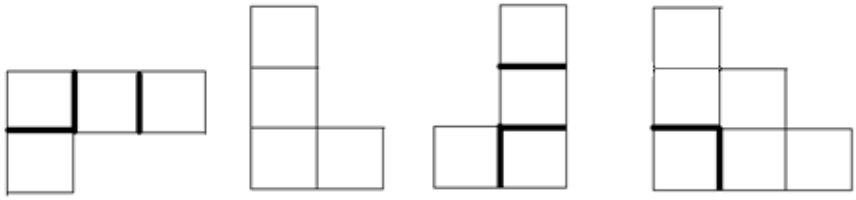
b) Sonam has a jar containing 3 red marbles, 1 black marble and 2 green marbles. [3]

i. What is the probability of drawing a red marble?

ii. Sonam took one marble and then replaced it. Then she took another marble. What is the complement of getting red and black marbles?

Question 11

a) Draw a structure that matches this set of orthographic drawings: [2]



Top view Left view Right View Front view

b) You have collected the height of 100 students in your school. Which graph would you choose to display the information? [3]
Provide any two reasons to support your answer.

Formulas and relationships

Simple Interest

$$I = PRT \; or \; I = \frac{PRT}{100}$$

Slope

$$slope = \frac{rise}{run} or \frac{change\ in\ y}{change\ in\ x} = \frac{y_2 - y_2}{x_2 - x_1}$$

Perimeters and circumference

$$Perimeter\ of\ a\ triangle\ = a + b + c$$

$$Perimeter\ of\ a\ rectangle\ = 2(l + w)$$

$$Perimeter\ of\ a\ square\ = 4s$$

$$Circumference\ of\ a\ circle\ = 2\pi r$$

Area

$$Area\ of\ a\ triangle\ = (b \times h) \div 2$$

$$Area\ of\ a\ rectangle\ = l + w$$

$$Area\ of\ a\ square\ = s \times s$$

$$Area\ of\ a\ circle\ = \pi r^2$$

$$rea\ of\ a\ trapezoid\ = \frac{(a + b)h}{2}$$

$$Total\ Surface\ area\ of\ a\ rectangular\ prism = 2(l \times w) + (l \times h) + (w \times h)$$

$$Sum\ of\ the\ interior\ angles\ of\ a\ polygon\ = 180^0(n - 2)$$

$$Each\ interior\ angles\ of\ a\ regular\ polygon\ = \frac{180^0(n - 2)}{n}$$

Volume

$Volume\ of\ a\ rectangular\ prism = l \times w \times h$

Pythagorean theorem

$c^2 = a^2 + b^2$

Theoretical Probability

$$P(E) = \frac{number\ of\ favourable\ outcomes}{number\ of\ possible\ outcomes}$$

Complementary Event

$P(NOT - E) = 1 - P(E)$

ROUGH WORK