

Grade 11

Third Term Test 2024

32

E

I

Index No:

Mathematics I

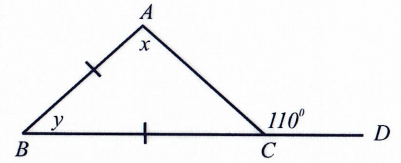
Time : 02 hours

- Answer all the questions on this paper itself.
- Indicate the relevant steps and the correct units when answering the questions.
- Two marks for each questions of part A and 10 marks for each questions of part B.

Part A

01. The assessed annual value of a certain shop is Rs. 50 000. If the relevant provincial council institution charges 8% of the value of the shop as rates. Calculate the rates that have to be paid for a year.

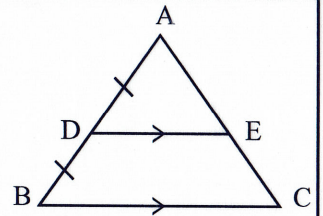
02. Find the magnitude of x and y based on the information in the figure



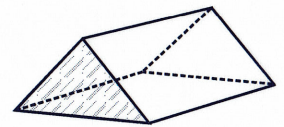
03. Solve $x(2x - 3) = 0$

04. Simplify $\frac{7c}{2ab^2} \div \frac{21c^2}{8ab}$

05. Perimeter of the equilateral triangle ABC is 30cm.
Find the perimeter of the trapezium BCED



06. The area of the shaded cross section of the given triangular prism is 25cm^2 .
If the volume of the prism is 150cm^3 , Find the length of the triangular prism.



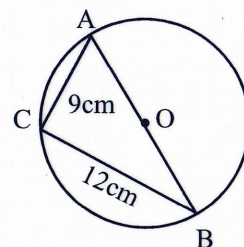
07. If $\log_4 x = 2$, Find the value of x

08. There is a bag containing 20 identical wood apples. Out of that 9 are raw wood apples and the rest are ripe woodapples. If randomly took one of these woodapples from the bag, find the probability of getting a ripe woodapple.

09. Factorize $3x^2 - 27$

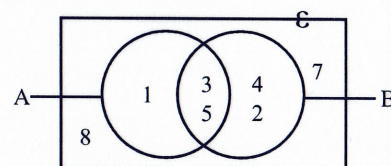
10. In an ungrouped frequency distribution, the inter-quartile range is 20. If the first quartile (Q_1) is 11. Find the third quartile (Q_3)

11. The points A, B and C lie on the circle with centre O. If $AC = 9\text{cm}$ and $BC = 12\text{cm}$, Find the radius of the circle.

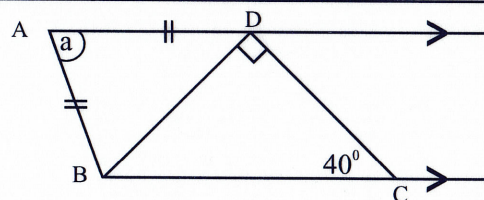


12. Find the least common multiple $2x^2y, 3xy, 4y^2$

13. Based on the information given in the Venn diagram, What is the value of $n(A' \cup B)$

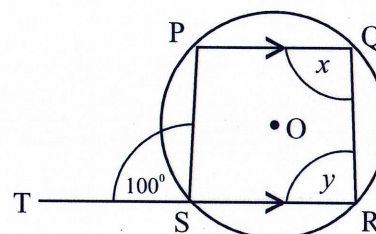


14. Using the data in the given figure, Find the value of a .



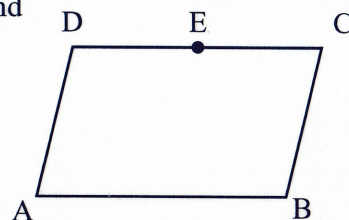
15. Find the gradient of the straight line that passes through the points $(0,6)$ and $(3,0)$. Hence write the equation of the straight line.

16. The points P, Q, R and S lie on the circle with the centre O. The line RS has been produced to T. If $\hat{PST} = 100^\circ$, Find the value of x and y .



17. Write the largest positive integer, that satisfies the inequality $2x - 3 < 3$

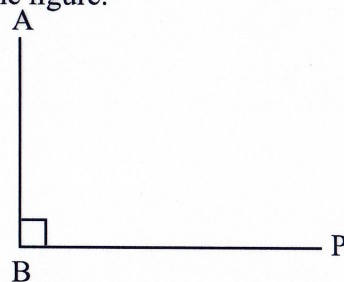
18. The midpoint of the side DC of the parallelogram ABCD is E. The sides AE produced and BC produced meet at F. Represent these information on the given diagram and write down the case of congruence of the $\triangle EFC$ and $\triangle ADE$.



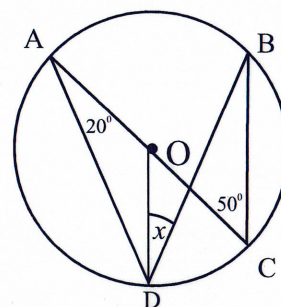
19. Water is pumped into a tank at the rate of 50 millilitres per minute. What is the volume of water in litres that collects in the tank in an hour?

20. The first term and the third term of a geometric progression are 8 and 32 respectively. Find the common ratio of the progression.

21. A building AB erected on a level horizontal ground and a car which is at the point P located at a distance of 30m from the foot of the building, is given in the figure. A person when observed from A, the angle of depression of the car is 36° . Include the given information in the figure. (Neglect the height of the man)



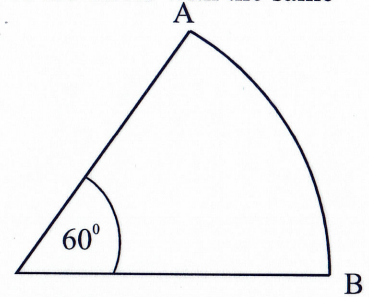
22. Based on the information in the figure, Find the value of x .



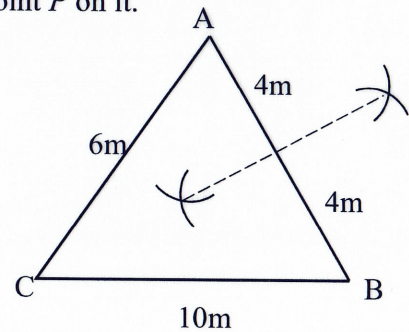
23. Put a "✓" mark in the box in front of each correct expression and "x" mark in the box in front of each incorrect expression given in the table.

$\sqrt{26.2} < 5$	
$(3.02)^3 > 27$	
$7.0 \times 6.3 < 49$	

24. The arc length AB of the given sector is 22cm. Find the circumference of the circle with the same radius as the given sector.



25. Three points A, B and C are located on a flat ground. A light post (P) to be fixed in the land such that, it will be equi - distance from the two points A and B and will be at a distance of 5m away from the point C. An incomplete sketch relevant to finding this location is shown in the figure. Complete the figure using the knowledge on loci and mark the point P on it.



Part B

01. a) Of the production of commercial mango plantations, $\frac{5}{9}$ were distributed for export and $\frac{3}{4}$ of the remaining amount for the local market. Then the rest of mangoes was distributed for the other products.

i. What fraction of the total quantity of mangoes was remained, after exporting?

ii. What fraction of the total quantity of mangoes was distributed for the local market?

iii. There were 2400 mangoes that was distributed for the other production. Then calculate the total number of mangoes that was produced.

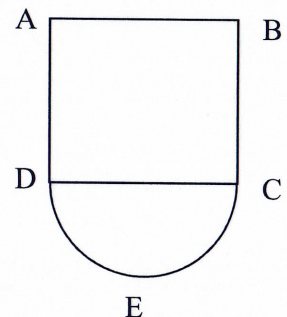
b) It takes 06 men 04 days to pack mangoes for the export. If a man is paid Rs. 2500 per day, Find the total amount to be paid.

02. The diagram below shows a part of a leaflet prepared by a printer in a company that prints leaflets. It consists of a square shape portion ABCD of side length 28cm and semi - circular shaped portion DCE.

i. Find the radius of the semi - circular portion.

ii. Find the arc length of the semi - circular portion and then calculate the perimeter of the whole leaflet.

iii. Find the ratio between the area of the square portion and the area of the semi - circular portion.



iv. A new portion with a triangular shape has to be attached in the leaflet according to the following requirements.

- The area of the triangular shaped portion is $\frac{1}{4}$ of the area of the square shaped portion.
- One side of the triangle is AB.

Draw with the measurements, a sketch of the leaflet to be created in the above diagram.



03. a) Mr. Chamara spends Rs. 60 000 to buy a certain number of shares of Rs. 30 in a company that pays annual dividends of Rs. 3.50 per share.

i. Find the number of shares Mr. Chamara bought.

ii. Find the annual dividends income that he receives from this investment, after one year.

iii. If he sold all these shares when the market price had increased to Rs. 35 per share, Find the total amount he received by selling all the shares and the annual dividends income.

b)

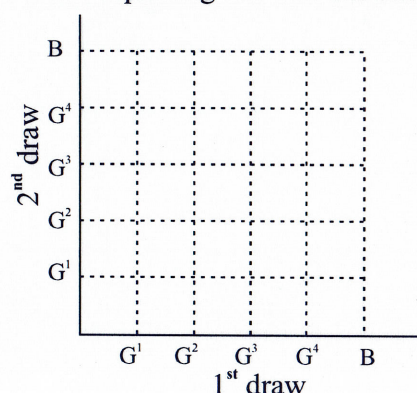
Annual Income (Rupees)	Income tax percentage
Initial 500 000	Tax free
Next 500 000	4%
Next 500 000	8%

If Mr. Chamara pays Rs.16 000 as income tax for the year 2023, based on the above table. Find the annual income of Mr. Chamara for the year 2023 ?

04. a) Out of the 05 balls in a container used by a cricket team for their training, one ball is damaged. A ball is drawn randomly from the container and examined, and without replacing this ball another ball is drawn randomly from the container and examined.

i. Using the symbols 'x' represent the sample space of the experiment of drawing a ball, in the grid. The damaged ball is denoted by B and the good balls are denoted by G^1 , G^2 , G^3 and G^4 .

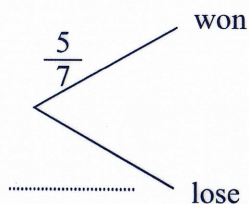
ii. In the grid encircle the event of drawing a good ball in both occasions and find its probability.



- b) This cricket team participates for the 02 initial matches. The probability of the team winning the first match they participate in is $\frac{5}{7}$. An incomplete tree diagram drawn to represent this information is shown in the following figure.

- i. Complete the tree diagram by indicating the relevant probabilities.

First match

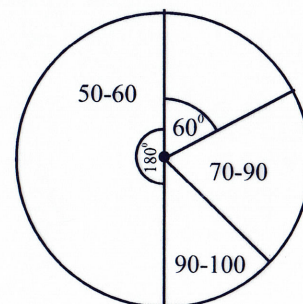


- ii. If they win the first match, then the probability of them winning the second match is $\frac{5}{6}$. If they lose the first match, the probability of them winning the second match is equally likely, Extend the above tree diagram and write the relevant probabilities.
- iii. Using the tree diagram, find the probability of winning the both matches.

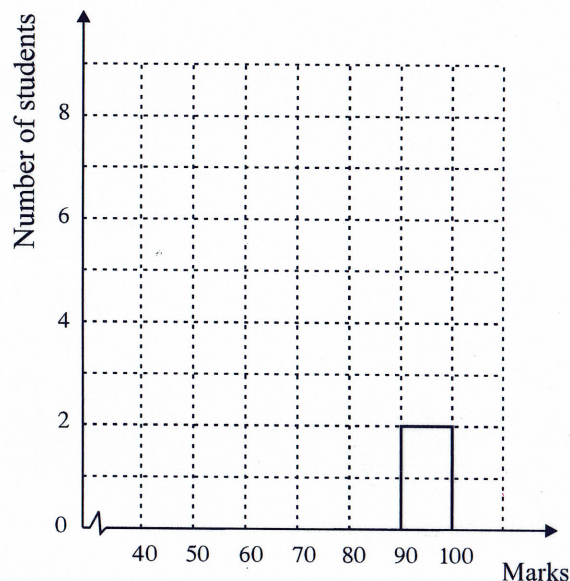
05. The pie chart represents information obtained from a group of 11 students who have received more than 50 mark for a mathematics diagnostic test. Number of students who received marks in the interval 70-90 is twice the number of students who received marks in the interval 90 - 100.
- i. Find the value of the angle in the sector that represents the mark interval 90-100.

- ii. Two students have received the marks in the interval 90 - 100. Fill in the blanks in the following table.

Class Interval	Number of students
50 - 60	
60 - 70	
70 - 90	
90 - 100	2



- iii. Using the above information, draw a suitable histogram on the system of axes given below to represent the number of students who received marks in each interval. Hence draw the frequency polygon.



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Mathematics II

Time : 03 hours

• Additional Reading Time- 10 mintues

Use additional reading time to go through the question paper, select the questions and decide on the questions that you give priority in answering.

Instructions :

- Answer **ten** 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 sphere of radius r is $\frac{4}{3}\pi r^3$ and the volume of a right circular cone of base radius r and height h is $\frac{1}{3}\pi r^2 h$

Part A

Answer five questions only.

01. A television set can be bought for Rs. 95000.00 by making a down payment of Rs. 5000.00 and paying the rest in 20 equal monthly installments. The interest is calculated on the reducing balance at an annual interest rate of 14%. When buying the above same television set on outright purchase that can be get a loan of Rs. 90000.00 from a bank at a monthly simple interest rate of 0.6%. It can also be paid in 20 equal monthly installments. Show giving the reasons, Which of the above two methods is more advantageous in buying the above television set.

02. a) An incomplete table prepared to draw the graph of the function $y = 4 - (x+2)^2$ is given below.

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

- Find the value of y , when $x = (-3)$.
- Using the scale of 10 small divisions representing one unit along the x - axis and y - axis, draw the graph of the given function on a graph paper.

b) Using the graph,

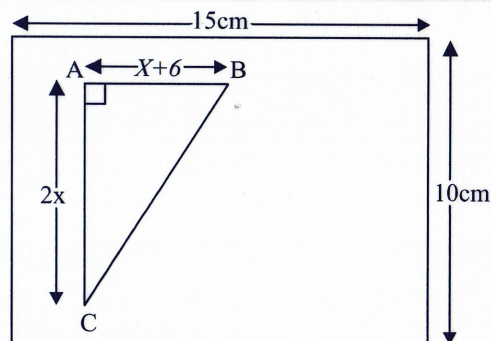
- Write down the equation of the symmetrical axis of the graph after drawing it.
- Write the values of x , when $y = 0$
- Write down the equation of the function corresponding to the graph obtained when the above graph is translated 3 units to the downwards along the y axis as the form of $y = ax^2 + bx + c$

03. a) Simplify. $\frac{7}{(a^2 - 3a)} - \frac{2}{(a - 3)}$

b) A toffees manufacturing company supplies toffees to the market in two ways as small packets of 12 toffees each and large packets of 25 toffees each. The price of a small packet is Rs. 180.00 and the price of a large packet is Rs. 250.00. When toffees are supplied to the market in both the above ways, the total value of toffees is Rs.3800.00 The total number of toffees which supplied to the market are 320.

- By taking the number of small packets as x and the number of large packets as y , build up a pair of simultaneous equations.
- By solving the above pair of simultaneous equations, find the number of toffee packets as separately.

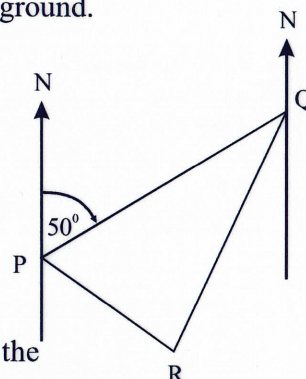
04. The given figure illustrates a right angled triangle ABC is cut away from the rectangular lamina with side length of 15cm and breadth of 10cm. If area of the remaining portion is 111cm^2 , show that x satisfies the equation $x^2 + 6x - 39 = 0$ (take the value of $\sqrt{3} = 1.73$)



Solve the equation by using the completing square method or any other method, and find the value of x to the nearest whole number. Hence find the length of AB side in the right angled triangle.

05. A rough sketch is shown P,Q,R three houses located in a horizontal level ground.

- The bearing of R from Q is 190°
- The bearing of R from P is 100°
- The distance between P and Q is 200m.



- I. Copy the figure in your answer script and indicate the information given above in it.
- ii. Show that $\hat{PRQ} = 90^\circ$
- iii. Using the trigonometric tables, calculate the distance from Q to R to the nearest meter.
- iv. If a light post S is located on the line PR at a distance of 60m from R , Find the magnitude of $\hat{QSR}$ using the trigonometric tables.

06. The given frequency distribution table shows the number of patients who visited to a hospital within 30 days to get some treatments for an infectious disease.

No of Patients	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
No of days	1	3	5	10	6	3	2

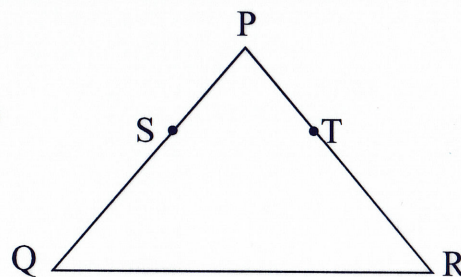
- i. Write the relevant class interval of the number of patients who have visited the most number of days.
- ii. Represent as a percentage the number of days that less than 30 patients who came to the hospital.
- iii. Taking mid value of the modal class as assumed mean or any other method, find the mean number of patients who came to get treatments in a day to the nearest whole number.
- iv. If this situation continues in the next 2 months, show that the expected number of patients arriving to the hospital does not exceed 2200.

Part B
Answer five questions only

07. Sachitha is saving money to buy a book as follows,
- | | | |
|-------------|---|-----------|
| First week | - | Rs. 10.00 |
| Second week | - | Rs. 15.00 |
| Third week | - | Rs. 20.00 |
- When writing the money saved in the first, second and third week in order, show that it is satisfying an arithmetic progression.
 - Find the amount he saved in the 12th week by using the formula.
 - In which week he saved Rs. 105.00
 - At the end of 15 weeks, he was able to buy that book using the total amount he saved. Find the value of the book he bought.

08. Use only a straight edge with cm/mm scale and a pair of compass for the following constructions. Show the construction lines clearly.
- Construct a triangle ABC with $AB = 6\text{cm}$, $\hat{BAC} = 60^\circ$ and $AC = 7\text{cm}$.
 - Hence that construct a ABDC parallelogram.
 - Construct a locus of points as equidistant to the points B and C.
 - Construct a circle as its centre O located on a locus drawn in above (iii) and DC straight line touches at C.
 - If the above circle intersect the line AC at point P, give reason for $\hat{PBC} = 60^\circ$

09. In the given isosceles triangle PQR, $PQ = PR$. The points on PQ and PR are S and T in respectively and $ST \parallel QR$. The perpendiculars drawn from the points S and T to the QR side meets at A and B respectively.
 $PQ \perp RS$.

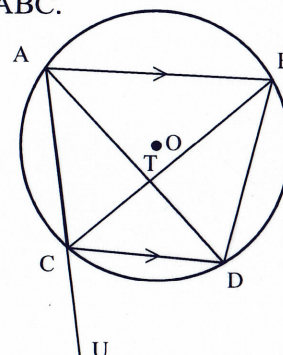


- Copy the given diagram in your answer script and mark the relevant data in it.

Show that,

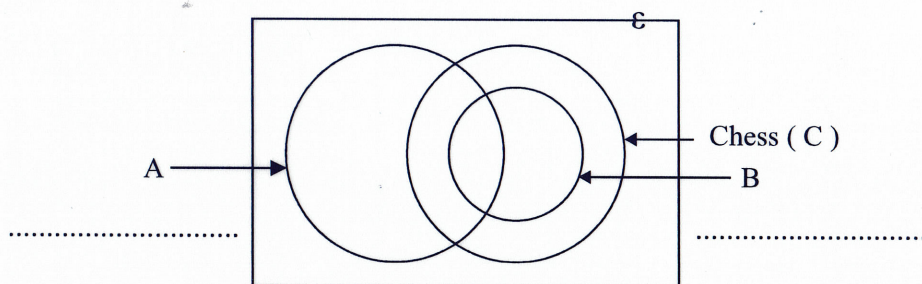
- $PT = PS$
 - $\triangle QSA \cong \triangle TRB$
 - $\triangle QSA$ and $\triangle QSR$ triangles are equiangular triangles.
 - $QS^2 = QR \cdot AQ$
10. a) 12 identical solid spheres with radius R are made by melting a solid right cone with the radius of $2b$ and height of $3b$. If there is no any wastage, Show that $R = \frac{b}{\sqrt[3]{4}}$
- b) If $b = 20$ find the value of R using logarithmic tables to the nearest first decimal place.

11. AB and CD are two parallel chords in the circle with centre O. AD and CB lines are intersected at T. The line AC is produced to U and $AC = CD$. Show that $\hat{BCU} = 3\hat{ABC}$.



12. The information about the players who played foot ball, hand ball and chess, among the 60 members in a certain sport club is given below.

- The players who play foot ball is 35
- All the players who play hand ball are playing chess and the players who play both foot ball and chess are 20.
- The players who play hand ball is 25 and 10 players play all three games.
- The players who play only one game is 24.



- Copy the given Venn diagram in your answer script and name the A and B sets.
- Include the above given information in the Venn diagram and find the number of players who play only foot ball.
- Shade the regions which represent the players who play only two games.
- Find the probability of a player picked at random being a player who plays only chess.

