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Grade 10- First Term Test – July 2023
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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		

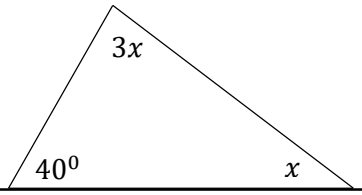
Part - A

*Answer **all questions** on this **paper itself***

1) 4 men can complete half of a certain work in 5 days. How many men are needed to complete this work in 4 days?

2) Factorize.: $25x^2 - 9$

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



4) Write the following group of numbers in ascending order.

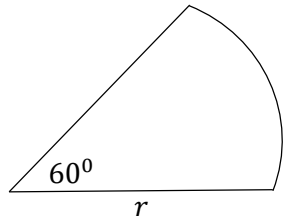
4.78×10^{-2} , 5.52×10^{3} , 6.66×10^{-3} , 7.22×10^{2}

5) Simplify: $\frac{5x}{4} + \frac{6x}{5}$

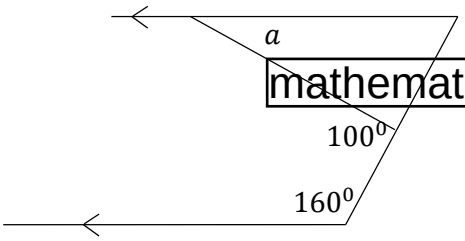
6) The magnitudes of the interior angles of a triangle are in the ratio 6 : 7 : 5. Determine the magnitudes of these angles and mention what type of triangle it is.

7) Find the value of $\sqrt{45}$ to the first approximation.

8) If the arc length of the sector given in the figure is 22 cm. Find its radius.



9) Find the value of *a* according to the information given in the figure.



10) Simplify:

$$\frac{5x}{3} + 17 = 32$$

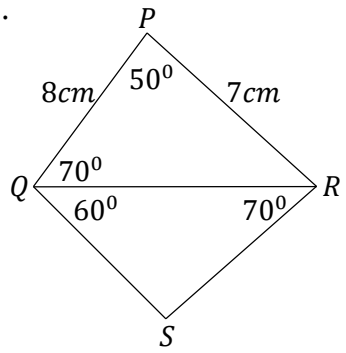
11) Make *x* the subject of the formula $\frac{x}{a} + \frac{y}{b} = 1$.

12) Complete using correct words.

The …….. angle formed when a …… of a triangle is produced is …… to the sum of the two ……. opposite angles.

13) An interior angle of a regular polygon is 120^o greater than an exterior angle. Find the number of sides of the polygon.

14) According to the information given in the figure, find the length of RS.

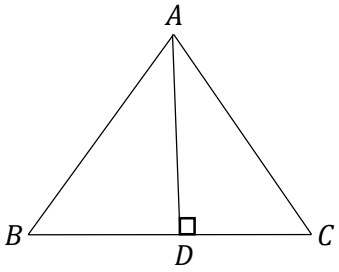


15) If a trader sells a pair of shoes bought for Rs. 2 500 at Rs. 3 250, find the profit percentage.

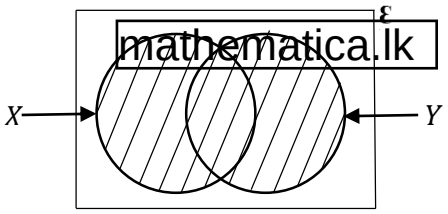
16) If the mean of the set of numbers 10, 15, 25, 15, 10, 20, x is 16. find the value of x.

17) Find the least common multiple of: 12 , 18 , 24

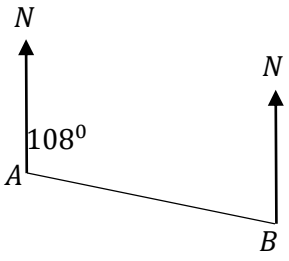
18) In the triangle *ABC*, *AB=AC*. The perpendicular drawn from A to BC is AD. Are the two triangles ABD and ADC congruent? If they are congruent, state the relevant case.



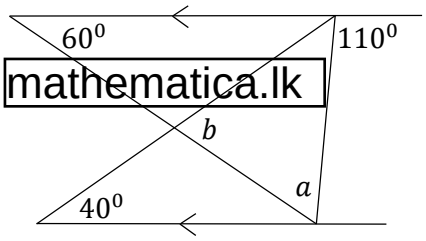
19) Write the shaded region in set notation.



20) Using the information given in the figure, write the bearing of A from B.

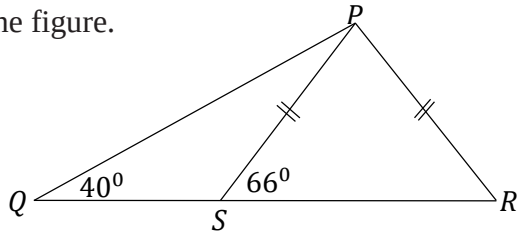


21) Find the value of *a* and *b* according to the information given in the figure



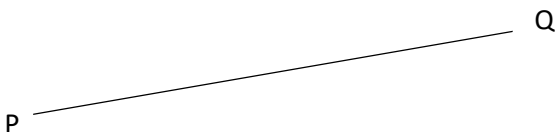
22) Solve the inequality $2x + 3 > 9$ and represent the solution on a number line.

23) Find the value of $Q\hat{P}R$ according to the information given in the figure.



24) Simplify: $(-1^5)^2$

25) Represent in a rough sketch, the construction that should be done to obtain the point R equi-distant from points P and Q and 6 cm from this line PQ.



Part - B

*Answer **all questions** on this question **paper itself***

1. When paint prepared for painting a house was poured into an empty container the container will full with $\frac{5}{7}$ of its capacity. First day $\frac{2}{5}$ of the paint is used and $\frac{1}{3}$ of the remaining paint is used on the second day. If another $4\frac{1}{2}l$ of paint will poured into the container so that it will half full again.

   i. What fraction of the total container is the amount of paint used on the first day?

   ii. What fraction of the total container is the amount of paint used on the second day?

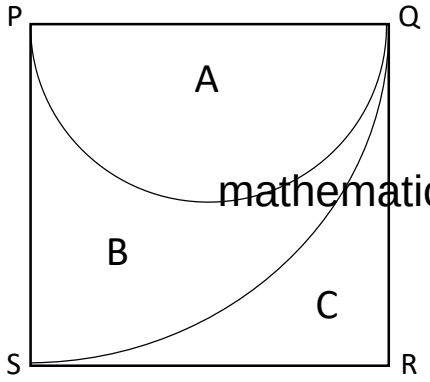
   iii. Find the capacity of the container and find the quantity of paint used on the first day in liters.

2. The figure shows a square-shaped PQRS interior garden with a side length of 21 m in a tourist hotel. As shown in the figure, section A is a semi-circular pond, section B is planted with grass and section C is planted with flowers. QS is a sector of a circle with central angle 90°.

   i. Find the area of the pond.

   ii. Find the perimeter of the area planted with grass.

   iii. Find the area planted with flowers .



   iv. If part A is rearranged into a circle of radius 7 m and the remaining part is decided to grow grass. Find the total area covered with grass now.

3. Kamal started a sweetmeat business by investing Rs. 75 000 on the 1st of January. Nimal joined the business by investing in Rs. 60 000 on the 1st of March of that year and Vimal joined the business by investing Rs. 90 000 on the 1st of April of the same year.
   i. Calculate the ratio in which Kamal, Nimal and Vimal invested money in the simplest form.

   ii. If the profit is divided between them according to the amount invested and the periods of investments, calculate the ratio in which the profit should be divided between them at the end of the year.

   iii. If the profit for the year was Rs.184 800, find separately the amount received by Kamal and Vimal.

   iv. Express Nimal profit as a percentage of his investment.

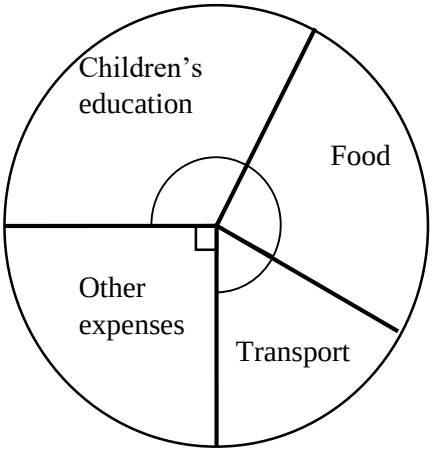
4. a) Write four common characteristics of a random experiment.

   b) Consider the random experiment of drawing a card from a bag containing identical cards numbered from 0 to 9 and recording the number on it.
      i. Write the sample space *S* of all the possible outcomes of this experiment.

      ii. Find the probability of drawing a card with a composite number marked on it.

      iii. Find the probability of drawing either a prime number or an odd number.

5. The following pie chart shows how Mr. Kumara spent his salary in a certain month.



i. Find his monthly salary if his spent Rs. 18 000 on other expenses.

ii. If he spent Rs. 22 000 for food, find the angle at the centre of the sector denotes food.

iii. Find the amount spent for transport, if the amount spent for children's education is three times the amount spent for transport.

iv. State the ratio between the amount spent on children's education and for expenses in the simplest form.

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Grade 10 – First Term Test – July 2023

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Mathematics - II

ගණිතය - 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.*

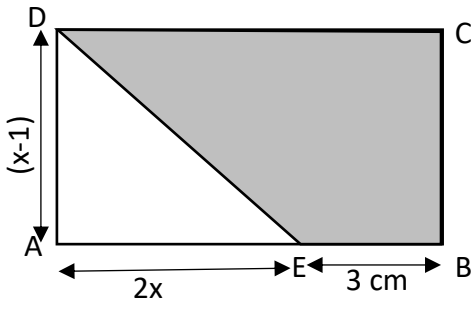
Part - A

Answer ***five*** questions only

1. (a) Sumith sells land he owns at Rs. 6 000 000 for which he paid a commission of 2% to the broker.
   i. Find the commission paid to the broker.
   ii. If Sumith offered a discount of 4% to the buyer when selling the land,
      a) Find the marked price of the land.
      b) Find the discount offered.

   (b) A dealer had to sell a sport item at a loss of 20% for Rs. 6 400 due to a manufacturing defect. Find the purchase price of it.

2. From the rectangular metal sheet ABCD of length $(2x + 3)$ cm and breath $(x - 1)$ cm, A right angled triangular part ADE is cut away as shown in the diagram.



   i. Write an algebraic expression for the area of the rectangle ABCD in terms of *x* and simplify.
   ii. Write the expression for the area of the triangle AED in terms of *x*.
   iii. Using the above two expressions, obtain an expression for the area of the shaded part.
   iv. Find the area of the trapezium BCDE, if x = 5 cm.

3. An incomplete table prepared to draw the graph of the function $y = 3x - 2$ is given bellow

x	-3	-2	-1	0	1	2
y	-11	-8	.....	-2	1	4

i. Find the value of y when $x = -1$
ii. Draw the Graph of the function $y = 3x - 2$ using a suitable scale.
iii. Mark the points A = (-1,3) and B = (2,0) on the same carticien plane and draw the straight line AB.
iv. Write the equation of the straight-line AB in the form of $y = mx + c$.
v. Write the co-ordinate of the intersection point of the above two lines.

4. (a) Factorize : $2x^2 - x - 1$

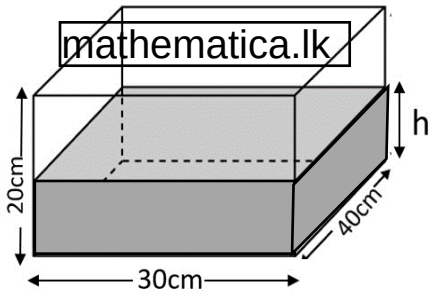
(b) Using the knowledge of factors find the value of

$96^2 - 2 \times 96 - 24$

(c) The cost of three books and two pencils is Rs. 155. The cost of three books is Rs. 80 greater than the cost of a pencil. Taking the price of a book as Rs. x and price of a pencil as Rs. y, construct two simultaneous equations. By solving them find the cost of a book and a cost of a pencil.

5. (a) The length, breadth and height of a cuboid shaped glass tank are 40 cm, 30 cm and 20 cm respectively. An amount of 18 *l* of water has been filled in it. .

i. Find the capacity of the glass tank in liters.
ii. Find the height of the water level **h** of the glass tank.
iii. When water in the above container is poured into a cuboid shaped container with a square base, the water level rises to a height of 45 cm. Find the length of a side of this square base.



(b) A water tank of capacity 2.5 m^3 is filled with water through two identical pipes. The speed of flow of water through a pipe is 12.5 liters per minute. Find the time taken to fill the tank completely with water when both the pipes are open.

6. The information on the number of electricity units consumed by 25 households in a town during a day is given below.

Number of electicity units	8	9	10	11	12	13	14
Number of households	1	4	5	6	3	4	2

i. What is the range of this data set?
ii. Find the mode and median of the data set.
iii. Find the mean number of electricity units to the nearest whole number used by a household in a day by preparing a suitable table.
iv. Accordingly, how many total units of electricity can be expected to be consumed by these 25 houses in the next month?

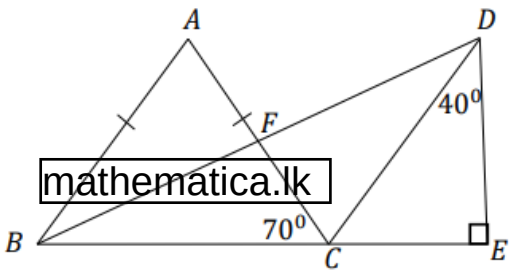
Part - B

Anawer ***five*** questions only

7. General term of a number pattern is $23 - 2n$,
   i. Write the first three terms of this number pattern.
   ii. Find the 12^{th} term.
   iii. Which term is -67.
   iv. Find the $(n + 2)^{th}$ term in terms of n.
   v. Show that 8 is not a term of this number pattern.

8. Use only the straight edge with a cm/mm scale and the pair of compasses for the following constructions. Show the construction lines clearly.
   i. Construct the triangle ABC such that AB = 8 cm, $C\hat{A}B = 90^0$ and AC = 6 cm.
   ii. Measure and write down the length of the side BC.
   iii. Write down a relationship between the sides AB, BC, and CA.
   iv. Construct the locus of a point moving equidistant to points A and B.
   v. Name the intersection point of the above locus in part(iv) and BC as D.
   vi. Draw a circle taking D as the center and DB as the radius.

9. (a) Write a theorem related to sides of a triangle and represent it in a figure.
   (b) In the triangle ABC, AB=AC and BC produced to E. If $A\hat{C}B = 70^0$, $D\hat{E}C = 90^0$ and $C\hat{D}E = 40^0$. Using the diagram,
   i. Find the value of $A\hat{B}C$.
   ii. Write the theorem used in part (i).
   iii. If $D\hat{B}C = 20^0$, find the value of $A\hat{F}B$.
   iv. Name two right-angle triangles in this diagram except the triangle DCE.
   v. Name an angle equal to $D\hat{C}E$.

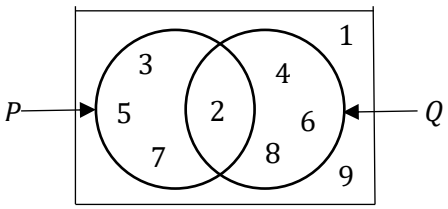


10. (a) A map is drawn to the scale 1:10 000. Find the actual distance represented by 1cm of the map in meter.

(b) The shrine room (S) is located at a distance of 60 m and on a bearing of 125^0 from the office (P) of a school. The laboratory (L) is located 30 m and on a bearing of 060^0 from the shrine room.

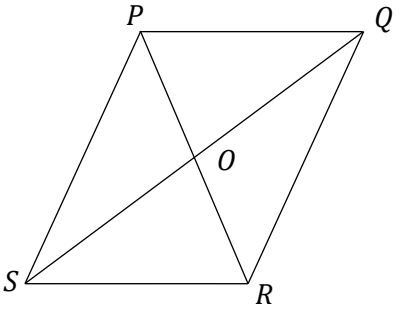
i. Draw a rough sketch based on the above information.
ii. Draw a scale diagram using a suitable scale based on the sketch.
iii. Find is the bearing of P from S.
iv. Find is the shortest distance from P to L

11. Answer the following questions using the Venn diagram given below,



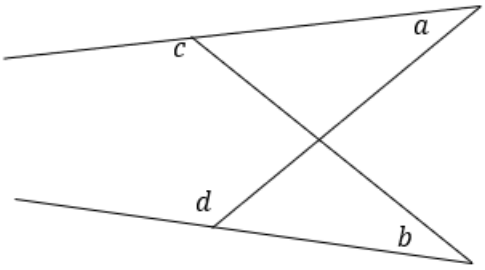
i. List out the elements of the sets P and Q.
ii. Write the set P as a description.
iii. How many subsets can be written for the set P.
iv. Write the set $P \cap Q'$ as a description.
v. Write the set $P \cup Q$ by listing the elements and find $n(P \cup Q)$.

12. (a) In the quadrilateral PQRS, PQ = RS and PQ//SR. The diagonals PR and QS intersect at O.



i. Copy the diagram on your answer script and mark the data.
ii. Show that $\Delta\ POQ \equiv \Delta\, SOR$.
iii. Hence prove that PO = OR and QO = OS.
iv. Write the case of $\Delta\, POS$ congruent $to\ \Delta\, QOR$.

(b) using the information given in the figure, write the value of d in terms of a, b and c.



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