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Visakha Vidyalaya, Colombo 05

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Second Term Test 2024

ගණිතය I **Mathematics I**	10 ශ්‍රේණිය Grade 10	*පැය දෙකයි* ***Two hours***

Name/Index number :……..

Certified Correct

……

Signature of Invigilator

Important :

* This question 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 question paper itself.**
* Use the space provided under each question for working and writing the answer.
* Indicate the **relevant steps** and the **correct units** when answering the questions.
* Marks are awarded as follows :
  In Part A
  2 marks for each question
  In Part B
  10 marks for each question
* Blank papers can be obtained for scratch work.

For Marking Examiners' Use Only		
Part	**Question Numbers**	**Marks**
A	1 - 25	
B	1	
	2	
	3	
	4	
	5	
Total		

..... First Examiner	..... Code Number
..... Second Examiner	..... Code Number
..... Arithmetic Checker	..... Code Number
..... Chief Examiner	..... Code Number

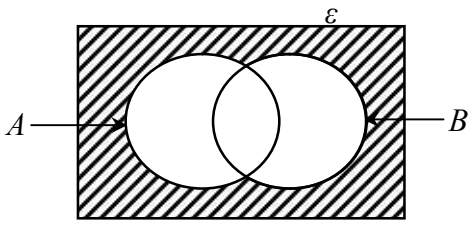
[See page two

Part A

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

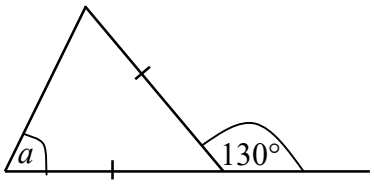
1. When an item worth Rs. 7 000 is imported, 7% of duty is charged. Find the duty.

2. Write the shaded region in set notation.



3. Simplify $\frac{2}{3x} - \frac{1}{2x}$

4. According to the given data, find the value of a.



5. If $10^{0.3010} = 2$, Find lg 20.

6. Find factor $2x^2 - 7x - 9$

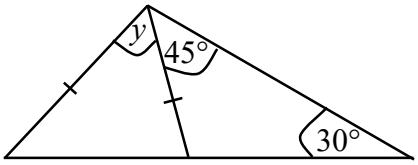
7. Underline the correct answers out of the following.

(i) $5 < \sqrt{30} < 6$ (ii) $6.5^2 > 49$ (iii) $2.5^2 > 6$

[See page three

8. Write all positive integers which satisfy the inequality $3x + 1 \leq 7$.

9. Using the given information find the value of y.



10. 7, 9, 5, 7, 6

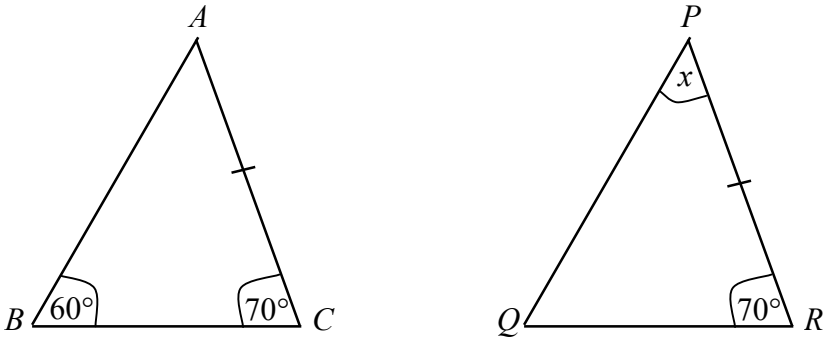
Find *a*) Mode

b) Mean of the given set of data.

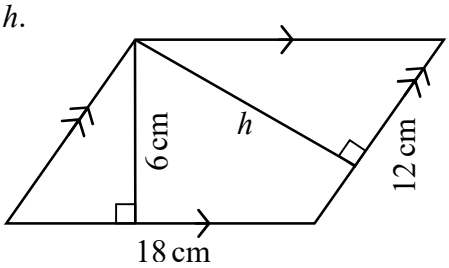
11. Find the least common multiple of

$8ab, 4a^2b^2$

12. If the triangle ABC and the triangle PQR are congruent under the case of AAS. Find the value of x.



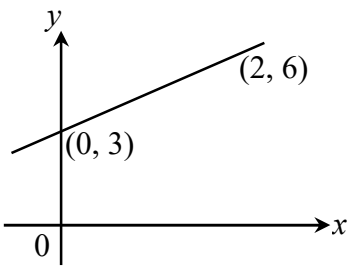
13. According to the information given in the figure find the value of h.



[See page four

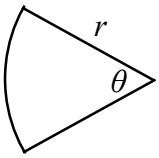
14. Solve $x(2x + 1) = 0$

15. Find the gradient and the intercept of the graph given.

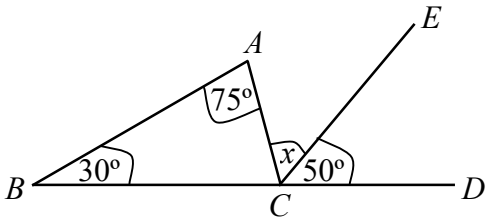


16. A card is picked at random from a pack of cards numbered from 1 - 10. Find the probability of getting a square number.

17. The perimeter of the given sector is 49 cm, and the arc length is 17 cm. Find the radius of the sector.



18. In the triangle ABC, BC produced to D. According to the given data find the value of $A\hat{C}E$.

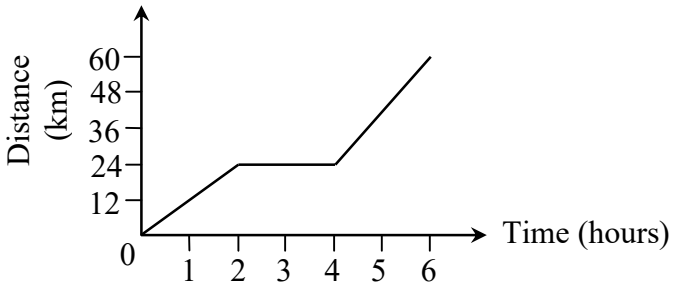


19. If the following statements are correct mark (√) and if it is wrong mark (×) in the boxes.

(1) In a parallelogram, all the angles are equal. ☐

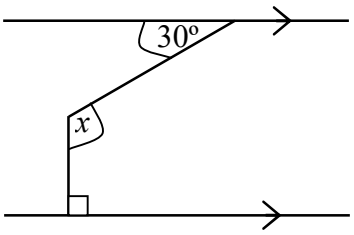
(2) In a rhombus, diagonals bisect each other perpendicularly. ☐

20. The distance time graph drawn to represent the motion of a bicycle is given in the figure calculate the average speed.



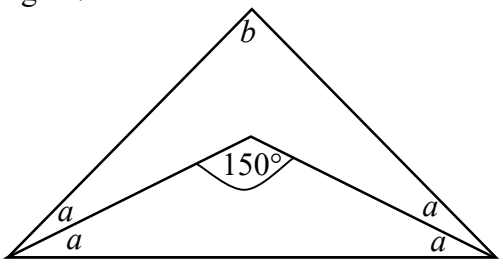
[See page five

21. According to the given data find the value of x.



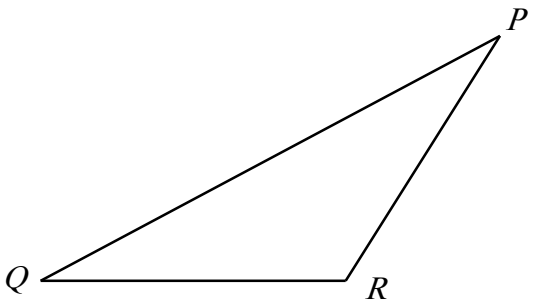
22. The length, breadth and height of a caboid shaped tank is 2 m, 1 m and 1.5 m respectively. Find the capacity of the tank in litres.

23. Find the value of a and b using the information given in the figure.



24. Solve $\frac{3}{a-b} - \frac{1}{b-a}$

25. In triangle PQR shown in the figure, draw a sketch of construction lines required to locate the point T on PQ which is equidistant to Q and R.



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Part B

* Answer **all** the questions on the paper itself.

1. $\frac{1}{4}$ of a full tank of oil was taken out by a factory for their needs. If it is noted that $\frac{1}{6}$ of the remaining oil is leaked out through a small hole, the remainder is pumped to another tank by a tube.

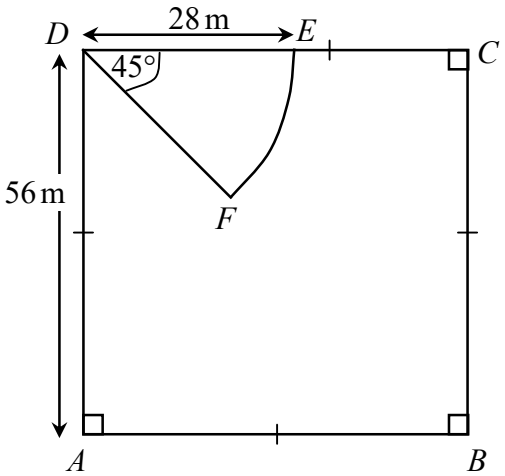
(i) After the oil is taken out by the factory, what fraction of oil is remaining out of the total.

(ii) What fraction of oil was leaked out of the total ?

(iii) What fraction of the total amount of oil pumped into another tank ?

(iv) If the total amount of oil in the tank initially was 48 000 *l*, what is the amount of oil in liters taken out by the tube ?

2. The figure shows a *ABCD* square shaped garden with the side length of 56 m. There is a pond with a shape of a sector with central angle 45° inside the garden. (Take $\pi = \frac{22}{7}$)



(i) Find the arc length of *EF*.

(ii) Find the area of the pond.

(iii) If Rs. 120 was charged for grazing an area of 1 m^2, find the total cost of grazing the rest of the area excluding the pond.

(iv) Another rectangular shaped playground with the same area as the above grassy area needs to be arranged, out of the garden taking *AB* as a border of it. Mark that playground in the above figure with the measurement.

[See page seven

3. It takes 10 days for 12 workers to harvest a field. They work 8 hours per day.

(i) Find the number of man hours it takes for one worker to complete the above task.

(ii) After the first five days, they worked for 10 hours per day in order to get over time payment. How many days can they complete the task before the number of days initially decided.

(iii) An employee's daily salary is Rs. 1 500 and another Rs. 200 per hour is paid as overtime allowance. Explain with reasons whether the owner of the land will make a profit or loss due to the overtime work of these employees.

4.(*a*) A certain provincial council assessed a building for Rs. 80 000 and charges Rs. 1 800 as quarterly rates for this building.

(i) Find the annual rates charged for this building.

(ii) Find the percentage of rates charged by that provincial council.

(iii) If the provincial council informs that the tax rate for the next year will be increased by 2%, find the new tax that should be paid for the building in next year.

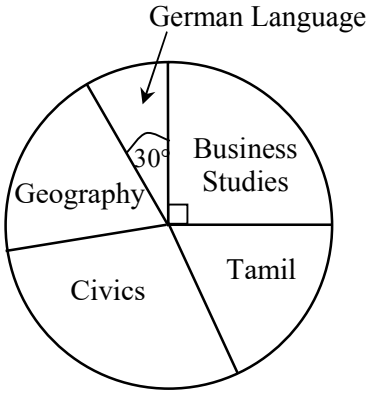
[See page eight

(*b*) The following table shows information on how the income tax is calculated in a certain year.

Annual Increase	Tax percentage
Initial 400 000	Tax free
Second 400 000	6%
Third 400 000	12%

If a person pays Rs. 42 000 as his income tax, find the annual income of that person.

5. The following pie chart represents the details of the subjects chosen by a class of grade 10 students for their first basket. Here the number of students who have selected Tamil and Grography are equal and the number of students who have selected civics is twice as the number of students who have selected Tamil.



(i) Find the central angle of the sector represented by the students who have selected Tamil.

(ii) If there are 4 students who have chosen Grerman Language, find the total number of students in the class.

(iii) Write the number of students who study Business studies, as a percentage of the number of students who study citizenship education.

(iv) Due to a transfer of the teacher, all the students who are studing German language had to choose civics education. Accordingly find the central angle of the sector represents Civic education in the newly drawn pie chart.

* * *

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Second Term Test 2024

ගණිතය II **Mathematics II**	10 ශ්‍රේණිය Grade 10	*පැය තුනයි* ***Three hours***

- **Answer ten questions by selecting five questions from each Part A and B .**

Part A

* Answer **five** questions only.

1.

Bank *A*
A simple interest of 5% per annum for each loan amount.

Bank *B*
An simple interest of Rs. 600 per annum for a loan amount of Rs. 10 000.

The details about the interest paid for loan transactions of banks *A* and *B* have published in the above notices.

(i) Calculate the total interest payble by Sandamali at the end of two years, if she borrows a loan of Rs. 180 000 from bank *A* to be repaid at the end of two years.

(ii) Calculate the annual interest rate offered by bank *B*.

(iii) According to the answer you get in (ii) above, explain with reasons which bank is more advantages when getting a loan.

(iv) If Sandamali takes another loan from bank *B* at the above annual interest rate, and the interest is Rs. 12 000 per annum, find the loan amount taken by her.

2. Given below is an incomplete table to draw the graph of $y = 2x^2 - b$.

x	–3	–2	–1	0	1	2	3
y	14	4	–2	–4	…..	4	14

(*a*) (i) Fill in the blank by considering the symmetry of the table.

(ii) Using the scale of 10 small divisions as one unit along x – axis and 10 small divisions as two units along y – axis draw the graph of the above function.

(*b*) Using the graph,

(i) Find the value of *b*.

(ii) Write the co-ordinates of the turning point.

(iii) Write down the interval of the values of x which the function increases by negatively.

(iv) Find the value of $\sqrt{2}$ to the nearest first decimal place using the graph.

[See page two

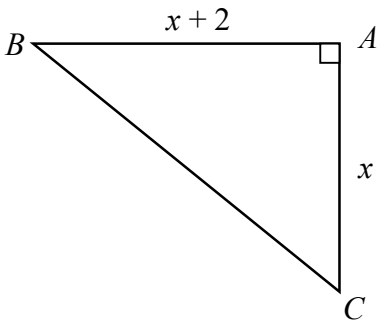
3. (*a*) Simplify. $\frac{1}{P+1} + \frac{P+1}{P^2-1}$

(*b*) At a cafeteria of a certain school, fish bun cost Rs. 100 each and milk packet cost Rs. 150 each. If 12 were sold from both the items for a total of Rs. 1 600,

(i) Taking no of fish bun as x and number of milk packets as y, construct a pair of simultaneous equation containing x and y.

(ii) Solve the pair of equations and find the number of fish bun and milk packets sold.

4. (i) Using the given information in the figure, build up an expression to find the length of BC in terms of x.



(ii) If $BC = 10$ cm, build up a quadratic equation in terms of x.

(iii) Solve the equation and find the value of x. Using the find the length of AB.

5. The number of minutes taken by 30 students to complete a math puzzle is recorded below. Copy the table into your answer sheet and fill it.

Time taken to complete the puzzle (x) (minutes)	No. of students (f)	fx
25	2	
26	3	
27	3	
28	6	
29	4	
30	3	
31	4	
32	2	
33	2	
34	1	
	Σf =	Σfx =

(i) Find the range of the time taken to complete the puzzle.

(ii) What is the mode of the time taken ?

(iii) Find the mean time taken to complete the puzzle to the nearest whole number.

(iv) What percentage of students took less than 30 minutes to complete the puzzle ?

6. (i) Find the value of x. (*a*) $\log_4 256 = x$

(*b*) $\log_3 x = 4$

(ii) Without using log table, find the value of given expression.

$\lg 125 + \lg 32 - \lg 4$

(iii) Simplify by using the logarithm tables.

$$\frac{54.8 \times 9.456}{21.5}$$

[See page three

Part B

* Answer **five** questions only.

7. A construction company plans to build a stepped pyramid shaped building. The bottom floor has 50 rooms and each subsequent floor has 4 rooms less than the floor below it.

(i) Write the number of rooms in the first 4 floors.

(ii) Find the general term of this number pattern.

(iii) Find the number of rooms in the 8^{th} floor.

(iv) Which floor has 10 rooms ?

(v) The contractor said, "There are no floors with 20 rooms". State whether this statement is true or false by giving reasons.

8. Using only the straight edge and the pair of compasses do the following constructions. Show the construction lines clearly

(i) Construct the triangle PQR, such that $PQ = 6\,\text{cm}$, $P\hat{Q}R = 120^{\circ}$ and $QR = 4\,\text{cm}$.

(ii) Construct a perpendicular to PR from Q.

(iii) Construct the perpendicular bisector of QR and name the point of intersection of the two loci as O.

(iv) Construct a circle taking O as the centre and OQ as the radius.

(v) Measure and write the diameter of the circle.

9. In a certain factory, a cuboid – shaped water tank with a length of 5 m a breadth of 4 m and a height of 3 m was installed to store water. A faucet that drains water at a rate of 50 liters per minute is fitted to the tank.

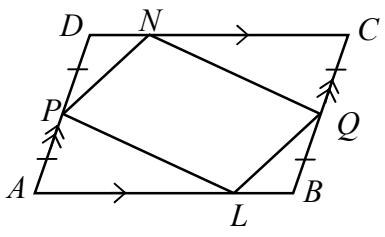
(i) Find the capacity of the tank in cubic meters.

(ii) Write that capacity in liters.

(iii) Find the time taken in hours to completely ampty the tank.

(iv) After two hours, in addition to the above faucet, another faucet was installed in the tank and water comes out from that faucet at rate of 70 l per minute. Find the total time taken in hours and minutes to completely empty the above tank.

10. $ABCD$ is a parallelogram. P and Q are the mid points of the lines AD and BC respectively. Points L and N are on the line AB and DC, such that $AL = 3LB$ and $CN = 3DN$.



(i) Show that $LB = DN$.

(ii) Prove that $\Delta PAL \equiv \Delta CQN$.

(iii) If PL // NQ Show that $PLQN$ is a parallelogram.

(iv) If the line segment joining P and Q is parallel to AB, show that area of $\Delta PAL = 3 \times$ area of ΔBLQ.

[See page four

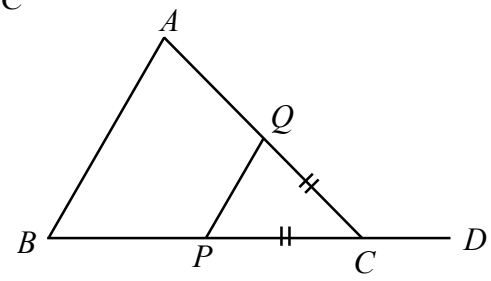
11. In Δ ABC, $AC = BC$, P and Q points are on AC and BC such that $PC = QC$. BC produced to D.
Using the given data,

(i) Show that $BP = AQ$.

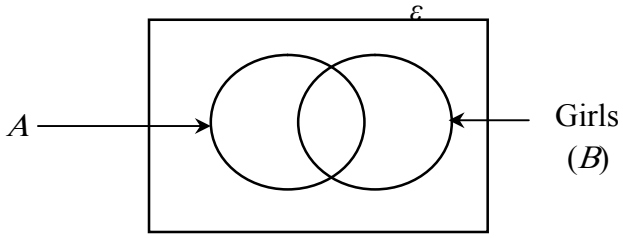
(ii) Express $Q\hat{C}D$ in terms of $Q\hat{P}C$.

(iii) Prove that $A\hat{B}C = Q\hat{P}C$.

(iv) Show that AB // PQ .



12. Out of 380 students who faced the second term examination in a certain mixed school 285 scored more than 40 marks in all subjects. 95 out of 125 girls who faced that examination scored more than 40 marks in all subjects.



(i) Suggest a suitable name for set A.

(ii) Copy the venn diagram and include the above information in it.

(iii) Find the number of boys who scored less than 40 marks in all subjects.

(iv) Shade the region of the venn diagram which shows the girls who scored less than 40 marks in all subjects.

(v) A teacher says that 25% of the total students is girls who scored more than 40 marks. Do you agree with this statement ? Give reasons.

* **

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