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Visakha Vidyalaya, Colombo 05

තෙවන වාර පරීක්ෂණය 2024 (2024 පෙබරවාරි)

Third Term Test 2024 (February 2024)

ගණිතය I **Mathematics I**	**11 ශ්‍රේණිය** **Grade 11**	*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

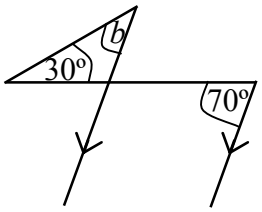
Part A

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

1. Calculate the interst charged for Rs. 1500 at the annual interest rate of 5% for 2 years.

2. 5 men take 4 days to finish $\frac{1}{4}$ of a work. Find how many days required to finish the remaining work by using 6 men.

3. Find the value of b.

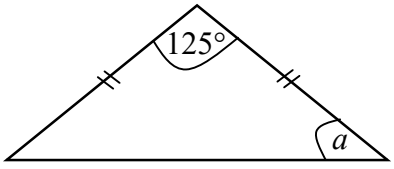


4. Evaluate. $81^{1/2} \times 3^{-2}$

5. If $10^{0.4945} = 3.122$ find the value of lg 0.3122 .

6. Simplify. $\frac{9}{14} - \frac{3}{7x}$

7. Find the value of a.



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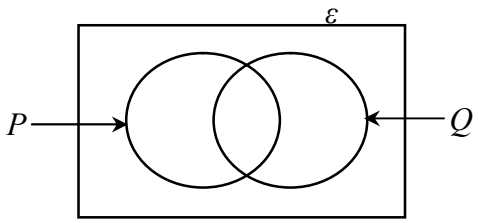
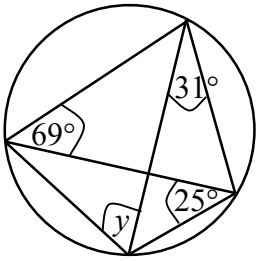
8. Shade the region $P \cap Q'$ in the given Venn - diagram.



9. Factorize . $a^2 + a - 12$

10. Factorize. $(x-2)^2 - \frac{9}{4}$

11. Find the value of y .

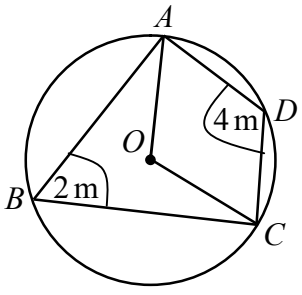


12. Solve the given quadratic equation.

$3x^2 - 27 = 0$.

13. Find the distance travels in 15 minutes by a motor car which travels in a constant speed of $15\,\text{km}\,\text{h}^{-1}$.

14. Find the value of $A\hat{O}C$ (obtuse angle)



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15. Find the matrix P. $\begin{pmatrix}3\\2\end{pmatrix} + 3P = \begin{pmatrix}12\\8\end{pmatrix}$

16. Subject a in the formula. $\frac{1}{V} + \frac{1}{u} = \frac{1}{a}$

17. Volume of a right cylinder whose radius of the base 5 cm is 275 cm^2. Find the height of it.

18. Find the co – ordinate of the point which the striaight line $x + \frac{1}{2}y = 1$ intersects the y axis.

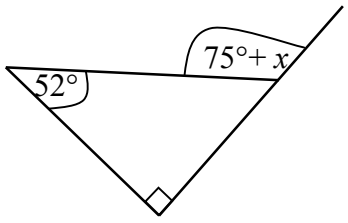
19. Write the 5th term of the given progression as a power of 3.

$\frac{1}{9}, \frac{1}{3}, 1, \ldots\ldots\ldots\ldots$

20. Fill in the blanks.

The straight line segment through the midpoints of two sides of a triangle is (1) ..... to the third side and equal in length to (2) ..... of it.

21. Find x.



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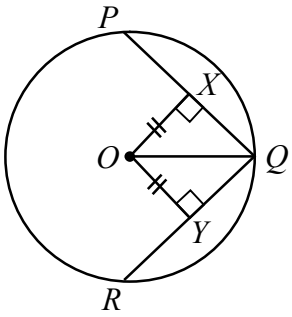
22. Put the signs '√' for correct statements '×' signs for incorrect statements.

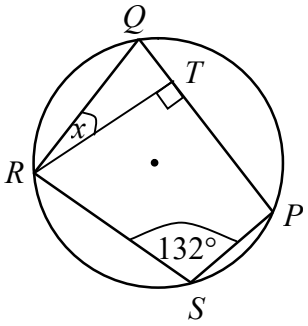


(1) The triangles QOX and QOY are not equal in area. ☐

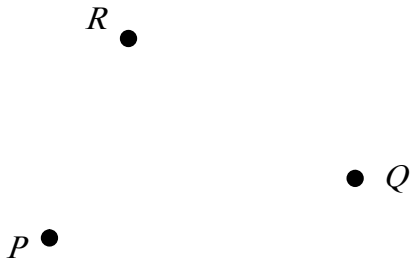
(2) PQ and RQ ජ්‍යාchords are equal in length. ☐

23. A and B are independent events. If $P(A) = \frac{5}{6}$ and $P(B) = \frac{2}{5}$. Find the value of $P(A \cap B)$.

24. Find x.



25. Sketch the location of a point equi - distant to P and Q points and equi - distant to straight lines PR and PQ using the basic knowledge of loci.



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Part B

* Answer **all** questions on the paper it self.

1. Out of the money allocated for a sports meet $\frac{2}{9}$ was given for decorations $\frac{1}{12}$ was given for ground facilities. Then $\frac{9}{10}$ of the remainder was allocated for prizes and certificates. After that $\frac{3}{5}$ of the remainder was taken for refreshments.

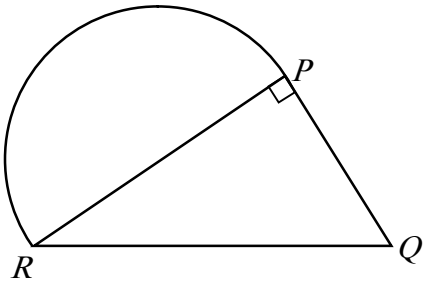
(i) Find the fraction of money reserved for prizes and certificates out of the total money.

(ii) Find the fraction of money taken for refreshments out of the total money allocated for the sports meet.

(iii) Find the cash in hand with the trcasurer of the sport committee after making all the above expenses as a fraction of the total money.

(iv) If the cash remains with the treasurer at the end of the sportmeet was Rs. 15 000 find the total amount money allocated for the sportmeet.

2. The figure shows a structure of a pandol made by using the shapes semicircle and a triangle. Total area of the pandol is 504 m^2 and the radius of the semi - circle is 14 m.



(i) Find the area of the semi - circle.

(ii) Find the length of PQ of the triangle.

Red and blue colour bulbs were supposed fixed one after another, on the semi – circular arc and on PQ with a distance of 2m from the point R to Q and there is a red bulb at the point R..

(iii) Find the total number of red bulbs needed for this.

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3.(*a*) Mrs. Silva expects to buy certain household equipments to her house. 8% of Value added tax (VAT) is imposed on kitchen utencils, 15% of VAT on bathroom items, 12% of VAT on living room equipments will be charged. With the relavent VAT charge she pays Rs. 12 744 for kitchen utencils, Rs. 23 000 for bathroom items and Rs. 14 000 for living room equipments.

(i) Find the cost of each type of household equipments seperately without the VAT charges.

(ii) Find the total amount of VAT paid for all household equipments.

(iii) Find the percentage of total Value added tax paid out of the total amount of money spent on household equipments.

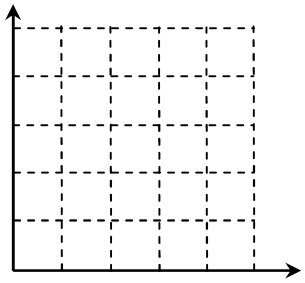
(*b*) Mr. Thennakoon has taken a loan of Rs. 60 000 from a bank at the interest of 12% compounded annualy.

(i) Find the total interest he has to pay to after two years?

(ii) Find the total amount of money he has to pay to get release from this loan.

4.(*a*) Dr. Perera selects a shirt randomly from his cupboard to wear to the hospital during the weekend. He has 3 long sleeves shirts and 2 short sleeves shirts. On Saturday he randomly picks a shirt and wear then he puts that shirt to wash. On next day he picks another one randomly from the cupboard.

(i) Show the sample space of all possible events on the given grid.



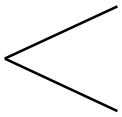
(ii) Show the event that he wears long sleevs shirts on both days on the grid and write the probability of it.

(iii) Show the event that he wears short sleevs shirts on both days on the grid and write the probability of it.

(iv) Find the probability of the event of wearing different types of shirts on those two days.

[See page eight

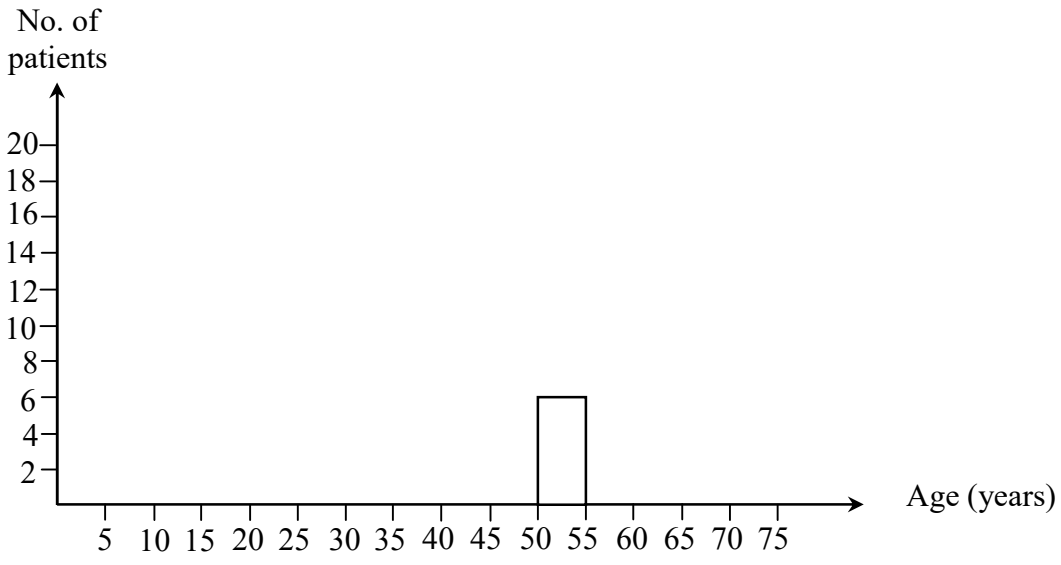
(*b*) (i) The probality of this doctor being late to the hospital is $\frac{3}{10}$. Illustrate his presence on these two days by extending the given tree diagram.



(ii) Find the probability that the doctor not getting late to work on those two days using the tree diagram.

5. Following incomplete frequency distribution and histogram illustrates ages of 80 patients who came for a medical laboratory on a certain day.

Class intervals (age in years)	No. of patients
15 - 20	9
20 - 30	.....
30 - 50	28
50 - 55	.....
55 - 70	15



(i) Fill in the blanks of the frequency distribution.

(ii) Complete the histogram using the given data.

(iii) Mention the age group which belong 35% of patients out of the total number of patients who came for the laboratory on that day.

(iv) Draw the frequency polygon using the histogram.

* **

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තෙවන වාර පරීක්ෂණය 2024 (2024 පෙබරවාරි)

Third Term Test 2024 (February 2024)

ගණිතය II Mathematics II	11 ශ්‍රේණිය Grade 11	පැය තුනයි *Three hours*

- Answer ten questions selecting five question 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 solid right cylinder of radius r and heigh is $\pi r^2 h$. The volume of a solid right circular cone of base radius r and height h is $\frac{1}{3}\pi r^2 h$)

Part A

* Answer **five** questions only.

1. An incomplete table showing the y values corresponding to several x values of the quadratic function $y = 3 + x\ (4 - x)$ within the interval $-1 \leq x \leq 5$ is given below.

x	–1	0	1	2	3	4	5
y	–2	3	6	…..	6	3	–2

(i) Find the value of y when $x = 2$.

(ii) Using the scale of 10 small divisions representing 1 unit along the x axis and along the y axis, draw the graph of the above function on a graph paper.

(iii) Describe the behaviour of the function within the interval $1 < x < 3$.

(iv) Draw the axis of symmetry and name it.

(v) Find an approximate value for $\sqrt{7}$ to the first decimal place using the graph of the function.

2. The price of a gas cooker is Rs. 40 000 when it is purchased outright. It can also be purchased by making a down payment of Rs. 4 000 and paying the remaining amount with interest in 12 equal monthly instalments. If an annual interest rate of 18% is charged on the loan where the interest is calculated on reducing balance. Find the value of a monthly installment.

3. (*a*) When $\frac{1}{12}$ of money with Kusal is added to the money with Nisal then the total is Rs. 400. And twice of the money Kusal has is Rs. 100 less than the money with Nisal.

(i) Take the money with Kusal as Rs. x and money with Nisal as Rs. y and construct a pair of simultaneous equations that represents the above information.

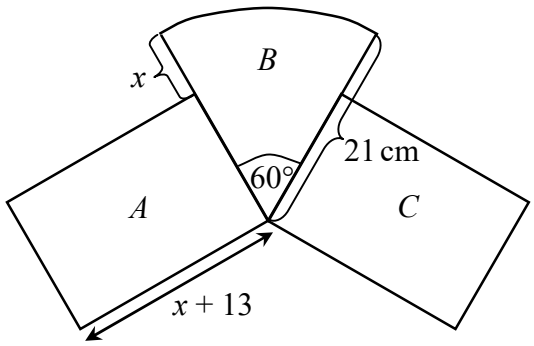
(ii) By solving these equations, find separately the money with Kusal and Nisal.

(iii) If Nisal wants to buy erasers worth Rs. 20 each from the money he has. Find how many erasers he can buy.

(*b*) Simplify. $\frac{1}{4-P^2} + \frac{1}{P^2+3P-10}$

[See page two

4.



The figure shows an emblem of a certain house of a sports - meet of a school with its measurements. There are two equal rectangular laminas on either sides of the sector. Area of '*A*' equals to the area of '*B*'.

(i) Show that x satisfies the quadratic equation $x^2 - 8x - 42 = 0$.

(ii) By solving it find the value of x to the first decimal place. ($\sqrt{58} = 7.6$)

5. A ship sails from the harbour *A* to the East at a speed of $6\,\text{km}\,\text{h}^{-1}$ and arrives to the point *C*. At the point *C* captain of the ship observes a boat anchored at point *B* on a bearing of 205° at 300m due south of *A*. After 5 minutes the ship travels to the East further and arrives to the point *D*. And the bearing of point *B* from *D* is 244° 59′.
Using trigonometric ratio,

(i) Find the distance of *BC* to the nearest metre.

(ii) Find the distance of *BD* to the nearest metre.

(iii) There is a light post at the point *A* of height 60 m. Find the angle of elevation of the top of the light post from the point *B*.

6. Welfare society of a certain office organizes a raffle to raise money for the Annual get together.

- 1st Prize - Rs. 25,000
- 2nd Prize - Rs. 15,000
- 3rd Prize - Rs. 5,000

The number of raffle tickets sold during 20 days period is given below.

Number of raffle tickets	60 - 70	70 - 80	80 - 90	90 - 100	100 - 110	110 - 120
Number of days	1	4	6	5	3	1

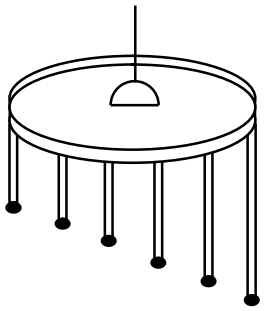
Find the mean number of raffle tickets sold in a day, thereby find the amount of money that can be collected for the Annual get – together by selling raffle tickets for 50 days. Prize of a raffle ticket is Rs. 20.

[See page three

Part B

* Answer **five** questions only.

7. The diagram given above is a decoration lamp. The length of these glass rods when taken consecutively lie in an arithmetic progression. The length of the shortest glass rod is 7 cm and all the other glass rods have the length such that the difference between two successive pieces of glass rods is 4 cm.



(i) Write the lengths of first four glass rods in this lamp.

(ii) Write an expression for the length of n^{th} glass rod in terms of n.

(iii) If the longest glass rod has a length of 75 cm, find the total number of glass rods used for this decoration lamp.

(iv) Find the total length of the glass rods used to make this decoration lamp.

(v) There are Light Emmiting Diodes (LED) fixed at the end of each of these glass rod. The number of LEDs fixed to a certain glass rod is twice the number of LEDs fixed the previous one. If there are 3 LEDs in the shortest glass rod find the total number of LEDs used for the first 5 glass rods in this decorative lamp.

8. Use only a straight edge with a cm/mm scale and a pair of compasses for the following constructions. Show the construction lines clearly.

(i) Construct the triangle ABC such that $AB = 7$ cm, $BC = 4$ cm and $A\hat{B}C = 60^{\circ}$.

(ii) Construct a parallel line to AB through C and construct a perpendicular from point A to the above parallel line and name it as AD.

(iii) Write the length of AD.

(iv) Construct the circle which goes through the points A, C and D and write the length of the radius of that circle.

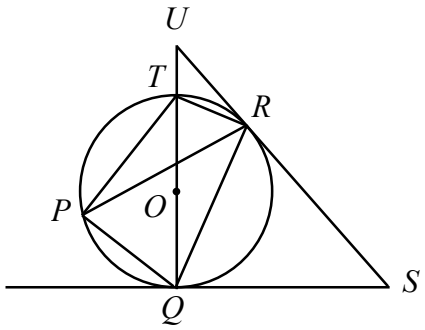
(v) Explain with reasons whether AC is a diameter of the above circle or not.

9. (a) A right cylindrical container of radius '$2r$' and height '$3h$' is filled with water up to the height of $\frac{1}{4}$ of it. When a right circular cone of base radius '$2a$' and height '$3a$' is completely immersed in the water of the above container the water reaches the spilling level, then show that, $r = \frac{2}{3}\sqrt{\frac{a^3}{h}}$.

(b) Find the value of the given expression to the second decimal place using the logarithms table. $\frac{8.305 \times \sqrt{0.6273}}{(2.463)^2}$

[See page four

10. P, Q, R and T points are there on a circle with centre O. Tangents drawn from the point S touches the circle at the points Q and R. If $\frac{1}{2} P\hat{T}Q = U\hat{R}T$ show that OR is the bisector of $P\hat{R}Q$. Also prove that $2 P\hat{R}O = Q\hat{S}R$.



11. $D\hat{A}B$ is an acute angle of the rhombus $ABCD$. The perpendicular drawn from A to AD straight line meets the circum - circle of the triangle ADB at E. The perpendicular drawn from C to BC meets the circum - circle of the triangle BCD at the point F.
Prove that,

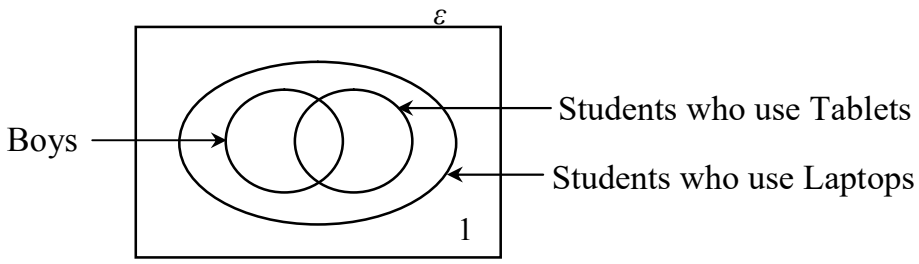
(i) $A\hat{E}D = C\hat{F}B$

(ii) $\Delta BCF \equiv \Delta AED$

(iii) $AFCE$ is a parallelogram.

(iv) $DEBF$ is a parallelogram.

12. The following Venn – diagram has been drawn to represent information on the usage of Laptops and Tablets by 80 students who follow a degree on Information Technology.



(i) Copy the Venn - diagram on to your answer script and include the above information in it. And shade the region which represents the girls who use tablets.

(ii) * There are 45 boys in this group.

* There are 7 girls who do not use tablets but they use laptops in this group.
Include the above information in the Venn – diagram.

(iii) Find the number of girls who use tablets.

(iv) If the total number of students who do not use tablets is 19. Find the number of boys who use tablets.

(v) Suppose there are some boys who do not use laptops in this group now. Then draw another suitable Venn – diagram in order to insert all these information by naming the subsets accurately.

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