



Royal College – Colombo 07

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32 E I

Grade 10- Second Term Test – October 2023

දෙවන වාර පරීක්ෂණය – 2023 ඔක්තෝම්බර් – 10 ශ්‍රේණිය

Mathematics-I

ගණිතය - I

Time : 2 hours

කාලය : පැය 2

Name / Index No:.....

Certified Correct

.....  
Signature of Invigilator**Important:**

- ❖ This paper consists of 8 pages.
- ❖ Write your **Index Number** correctly in the appropriate places on this page and on page three.
- ❖ Answer all questions on this paper itself.
- ❖ Use the space provided under each question for working and writing the answer.
- ❖ It is necessary to indicate the relevant steps and the correct units in answering the questions.
- ❖ Marks will be awarded as follows.  
Two marks each for questions 1 - 25 in part A.  
Ten marks each for questions in part B.
- ❖ A blank paper can be obtained for rough work from the supervisor on your request.

**For Marking Examiner's use only**

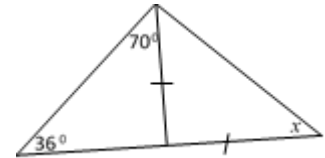
Part	Question Number	Marks
A	1 - 25	
B	1	
	2	
	3	
	4	
	5	
Total		
Signature of Invigilator		

**PART A***Answer **all** questions on the **paper** itself*

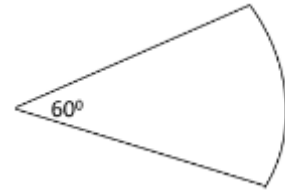
- 1) It has been estimated that 10 men need six days to complete a certain task. How many days will it take 12 men to complete the same task.

2) Solve :  $2(x + 1) = 8$

- 3) Find the value of  $x$  according to the information given in the figure.

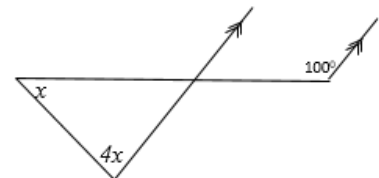


- 4) Radius of the given sector is 21 cm. Find its area.



5) Simplify:  $\frac{1}{x+1} - \frac{1}{1-x}$

- 6) Find the value of  $x$  based on the information given in the figure.



- 7) Find the first approximation of  $\sqrt{18}$ .

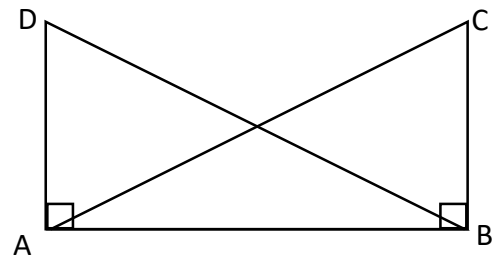
- 8) Find the range and the median of the given data.

15   8   16   12   25   9   30

- 9) Represent in index from:  $\log_5 625 = 4$

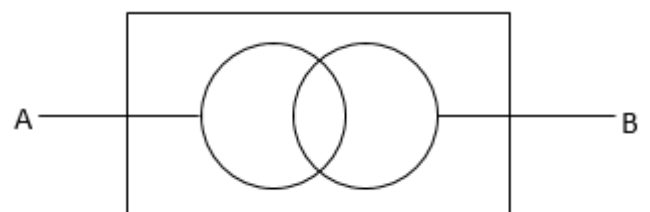
- 10) Find the probability of getting a triangular number, when rolling an unbiased die with its faces marked from 1 to 6.

- 11) In the given figure  $AC=DB$ . State whether the triangles  $ABC$  and  $ABD$  are congruent. If they are congruent write the case of congruency.



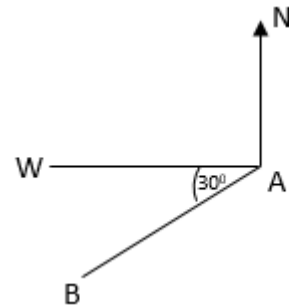
- 12) Find the capacity of a square based cuboid in milliliter if the base side length is 5 cm and the height is 12 cm.

- 13) In the given Venn diagram, shade the region  $A' \cap B'$

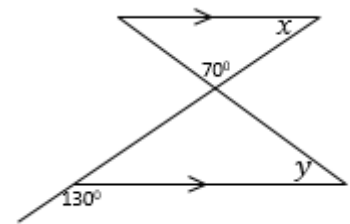


14) If the general term of a number pattern is  $3n - 2$ , find its 12<sup>th</sup> term.

15) In the given figure, find the bearing of A from B.

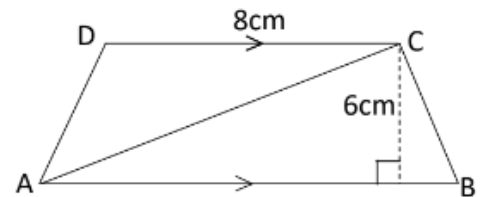


16) Find the values of  $x$  and  $y$  based on the information given the figure.

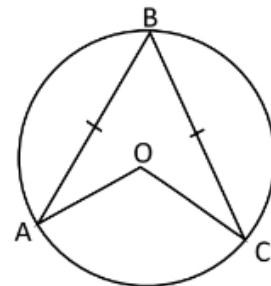


17) Simplify:  $\frac{x^2-4}{x^2+5x+6}$

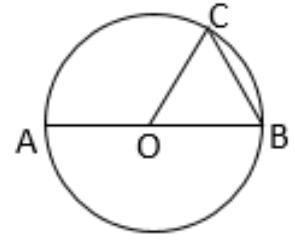
18) Find the length of the side AB, if the area of the given figure ABCD is  $54 \text{ cm}^2$



19) The centre of the given circle is  $O$ . If  $AB = BC$  and  $\hat{BAO} = 30^\circ$ , find the value of  $\hat{AOC}$ .



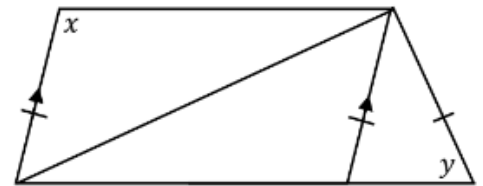
- 20) O is the centre of the given circle. If  $\widehat{AOC} = 120^\circ$  and  $AB = 10$  cm, find the length of  $BC$ .



- 21) If  $\frac{x}{y} = \frac{5}{4}$ . Find the value of  $\frac{x-y}{y}$ .

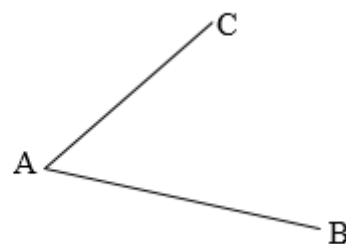
- 22) Write the gradient and the intercept of the equation of the straight line  $2y = 4x + 6$ .

- 23) According to the information given in the figure, find the value of  $x + y$



- 24) Solve:  $2x^2 - 18 = 0$

- 25) Using your knowledge of loci draw a sketch to find the point on the given figure which is at an equal distance from the line  $AB$  and the line  $AC$  and  $4$  cm away from the point  $A$ .



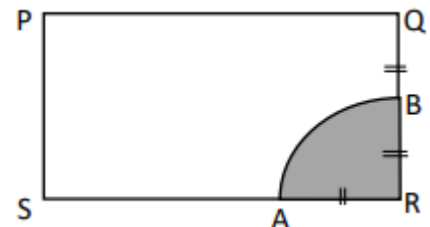
**PART B***Answer all questions on the paper itself*

- 1) A cinnamon exporting company, last year exported from the products of cinnamon,  $\frac{2}{7}$  to Europe and  $\frac{1}{3}$  to North America.
- What fraction of the total stock of cinnamon was exported to Europe and North America?
  - If  $\frac{1}{4}$  of the remaining stock was released to the domestic market, what fraction of the total cinnamon stock was released to the domestic market?
  - If the remaining quantity of cinnamon was stored after exporting and releasing it to the local market, what fraction of the total stock was stored?
  - If the mass of cinnamon exported North America is 42 t more than the mass of cinnamon stored, find the total mass of the cinnamon produced in that year.

- 2) A pond with a shape of sector is shaded in the PQRS rectangular plot of land of length 40 m and breadth 28 m. Vegetables were grown in the remaining portion of the land.

i. Find the radius of the pond.

ii. Find the AB arc length.



iii. It has been decided to plant security poles at 2 m intervals along the edge of the arc AB. How many poles are required for this?

iv. Find the area of the land vegetables were grown.

v. If flower plants are planted in a rectangular plot which is equal in area to the area of the portion allocated for the pond, with PS as length side, find breadth.

3)

**A certain urban council charges 13% of the annual assessed value of a business premises as rates.**

- Chamara is an owner of a business premises. Assessed annual value of the business premises is Rs. 120 000 within the urban council.
- i. He rents out his business premises for 20 000 rupees per month for three years. He takes one year's rent as an advance. Find the total amount of advance he receives.
- ii. If he uses 30% of the money received to repair the business place, find the amount spent on it.
- iii. Calculate the rates that have to be paid for a year.
- iv. After paying the annual rates and repairing the place of business, what is the amount left in his hand from the advance?

4) The following table represents the information on foreign languages studied by Grade 10 students.

- No of students studying German language is twice the no of students studying Korean language.
- The total number of students studying Chinese language and Japanese language is 10 less than the number of students studying German language.

Foreign language	No of students	Angle at the centre
German language	60	120°
Korean language	.....	.....
Japanese language	35	70°
French	40	80°
Chinese Language	.....	.....

- i. Fill blanks in the table.
- ii. Represent above information in a pie chart.

iii. If five students who has studied Japanese changed their language to French, what is the angle of the sector which represents the students who are studying French now.

5) (a) A bag contains 2 vanilla flavored milk packets, 5 chocolate flavored milk packets and 3 strawberry flavored milk packets, of the same size and shape. When take out a milk packet randomly.

- i. Find the probability of getting a chocolate flavored milk packet.
- ii. Find the probability of getting vanilla flavored or strawberry flavored milk packet.

(b)  $\epsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$

$A = \{x : x \text{ is a prime number, } 1 < x < 10\}$

$B = \{\text{Even number less than } 10\}$

- i. List out the elements of set A.
- ii. Represent the above information in a Venn diagram.
- iii. List out the elements of set  $(A \cup B)'$
- iv. Find  $n(A' \cap B)$





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Grade 10- Second Term Test – October 2023

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Mathematics-II

ගණිතය - II

32 E II

Time: 3 hours  
කාලය : පැය 3**Instructions:**

- Answer 10 questions selecting **five** questions from **part A** and **five** questions from **part B**.
- Write the **relevant steps** and the **correct units** in answering the questions.
- Each question carries **10** marks.

**Part - A**Answer **five** questions **only**.

(1) Mr. Dilran who has taken a loan of Rs. 60 000 from a financial institution at an annual simple interest rate of 12%, promised to settle the loan in 3 years by paying the total amount.

- How much interest is charged per year on Rs. 100.
- Find the simple interest that has to be paid for a year on the loan amount.
- Find the total amount that he has to pay to settle the loan in 3 years.
- If a part of the loan amount received from the above financial institution is deposited in another financial institution that pays an annual simple interest rate of 18% and received an interest of Rs. 21 600 in 3 years. What is the amount deposited in the second financial Institution?

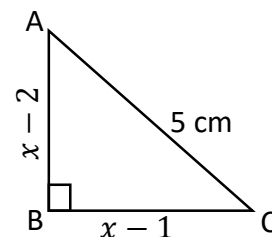
(2) An incomplete table of values which is used to draw the graph of the function  $y = 3 - 2x^2$  is given below.

$x$	-3	-2	-1	0	1	2	3
$y$	-15	-5	.....	3	1	-5	-15

- Find the values of  $y$  when  $x = -1$ .
- Using the scale of 10 small divisions as one unit along the  $x$  – axis and 10 small divisions as two units along the  $y$  – axis, draw the graph of the above function.
- Using the graph,
  - Find the maximum value of the function.
  - Write the equation of the axis of symmetry.
  - Write the range of  $x$  for which the function increases positively.
  - Find roots of the equation  $3 - 2x^2 = 0$ .

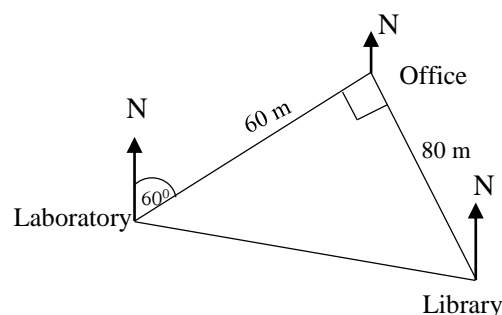
- (3) In the right-angled triangle  $ABC$ ,  $\hat{A}BC = 90^\circ$ ,  $AB = x - 2$  cm,  $BC = x - 1$  cm and  $AC = 5$  cm.

- In the triangle  $ABC$  write a relationship between the sides  $AB, BC$  and  $AC$  in terms of  $x$
- Show that  $x$  satisfies the equation  $x^2 - 3x - 10 = 0$
- Solve the above equation and find the length of the sides  $AB$  and  $BC$ .



- (4) The given rough sketch depicts the location of a school, laboratory, office and a library.

- Find the bearing of office from the Laboratory.
- Find the bearing of laboratory from the office.
- Draw a scale diagram using the scale 1: 1 000
- Hence find the actual distance from the laboratory to the library.



(5) (a) Solve:  $\frac{7}{2x-3} - \frac{2}{3} = \frac{5}{2x-3}$

- (b) The sum of twice the money that Prabath has and thrice the money that Nuwan has is Rs. 50. When three times of money that Nuwan has is subtracted from nine times of the money that Prabath has, the value equals to Rs. 27.

- Construct a pair of simultaneous equations by taking the amount of money that Prabath has as Rs.  $x$  and that of Nuwan has as Rs.  $y$ .
- Solve the pair of simultaneous equations and find the amount of money that Prabath and Nuwan has separately.

- (6) Below is the information about the number of days of absence of students in a class in a particular month.

4, 1, 2, 5, 2, 2, 5, 2, 3, 4, 3, 2, 5, 4, 5, 2, 2, 3, 4, 5, 2, 6, 2, 3, 1

- (i) Copy the given table in your answer sheet and using the above information, complete the following table.

Number of absent days ( $x$ )	Tally marks	Number of absentees ( $f$ )	$fx$
1			
2			
3			
4			
5			
6			
		$\Sigma f =$	$\Sigma fx =$

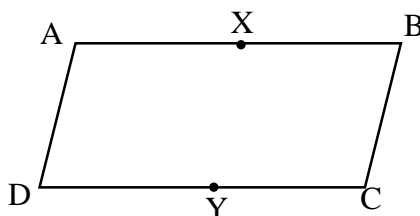
- What is the mode of the absent days?
- Find the mean number absent days to the nearest whole number.

## Part - B

Answer **five** questions **only**.

- (7) Consider the number pattern 8, 11, 14, 17, ...
- Find the general term
  - Find the 20<sup>th</sup> term of this number pattern using the general term
  - Which term of this number pattern is 59?
  - Show that 69 is not a term of this number pattern?
- (8) Use only a straight edge with a *cm/mm* scale and a pair of compasses for the following construction. Show the construction lines clearly.
- Construct a triangle  $ABC$  in which  $AB = 7\text{ cm}$ ,  $\hat{ABC} = 75^\circ$  and  $BC = 6\text{ cm}$ .
  - Construct the angle bisectors of  $\hat{ABC}$  and  $\hat{BAC}$ . Name their point of intersection as  $O$ .
  - Construct a perpendicular to  $AB$  from  $O$  to meet  $AB$  at  $X$
  - Construct a circle taking  $O$  as the centre and  $OX$  as radius
- (9) (a) Write the formal proof of the theorem “**The opposite sides of a parallelogram are equal in length.**”

- (b) In the given figure  $ABCD$  is a parallelogram  $X$  and  $Y$  are the mid points of  $AB$  and  $DC$



- Prove that  $BXDY$  is a Parallelogram
  - Prove that the area of triangles  $ADX$  and  $BCY$  are equal.
- (10) (a) The diagram given here shows a cuboidal shaped water tank of the length 8 m, width 5 m and the height 3 m. There is an amount of water in the tank to a height of 2 m.
- 
- Find the volume of the tank.
  - Find the capacity of the tank.
  - When 15 identical cubes of side length  $a\text{ m}$  are put in the above tank, its water level rises by  $x\text{ m}$ . Show that  $a^3 = \frac{8x}{3}$ .

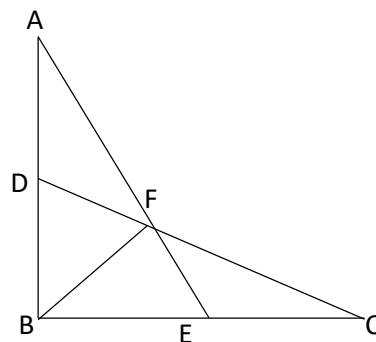
- (b) Find the value using logarithmic tables.  $\frac{4.23 \times 283.4}{2.86}$

- (11) (a) Explain the theorem “The exterior angle formed by producing a side of a triangle is equal to sum of the interior opposite angles” using a diagram.

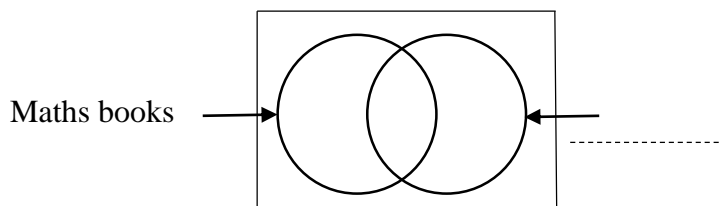
- (b) In the given figure the straight lines  $AE$  and  $DC$  intersect at  $F$ .  $\angle DAF = \angle ECF$  and  $\angle DBF = \angle EBF$ .

Prove that

- (i)  $\triangle BDF \equiv \triangle BEF$   
 (ii)  $AD = CE$



- (12) Nimal bought 1 000 books among which some are mathematics books and others are science book. 400 science books were printed properly and 200 mathematics books were not printed properly. The number of science books is 500.



- (i) Copy the given Venn diagram in your answer sheet and enter the above information.  
 (ii) Find the number of mathematics books which were printed properly.  
 (iii) Find the total number of mathematics books.  
 (iv) Shade the region in the Venn diagram which shows the mathematics books printed properly.

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