



Royal College - Colombo 07
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Grade 11 - First Term Test - July 2023
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Mathematics - I
ගණිතය - I

Time: 2 hours
කාලය : 2 පැය

Name / Index No:.....

Certified Correct

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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		

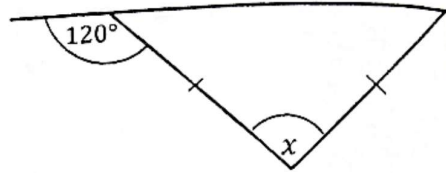
Part - A

Answer all questions on this question paper itself

- 1) 8 men take 6 days to complete a certain task. Find the number of days it will take 12 men to complete the same task?

2) Factorize: $2x^2 - 32$

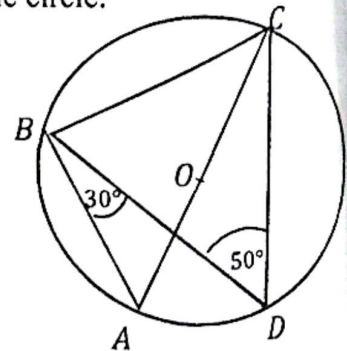
- 3) Find the value of x based on the information given in the figure.



- 4) Find the radius of a right circular cylinder, If the area of the curved surface is 880 cm^2 and the height is 10 cm. (The area of the curved surface of the cylinder with r base radius is given by $2\pi rh$ and $\pi = \frac{22}{7}$)

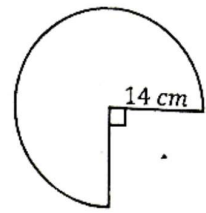
5) Simplify: $\frac{1}{1-x} - \frac{2}{x-1}$

- 6) In the given figure O is the centre of the circle A, B, C and D are points on the circle. $\angle ABD = 30^\circ$, $\angle BDC = 50^\circ$ Find the value of $\angle BCD$.

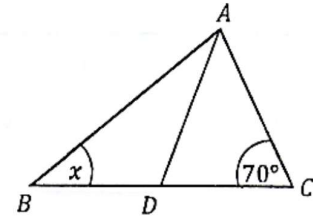


- 7) If $\lg 2 = 0.3010$, find the value of $\lg 25$.

- 8) Find the area of the given sector using the information in the given figure.



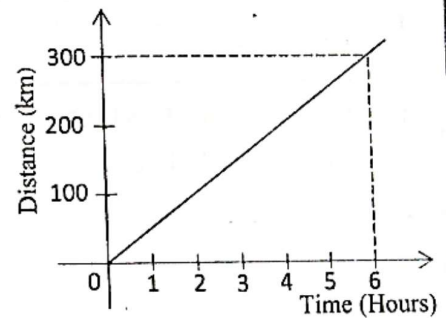
- 9) In the given figure ABC is a triangle. D is a point on BC, $\angle ACD = 70^\circ$ and $AD = BD = DC$, find the magnitude of x .



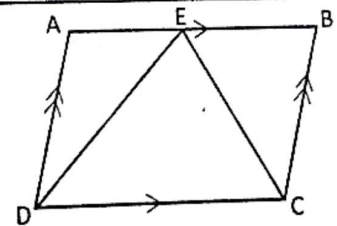
- 10) Solve: $2x^2 = x$

use radius is

- 11) The given figure is a distance-time graph of a motion of a car. Find the speed in kmh^{-1} .



- 12) In the given figure ABCD is a parallelogram with area 80 cm^2 . Find the sum of areas of the triangle ADE and triangle CEB.

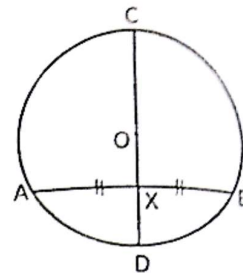


- 13) Find the probability of getting either a prime number or an odd number when a fair cubic die with its sides numbered from 1 to 6 is rolled.

- 14) According to the information given in the figure O is the centre of the circle. A, B, C and D are points on the circle. CD intersects the line AB at X .

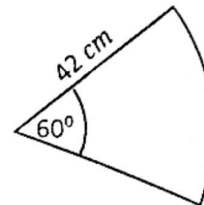
For each statement in the table, if it is correct mark " $\checkmark$ " in front of it and if it is incorrect mark " $\times$ " in front of it.

(i) CD is the perpendicular bisector of AB	
(ii) The length of AB = The length of CD	

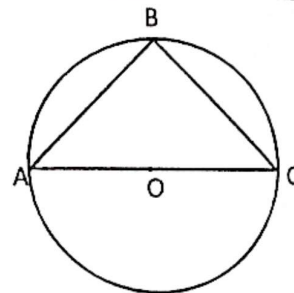


- 15) A person deposited an amount Rs. 10 000 in a bank at 18% annual simple interest rate. Find the total amount of money he received at the end of 3 years.

- 16) Find the area of the sector given in the figure.

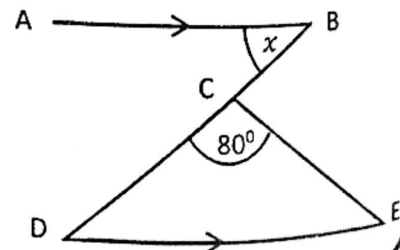


- 17) In the given figure, O is the centre. A, B and C are points on the circle. If $AB = 5$ cm, $BC = 12$ cm, find the radius of the circle.



- 18) If $x + y = 6$ and $xy = 8$, using the knowledge of binomial expression, find the value of $x^2 + y^2$.

- 19) In the given figure, $AB \parallel DE$, $DC = CE$ and $\angle DCE = 80^\circ$. Find the value of x ?



20) Shade the Venn diagram

21) The 8th difference

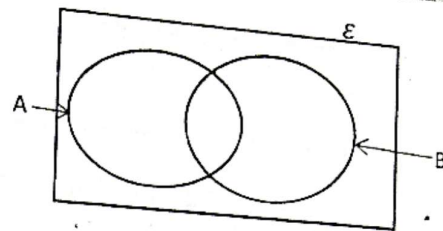
22) Write the

23) A pie-chart who sat candida

24) Simplify

25) Show that also equal

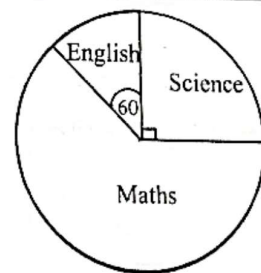
- 20) Shade the region represented by $A' \cap B$ in the given Venn diagram.



- 21) The 8th term and 1st term of an arithmetic progression are 25 and 4 respectively. Find its common difference of it.

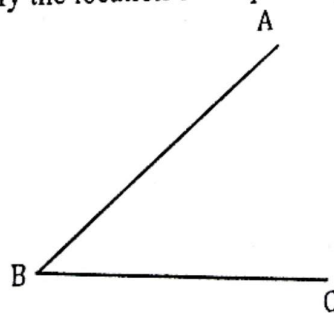
- 22) Write the equation of the straight line which passes through the points $(-2, -4)$ and $(0, 2)$.

- 23) A pie-chart prepared to depict the information obtained about the candidate who sat for an exam in science, maths and English. If number of English candidates was 18, find the number of candidates who sat for the maths?



- 24) Simplify: $\frac{4x^2y}{18xy} \times \frac{3x}{6y}$

- 25) Show the appropriate construction to identify the location of the point equi-distant from AB and BC and also equi-distant to the points B and C.

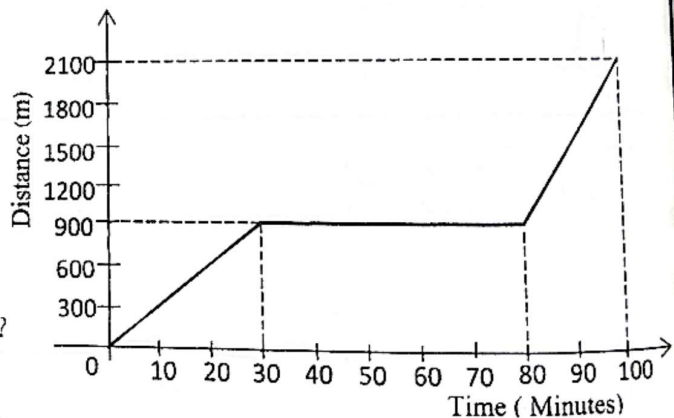


Part - B

Answer all questions on this question paper itself.

- 1) Sunil decided to use $\frac{1}{2}$ of his land for pineapple cultivation, $\frac{1}{3}$ for watermelon cultivation, $\frac{2}{3}$ of the remaining land for banana cultivation and the rest for vegetable cultivation.
- Find what fraction of whole land was allocated to cultivate the pineapple and watermelon?
 - Find what fraction of whole land was allocated to cultivate the bananas?
 - Find what fraction of whole land was allocated to cultivate the vegetables?
 - If the land allocated to cultivate bananas is 40 perches more than the land cultivated with vegetables, how many perches is the total land?

- 2) The following distance-time graph shows how Saman travelled from home to a hospital and then he travelled from the hospital to a shop.



- Find the speed in meters per second at which Saman travelled from home to hospital.
- How long did he stay in the hospital?
- Show that the speed of Saman travelled from the hospital to the shop is faster than he travelled from the home to the hospital.
- If Saman left home at 10.10 a.m., find the time he reached to the shop.

- 3) A building owned by Kamal which lies within the limits of a certain municipal council which charges 16% of the assessed annual value of the property as rates, he has to pay quarterly rates of Rs. 2 200.

i. How much has to be paid as rates for a year?

ii. What is the assessed annual value of the building?

- (b) Kamal rented this building and monthly rent charged Rs. 30 000 each for rent. He takes ten months' rent as an advance.

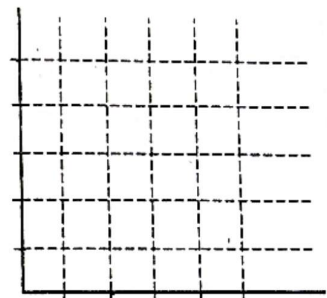
i. Find the amount of advance received.

ii. Kamal has to spend 10% of this advance is used on maintenance. Find the amount spend on maintenance.

iii. What is his net income after all the above expenses?

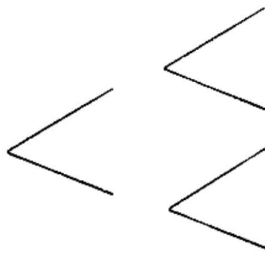
- 4) A box contains two pink balls and three blue balls of the same size and shape. A ball is drawn at random from the box and its color is noted and the ball is put back into the box and another ball is drawn at random and its color is noted.

i. Represent the sample space of the above experiment on the given grid.



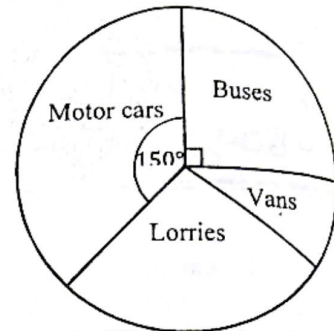
ii. Find the probability of getting a pink ball in both cases.

iii. By considering the colour of the balls drawn out and complete the tree diagram given below.



iv. Find the probability of getting balls with different colours in both cases.

5) The given pie chart represents the information collected about the vehicles travel in the highway in an hour. It was noted that the number of buses traveled was 120.



- i. What is the least driven type of vehicle during an hour?
- ii. Find total number of vehicles that travelled during that hour?
- iii. If sixty vans were travelled, what is the corresponding central angle?
- iv. How many lorries were travelled?
- v. Find the ratio between buses and vans travelled.



Instructions

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32 E II

Grade 11 – Frist 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.
- The volume of a right circular cone of base radius r and height h is $\frac{1}{3}\pi r^2 h$.
- The volume of a sphere of radius r is $\frac{4}{3}\pi r^3$

Part - A

Answer five questions only.

- If the total amount that had to be paid after 2 years 3 months to settle a loan borrowed at an annual simple interest rate of 14% was Rs. 47 340, find the loan amount.
 - The annual income of Mr. Ravi is Rs. 1 350 000. The limits and the percentages of income taxes which should be given to the government are shown in the following table.

Income	Percentage charged as tax
For the first Rs. 500 000	Tax free
For the second Rs. 500 000	4%
For the third Rs. 500 000	8%

Calculate the total amount Mr. Ravi pays, as tax for a year.

- A table prepared to draw the graph of the function $y = 3 - ax^2$ is given below.

x	-3	-2	-1	0	1	2	3
y	-15	-5	1	3	1	-5	-15

- What is the value of 'a'?
 - Using a scale of ten small divisions as one unit along x -axis and ten small divisions as two units along the y -axis, draw the graph of the above function.
- Using the graph,
 - Write the maximum or minimum value of the function and the coordinates of the turning point
 - Find the roots of the equation $0 = 3 - ax^2$.
 - Write the interval of values x for which the function decreases positively.

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3. a) Factorize

i. $49a^2 + (a + b)(-b - a)$

ii. $2x^2 - 5xy - 3y^2$

b)

i. Solve : $x = 3y - 60$

$$2x + y = 55$$

ii. $(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$. If $a^3 - b^3 = 5$ and $a - b = 5$,

find the value of ab .

4. The length of a rectangle is x cm. Its breadth is 3 cm less than the half of the value of its length. The area of a rectangle is 360 cm^2 . Express the area of the rectangle in the form $Ax^2 + Bx + C$. Find the length and the breadth of the rectangle by solving the above quadratic equation.

5. The following frequency distribution shows the scores obtained by cricket teams in ODI matches.

Scores	51-75	76-100	101-125	126-150	151-175	176-200
Number of matches	1	3	6	12	10	8

- What is the modal class?
 - Find the percentage of matches that scored more than 150 runs out of the total matches.
 - Calculate the mean mark of a match by taking the mid value of the modal class as the assumed mean to the nearest whole number.
 - What is the maximum score that can be obtained in all the matches?
6. A hollow metal sphere of internal diameter 8 cm and thickness 2 cm is melted to form a right circular solid cone of radius a cm and height h cm. Assume that the amount of metal wasted in casting is 4% and show that the radius of the solid cone $a = \frac{16}{5} \sqrt{\frac{57}{h}}$.
- If $h = 12.5$ cm, using the logarithmic table find the radius of the cone to the nearest whole number.

Part - B
Answer five questions only.

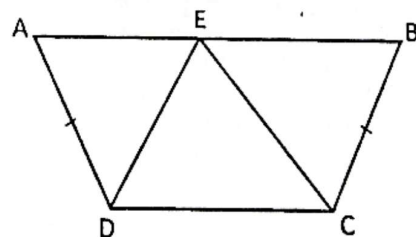
7. An oil leak occurs due to a fault in the engine of a vehicle. A drop of oil was leaked at the moment of starting the car which was parked and started the journey, another drops of oil after 20 m after the start of the journey, after 40 m and after 60 m and so on every 20 m. (Consider that the vehicle is moving continuously at uniform speed.)
- Find the distance traveled by the vehicle when the 10th drop of oil leaks.
 - How many drops of oil are spilled when this vehicle travels a distance of 2 km?
 - If the volume of a drop of leaking oil is 0.5 ml, find the distance traveled by the vehicle when 1 liter of oil is spilled.
 - When the journey starts amount of oil in the tank was 5 l. If the oil level decreases half of its amount, definitely the engine will stop. Find the maximum distance that the vehicle is able to travel without failing the engine.

8. Use a straight edge with a cm/mm scale and a pair of compasses for the following construction. Show the construction lines clearly.
- Draw a straight-line segment AB of length 6.5 cm and construct its perpendicular bisector.
 - Take the midpoint of AB as C and construct a semicircle with C as the center and AB as the diameter.
 - Construct the triangle ADB such that $AD = 5.5$ cm and $\widehat{ADB} = 90^\circ$.
 - Construct a line parallel to AB through D and mark the point E on that line so that ABED is a parallelogram.
 - Show that $\widehat{ADB} + \widehat{DBE} = 180^\circ$ with reasons.

In the quadrilateral ABCD, $AD = BC$ and $AB = 2DC$.
The point E is the midpoint of side AB and $\widehat{CEB} = \widehat{CDE}$.

Prove that,

- ADCE is a parallelogram.
- Area of the parallelogram $ADCE = 2 \times$ Area of the $\triangle BCE$
- Area of the $\triangle DCE = \frac{1}{3}$ Area of the quadrilateral ABCD.





10. A bird who perched on a branch of a 40 m tall straight tree on the bank of a lake, observes a fish who come to the surface of the water with an angle of depression of 30° . While the fish swimming towards the bank of the lake observed the bird with an angle of elevation of 45° at a certain point. Represent the above data in a rough sketch.

By drawing a scale diagram of using the scale 1:1000, find the actual distance the fish swam towards the bank of the lake from the point the fish saw the bird to the point the bird saw the fish. (Note that the fish swims in a straight path toward the lake shore, and that the foot of the tree and the fish are in the same horizontal plane.)

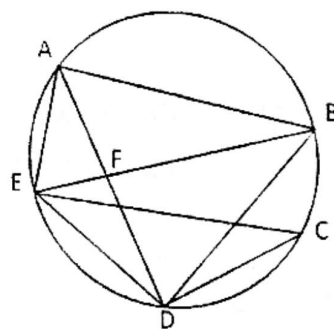
11. In a group of 60 students studying in an art institution, 30 students do not like singing and 28 students do not like playing music. There are 12 students who like both singing and playing music.

- Represent the above information in a Venn diagram.
- How many students like singing only?
- How many of the students do not like both singing and playing music.
- In the Venn diagram shade the region to represent the students who prefer at least one of singing or playing.

12. In the given figure points A, B, C, D and E lie on the circle. If $\angle AEB = 90^\circ$ and $AB = BD$

Show that with reasons,

- BE is a diameter.
- $\triangle ABE \cong \triangle BDE$
- $\angle ABE = \angle DCE$
- $AF = FD$



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