



Royal College - Colombo 07
රාජකීය විද්‍යාලය - කොළඹ 07

32

E

I

Grade 11 - Second Term Test – 2024 (August)
දෙවන වාර පරීක්ෂණය -2024 (අගෝස්තු)- 11 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

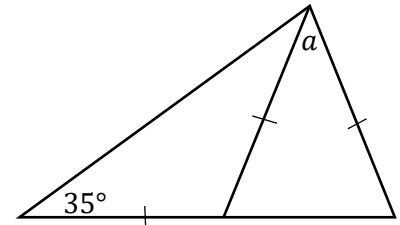
Part	Question Number	Marks
A	1 - 25	
B	1	
	2	
	3	
	4	
	5	
Total		
Signature of Invigilator		



PART -AAnswer *all* questions on the *paper itself*.

- 1) If Rs. 4800 has to be paid as annual rates for a house of assessed annual value RS. 60 000, calculate the rates percentage charged.

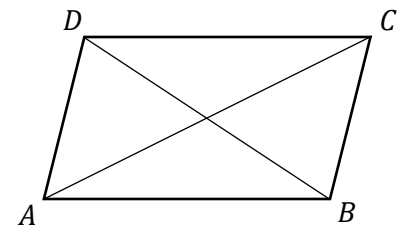
- 2) Find the value of a based of the information given in the figure.



- 3) Find the least common multiples of the following algebraic terms.

$$3a^2, 12ab, 2ab^2$$

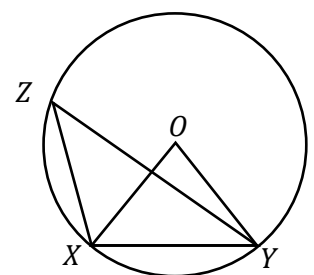
- 4) $ABCD$ is a parallelogram. If the area of the triangle ACD is 15cm^2 , find the area of the triangle BCD .



- 5) Simplify: $\frac{2a^2}{y} \div \frac{8x}{15y}$

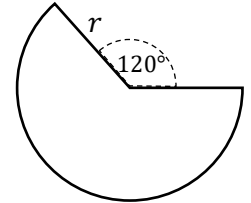
- 6) Express $a^b = c$ in logarithm form.

- 7) Centre of the given circle is O and $\angle XOY = 50^\circ$. Find the value of $\angle XZY$.



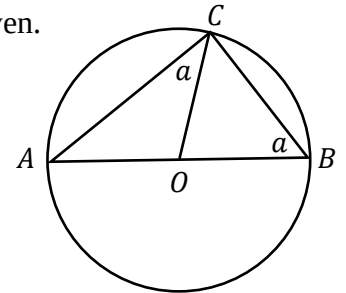
- 8) If 12% value added tax (VAT) is charged for an electric appliance worth Rs.24 000, calculate the amount of VAT charged.

- 9) The diagram shows a sector of area 231 cm^2 . Find the radius of the sector.



- 10) Find the equation of the straight line that passes through the point (2,5) and the intercept is 3.

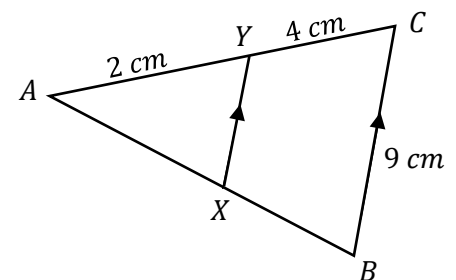
- 11) O is the centre of the circle. Find the value of a based on the information given.



- 12) Find the interquartile range of the following sample of data.

12, 13, 14, 15, 16, 18, 20, 21, 23

- 13) Find the length of XY according to the information given in the figure.



- 14) The circumference of the circular base of a right circular cylinder is 88 cm and the height is 10 cm. Find the area of the curved surface of the cylinder.



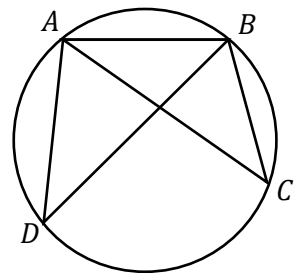
15) Factorize: $x^2 - 5x + 6$

16) Write the 10th term of the geometric progression 2, 8, 32, ... as a power of 2.

17) An observer from the point **R** of the top floor of a verticle building, observes a point **B** located on the same level ground, 35 m from the building with an angle of depression of 35° . Represent this information in a rough sketch.

18) There are 15 boys and 20 girls in a class. If a student is picked randomly from among them, find the probability that the selected student is a boy.

19) The points A, B, C and D lie on the circle shown in the figure. BD is a diameter and $\angle ABD = 50^\circ$. Find the value of $\angle ACB$.

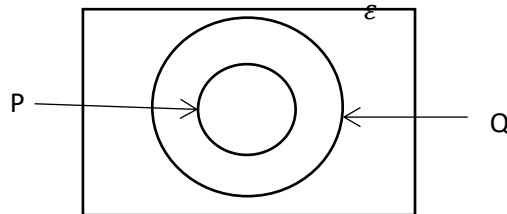


20) Solve: $\frac{5x}{3} = x + 2$

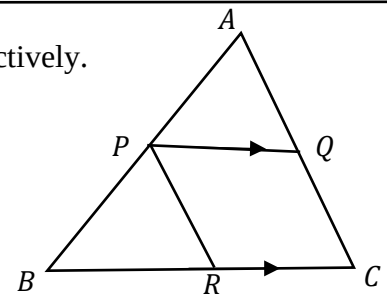


- 21) Express the total surface area of a right circular cone of base radius a units and the slant height $2a$ units in terms of π and a (surface area of a cone $\pi rl + \pi r^2$)

- 22) In the given venn diagram, shade the region $P \cup Q'$.

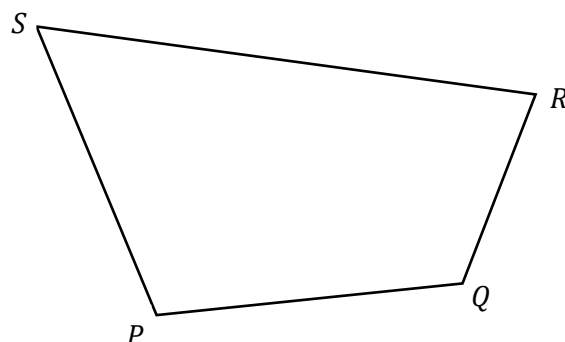


- 23) In the given figure, the mid points of AB and BC sides are P and R respectively.
write with reason, which type of quadrilateral is $PQCR$.



- 24) Solve: $\frac{4x}{x+2} = \frac{x}{7}$

- 25) $PQRS$ is a piece of land in the shape of a quadrilateral. It is required to fix a tap which is equidistance from the two boundaries PQ and QR and at an equal distance from corners P and Q . Using the knowledge of loci, complete the sketch indicating how the location of the tap is found.



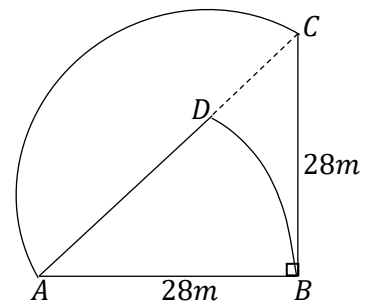
Part B**Answer all questions on this paper itself**

1) Nimal deposited $\frac{3}{5}$ of the money he had in a bank and spent $\frac{1}{6}$ of the remaining amount to buy a pair of shoes to his daughter. Then another 20 000 rupees was remained.

- i. What fraction of the total amount of money was spent to buy the pair of shoes?
- ii. Find the total amount of money Nimal had?
- iii. Find the amount spent to buy the pair of shoes.
- iv. If the pair of shoes was bought with a discount of 20% to the same price as in (iii), find the marked price of it.

2) The figure shows a plot of land ABC in the shape of a sector of radius 28 m . Here chilies are cultivated in the sector ABD and green beans are cultivated in the remaining part.

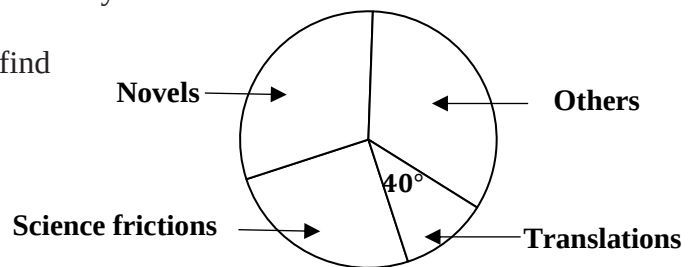
- i. Find the perimeter of the land.
- ii. Find area of the piece of land where chilies are cultivated.
- iii. Find area of piece of land where green beans are cultivated.
- iv. Bananas have been planted in a rectangular plot outside the land with AB as one side and area equals to the half the area of the plot where chilies are grown. Draw the sketch of the land where bananas are planted with its measurements on the above figure itself.



- 3) (a) Dhanuka bought shares in a company which pays annual dividend of Rs. 4 per share at the market price of Rs. 15 per share. After receiving dividend income in one year, he sold all the shares on an occasion when the market price was Rs. 18 per share. Then he received capital gain of Rs. 24 000.
- What was the capital gain per share?
 - Find the number of shares he had.
 - Find the amount invested to buy these shares in the company.
 - Find his annual dividends income.
- (b) Kasun borrowed a certain amount of money at a monthly simple interest of 4%. If he had to pay a total amount of Rs. 24 000 after 5 months to settle the loan, find the loan amount.

- 4) (a) The following pie chart illustrate the information about the different types of books displayed at a certain bookstall in a book exhibition held in literary month.

- i. If the number of translations books is 500, find the total number of books in the book stall.



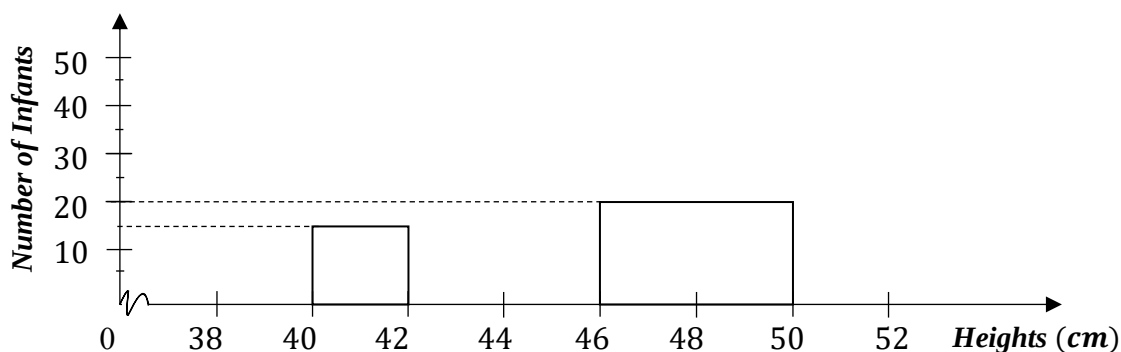
- ii. If the number of novels is 1750, find that angle at the centre of that sector.
- iii. If the number of other books in the stall is four times the number of science fictions books in it, find the number of science fictions books in the stall.



- (b) The following incomplete frequency distribution and corresponding frequency histogram shows information about the heights of infants who have attended a baby clinic.

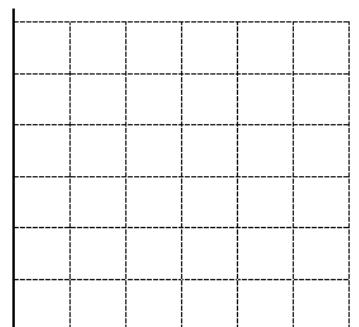
Height (to the nearest cm)	40-42	42-44	44-46	46-50
Number of infants		20	50	

- Fill in the blanks in the table
- Complete the given histogram.



- 5) (a) Two fair dice, red and blue colour, with their sides marked as 1, 1, 1, 2, 2 and 3 are rolled simultaneously and the sides shown upwards is recorded.

- Represent the sample space of the above random experiment on the given grid.
- Find the probability of getting even numbers in both dice?



- (b) Dhanuka and Amara are two students who are facing the O/L exam this year. The class teacher states that the possibility of selecting Mathematics stream for the Advance Level by these two students after passing the exam as below,

- The probability of selecting the mathematics stream by Danuka is 90%
 - The probability of selecting the mathematics stream by Amara is 80%
- Represent the above information in a tree diagram

- Using the tree diagram, find the probability of selecting Maths stream by both of them.





Royal College - Colombo 07
රාජකීය විද්‍යාලය - කොළඹ 07

32 E II

Grade 11 –Second Term Test – 2024 (August)
දෙවන වාර පරීක්ෂණය – 2024 (අගෝස්තු) - 11 ශ්‍රේණිය

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.
- The volume of a cylinder of base radius r and height h is $\pi r^2 h$
- The volume of a sphere of base radius r is $\frac{4}{3} \pi r^3$

Part - A

Answer **five** questions only.

- 1) Two advertisements published in a newspaper are as follows.

Financial institute A

An annual compound interest of 8% for your valuable deposits from us.

Financial institute B

The highest annual simple interest of 8.5% for your valuable deposits

Kusumsiri deposited an amount of 90 000 rupees he had, as a fixed deposit for two years in the above two financial institutes. If he deposited money in these two institutions A and B in the ratio of 2:3 respectively, find the total amount received by Kusumsiri at the end of two years.

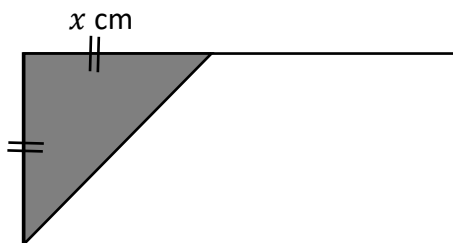
- 2) An incomplete table of y values corresponding to several x values of the quadratic function $y = (x - 1)(x + 3)$ within the interval $-4 \leq x \leq 2$, is given below.

x	-4	-3	-2	-1	0	1	2
y	5	0	-3	...	-3	0	5

- a) i) Find the value of y when $x = -1$
 ii) Using the standard system of axis and a suitable scale, draw the graph of the above quadratic function on a graph paper.
- b) Using the graph that you drew,
- Find the roots of the quadratic equation $x^2 + 2x - 3 = 0$
 - Write the interval of values of x on which quadratic function is negative.
 - Write the coordinates of the minimum value of the function and hence express the function in the form $y = (x + a)^2 - b$.
 - Write the equation of the function that is obtained by translating the given graph by two units to the right along the x axis and three units upwards along the y axis, without changing its shape

- 3) When an isosceles triangular portion is cut out from a rectangular sheet of length 6 cm as shown in the figure, the area of the remaining portion of the sheet is 17 cm^2 . Based on the information given, show that x satisfies the quadratic equation $x^2 - 12x + 34 = 0$.

Taking the value of $\sqrt{2}$ as 1.41, find the solution of the above equation and show with reasons that x can take exactly only one value.



- 4) (a) When constructing a foundation for a new house, the labour cost of constructing a 1 m length of granite foundation is Rs.1500 less than the labour cost of constructing a 2 m length of concrete foundation. The total labour cost of constructing a 10 m length of granite foundation and a 5 m length of concrete foundation Rs 35 000.

By taking the labour cost of constructing a 1 m length of granite foundation as x and the labour cost of constructing a 1 m length of concrete foundation as y , construct a pair of simultaneous equations and by solving them find the cost of constructing 1 m length of each separately.

- (b) The owner of the above house has allocated 300 000 rupees as labour cost for building the foundation. According to the housing plan, it has been estimated that the foundation will have to be finish with a length of 50 m from granite and a length of 75 m from concrete. Accordingly, show that the amount of money available to the owner is sufficient for this purpose.

- 5) To find the height of a statue, a student who is at point **A**, on the flat ground where the statue is located, observes the top of the statue with an angle of elevation of 27° . When the student walks 20 m along a straight path towards the statue and stop at point **B**, observes the top of the statue with an angle of elevation of 41° .

- Draw a rough sketch based on the above information.
- Draw a scale diagram based on the sketch, Using the scale of 1 cm representing 4 m .
- Using the scale diagram drawn, find the height of the statue to the nearest meter.

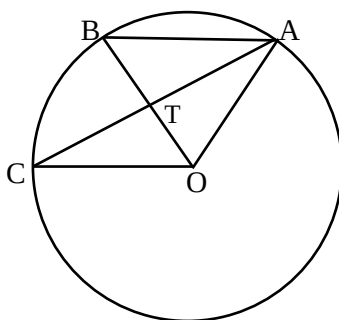
- 6) The following grouped frequency distribution has been prepared by weighing 100 packets of dahl which are marked as 250 g each in a shop

Mass (grammes)	235-239	240-244	245-249	250-254	255-259
Number of packets	6	17	25	27	25

- Find the probability that a randomly selected packet of dahl is less than the specified mass.
- By taking the mid value of the model class as the assumed mean, find the mean mass of a packet of dahl to the nearest gramme.
- Show that the maximum loss to the vendor due to lack of proper mass in packing as above does not exceed 150 g .

Part - B*Answer five questions only*

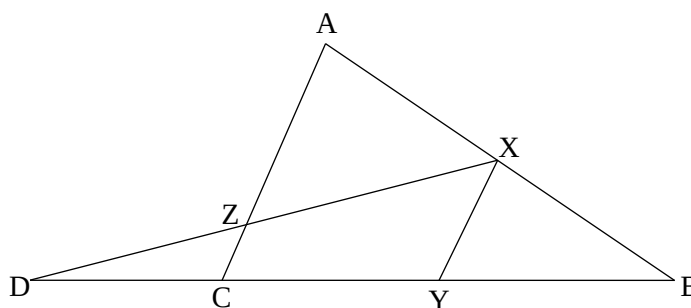
- 7) In a quiz competition where multiple question papers are given, the first paper consists of 10 questions. Each of the subsequent papers will have four more questions than the previous paper.
- What progression do the number of questions contained in each question paper given in the above manner follow? Give reasons.
 - Find the number of questions in the 5th paper using the formula related to progressions.
 - Which question paper consists of 62 questions given in the above order.
 - When finishing this competition, 20 questions papers should be answered. Find the total number of questions answered by a competitor after answering the last paper.
- 8) Use only a straight edge with *cm/mm* scale and a pair of compasses for the following constructions. Draw the construction lines clearly.
- Construct the triangle ABC such that $AB = 10\text{ cm}$, $BC = 6\text{ cm}$ and $AC = 8\text{ cm}$
 - Mark point D on AB such that $\hat{BAC} = \hat{BCD}$ and complete the triangle ADC .
 - Construct the locus of a point that moves at an equal distance from points A and D . Name the point at which this locus intersects AC as O .
 - Construct a circle taking O as the centre and OD as the radius.
 - Measure and write down the length of CD to the first decimal place.
- 9) In the given figure, the points A, B, C , lie on the circle with centre O . OC is parallel to AB and OB is perpendicular to AC . Show that $OC = AB$ and find the magnitude of $\hat{AOB}$, hence find the magnitude of $\hat{ACB}$.



- 10) a) A solid sphere of radius r cm is inserted into a right circular cylindrical container of base radius $3r$ cm and height $2r$ cm. Water is filled into the cylindrical container so that sphere is emersed in it and the water level of the cylinder has gone up to the level of overflow. Thereafter, when the water in the cylinder is poured in to a square based cuboid shaped container of base length x cm, the water level of the cuboid shaped container rises to a height of $2r$ cm. Show that, $x = 5r\sqrt{\frac{22}{21}}$

b) Find the value of $\frac{4.37^2}{\sqrt{0.752}}$ using the logarithm table.

- 11) In the triangle ABC given in the figure, $AB = BC$. The midpoint of AB is X . The straight line through X drawn parallel to AC meets BC at Y . The side BC is produced to D , such that $AX = CD$ and DX and AC intersect at Z .



- Copy the given figure in your answer script and include the given information.
 - Give reasons why $BY = CY$
 - Show that $DZ = ZX$
 - Show that $ZC = \frac{1}{4}AC$
- 12) The class teacher, in a grade 11 class of 40 students, has suggested to do a Shramadana Campaign as a project. The number of girls in this group is 25. Several students were assigned to prepare the project report. The number of boys who were not involved in the preparation of the report is 8.
- Represent the above data in a suitable Venn diagram.
 - How many boys involved in preparing the project report?
 - If the number of girls who did not prepare the report is three times the number of boys who helped prepare the report. How many students were involved in preparing the report?
 - If all the girls who participate in the project were involved in preparing the report, draw a new Venn diagram showing how the above information should be changed.
