



Royal College - Colombo 07
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Grade 11 - First Term Evaluation – June 2021

Time : 2 hours
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Mathematics
ගණිතය

Name /Index No :-.....

Certified Correct.

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Signature of Invigilator

Important:

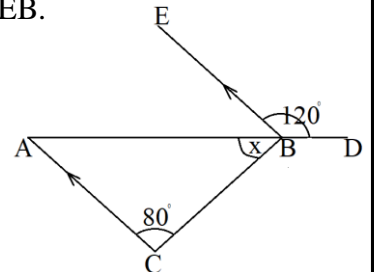
- ❖ This paper consists of 8 pages.
- ❖ Write your **Index Number** correctly in the appropriate places on this page and on page three.
- ❖ Answer all questions on this paper itself.
- ❖ Use the space provided under each question for working and writing the answer.
- ❖ It is necessary to indicate the 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

Question Numbers		Marks
A	1 - 25	
B	1	
	2	
	3	
	4	
	5	
Total		

Part - AAnswer **all** questions **on this question paper itself**.

1) If the cost of 3 oranges is 72 rupees, find the price of one orange.

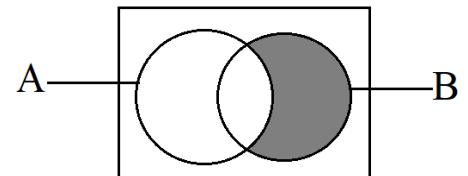
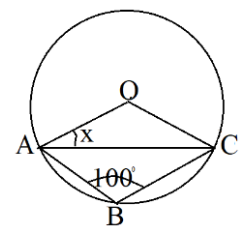
2) In the given figure, ABC is a triangle. AB is produced to D. AC is parallel to EB.
Find the magnitude of x .3) Solve : $\frac{1}{2x} + \frac{1}{x} = \frac{3}{4}$

4) A car can travel 240 km in 4 hours.

I. Find the speed of the car.

II. Find the distance it can travel in 6 hours.

5) According to the Venn diagram given, write the shaded region in set notation in terms of the sets A and B.

6) Express $\lg 1 = 0$ in index form.7) Simplify : $2\sqrt{3} + 2\sqrt{48}$ 8) A, B and C are points on the circle with centre O. Find the value of x .

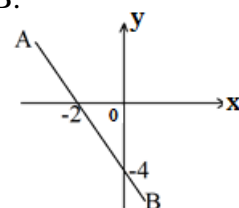
9) In a box there are 6 card numbered from 1 to 6. What is the probability of a card taken randomly from the box written with a prime number?

10) Seventh term of an arithmetic progression is 22 and the first term of the progression is 4. Find the common difference of the progression.

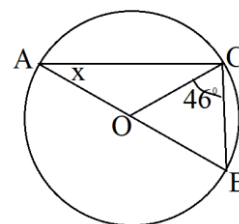
11) If $\sqrt{x} = 5$, find the value of $x^2 - 2$.

12) The height of a cylinder is 30 cm and the diameter of it is 28 cm. There is water in the cylinder to a height of 10 cm. Taking the value of $\pi = \frac{22}{7}$, find the volume of water in the cylinder in **ml**. (The volume of a cylinder with r radius and h height is given by $\pi r^2 h$)

13) According to the data given in the diagram, write the equation of the straight line AB.



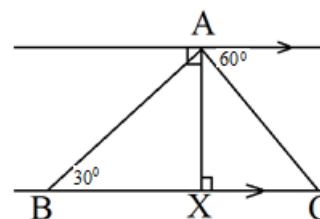
14) In the given figure, O is the centre of the circle. $\angle OCB = 46^\circ$. Find the magnitude of x .



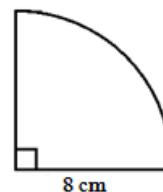
15) In the given figure, AX is a vertical post which is erected on the horizontal ground BC.

In the table place the mark (✓) in the boxes in front of the true statements if any, and mark (×) in the boxes in front of the false statement.

The angle of elevation of C from A is 60° .	
The angle of depression of B from A is 30° .	
The angle of depression of C from A is 60° .	

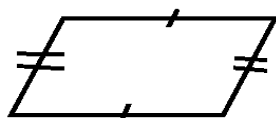


- 16) Given here is a sector of radius 8 cm. Find the base radius of the cone which can be made by using the given sector.



- 17) Factorize : $4x^2 - x - 5$

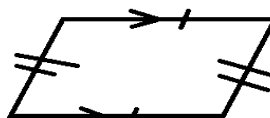
- 18) According to the data given in the figure, select and underline diagram which is not a parallelogram.



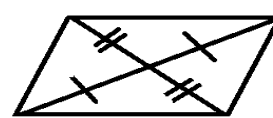
(a)



(b)



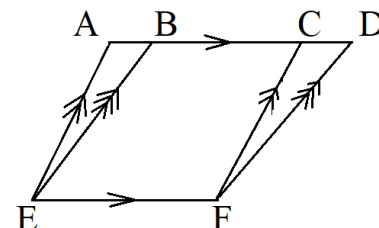
(c)



(d)

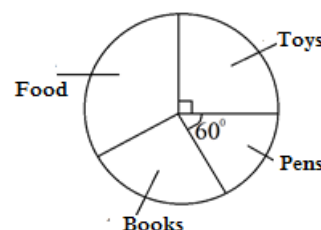
- 19) Simplify $\frac{4x^2y}{3x} \times \frac{6}{2xy^2}$

- 20) According to the given diagram, AEFC and BEFD are parallelograms. The area of the figure ADFE is 84 cm^2 and area of the figure BCFE is 40 cm^2 . Find the area of the triangle CDF?



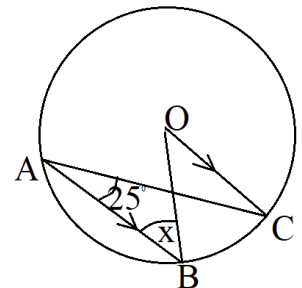
- 21) Find the number that has to be added to make the expression $x^2 - 12x$ a perfect square and express it as a perfect square.

- 22) The pie chart illustrates the values of various goods sold by a certain shop. If the value of the sale of toys is Rs.1800 find the sale value of pens?

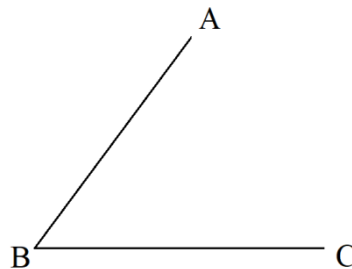


23) Find the least common multiple of the following expressions $4m^2n^2$, $10m^3n$, $2mn$

24) In the given figure, O is the centre of the circle. AB is parallel to OC and $\widehat{BAC} = 25^\circ$. Find the magnitude of x .



25) The figure shows two straight lines AB and BC which meet at the point B. Show by an appropriate construction to identify the location of a point which is equidistance from AB and BC and also is equidistance from the point B and C.



Part - B

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

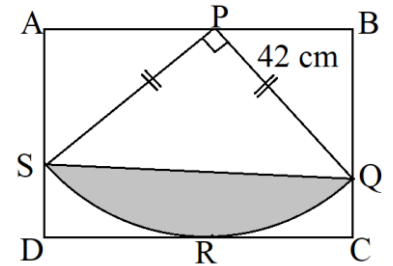
1. Mr. Sudam invested $\frac{1}{3}$ of his cash in stock market and $\frac{1}{5}$ in the bank.

(i) Find what fraction of the total amount was invested in the stock market and in the bank?

(ii) If $\frac{3}{7}$ of the remaining amount was used to start a business. Find what fraction of the total amount was used for the business.

(iii) If Mr. Sudam had another Rs. 80 000 left after starting the business, how much money did he have?

2. The figure shows ABCD rectangular shaped white colour fabric, which was prepared to make a wall decoration. The sector PQRS of it was sewn in using two colours of fabric. The triangular portion PQS is in yellow colour fabric and the segment QRS is in red colour fabric.



- (i) Find the length of the arc QRS.
- (ii) Find the area of the red colour fabric.
- (iii) Find the perimeter of the sector PQRS.
- (iv) 23 buttons sewed on the edges of the sector PQRS. If the buttons are sewn at equal distance of 7 cm along the edges of the PQ and PS, what is the distance between two buttons sewn at equal along the arc QRS?

3. (A) Mr. Perera's annual assessed value of the house is Rs. 950 000 and his annual income is Rs. 750 000. The local authority charges 8% of the assed annual value of the house as rates.

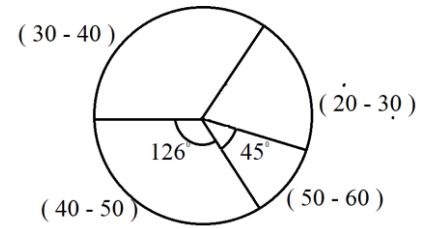
- (i) How much has to be paid as rates for year?
- (ii) How much has to be paid as rates for a quarter?

- (B) The first Rs. 500 000 of annual income is exempt from income tax and the next Rs. 500 000 is subject to 4% income tax

- (i) How much Mr. Perera's annual income tax?
- (ii) Find his annual income after paying the rates for a year and income tax?
- (iii) If $\frac{3}{4}$ of the balance is spent on food, what is the cost of food?

4. The following pie chart illustrates the information on the age group of employees in an institution.

- (i) If the number of employees in the age group of 50-60 is 15, what is the total number of employees in the institution?



- (ii) How many employees are belonging to the age group of 40-50?
- (iii) If the number of employees in the age group 30-40 is three times of the number of the age group 50-60. Complete the table given below by filling the number of employees in each age group.

Age Group	20 - 30	30 - 40	40 - 50	50 - 60
Number of Employees				15

- (iv) The cost of breakfast of an employee is 172 rupees and the cost of the lunch is three times of the cost of the breakfast. If all the employees in this institution getting both meals per day, find how much does the owner spend on food for 30 days?

5. In a box, there are 2 black balls and 3 white balls with the same shape and size. The two black balls are numbered 1 and 2 and the white balls are numbered 1, 2 and 3. A ball is drawn random, its color is recorded and then put back to the box. Then another ball is drawn from the box and its color is also recorded.

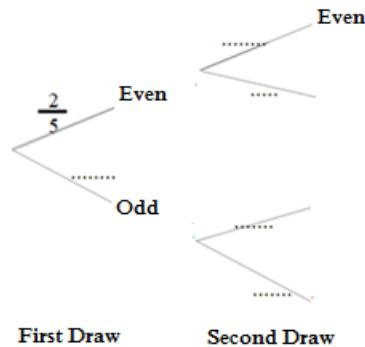
- (i) Using the symbol 'X' represent the sample space of the experiment of drawing balls, in the given grid. (B₁, B₂ represent black balls and W₁, W₂, W₃ represent white balls)

Second Draw	W3					
	W2					
	W1					
	B2					
	B1					
		B1	B2	W1	W2	W3
	First Draw					

- (ii) In the grid encircle the event of drawing the different color balls on both occasions and find its probability.

- Suppose that the number marked on the ball was also recorded in each of the above drawings.

- (iii) Complete the following tree diagram relevant to this random experiment.



- (iv) Find the probability of drawing balls marked with an even number at least once.

- (v) State with reasons whether there is a greater probability of drawing balls marked with an even number at least once or drawing the different color balls on both occasions.



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II

Grade 11 – First Term Evaluation – June 2021

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Mathematics - II

ගණිතය - II

Time : 3 hours

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Important

- * 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 $\frac{1}{3} \pi r^2 h$ and the volume of a sphere of radius r is $\frac{4}{3} \pi r^3$

Part - A

Answer **five** questions **only**.

- 01.** A man builds a small house and a large house for sale. The cost of building a small house was $\frac{3}{5}$ of the cost of building a large house. He was able to make a 22% profit from selling the big house for Rs. 30 500 000.
- (i) How much did he spend for the construction of the large house?
 - (ii) How much did he spend for the construction of the small house?
 - (iii) If he sold the small house with a 22% of profit, what was the selling price of the small house?
 - (iv) Instead of construction of two houses, if he deposited the same amount in fixed deposit of a bank which pays an annual simple interest rate of 21%, find his annual income.
 - (v) If it takes a year from the start of the construction of houses to the date of sale, state whether which is more profitable build houses for sales or depositing money in the bank.
- 02.** An incomplete table of values prepared to draw the graph of the function $y = 7 - 2x^2$ is given below.

x	-3	-2	-1	0	1	2	3
y	-11	-1	5	7	-1	-11

- (i) Find the value of **y** when **x = 1**
- (ii) Taking 10 small division as one unit along the **x** axis and 10 small division as 2 units along the **y** axis, draw the graph of the function.

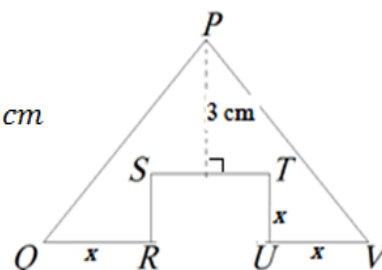
Using the graph,

- (iii) Write the equation of the axis of symmetry.
- (iv) Using the graph find the roots of $7 - 2x^2 = 0$
- (v) If the graph of the function $y = 7 - 2x^2$ moves downwards along the **y** axis by 3 units. Write the equation of the graph.

03. (a) A group of children bought some guavas. If they cut each guavas into 4 equal pieces and divide one piece for each child, 3 pieces will be left. If one guava is cut into 3 equal pieces and divided into one piece for each child, 2 pieces will not be enough. Take the number of children as x and the number of guavas as y and construct a pair of simultaneous equations. Find the number of children and the number of guavas separately by solving them.

(b) Simplify $\frac{x+1}{y} \div \frac{2(x+1)}{x}$

04. In the lamina $PQRSTUV$ shown in the figure is made by cutting and removing a $SRUT$ rectangular portion of the breadth x cm from a PQV triangular metal plate. The length of the side QV is $8x$ cm. The perpendicular distance from P to ST is 3 cm. Write down the length of ST in terms of x .



If the area of this lamina is 18 cm^2 , show accordingly that the equation $x^2 = 6x - 9$ is obtained and by solving it find the value of x .

05. The following frequency distribution shows the number of milk powder packets sold in a shop in 105 days (Here, 50-60 denotes the interval 'greater than or equal to 50 and less than 60').

Class Intervals (milk packets)	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Number of days(f)	10	11	10	21	19	17	17

- What is the modal class of the distribution?
 - By taking the mid-value of the class interval (50-60) as the assumed mean, find the mean amount of milk powder packets sold in a day.
 - Considering that the selling pattern of these milk powder packets is unchanged, the shop owner stores the required milk powder packets for 60 days. If the price of a packet of milk powder is 120 rupees, how much does he spend on it?
06. The pilot of the fighter jet who was traveling 1200 m above the sea level in a horizontal line from east to west, at one point observes two enemy boats X and Y parked at sea. At that point, boat X was observed with an angle of depression 30° and boat Y was observed with an angle of depression 60° . Forty seconds after the initial observation of the fighter jet, the boat X appears with an angle of depression 60° . (The fighter jet and the two boats are in the same vertical plane)
- Sketch a diagram to depict the given information.
 - Draw a scale diagram using the scale of $1 : 20\,000$
 - Using the scale diagram, find the distance between the two boats to the nearest whole number.
 - Find the speed of the fighter jet.

Part - B
(Answer five questions only.)

07. The Mathematics teacher, Jayaruwan conducted an experiment to measure the amount of water that comes out in each minute from a container filled with 1 l of water. The information he recorded was as follows. 60 ml of water was released in the first minute, 58 ml of water in the second minute and 56 ml of water in the third minute. Amongst the records maintained in this experiment, it was recorded that the amount of water that came out in the last minute was 20 ml.

- (i) Show that the amount of water released in each minute are in an arithmetic progression.
- (ii) Find the amount of water that comes out in the 7th minute?
- (iii) Find the volume of water left in the container after the final observation.
- (iv) Indicate the volume of water discharged as a percentage of the total volume of water.

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

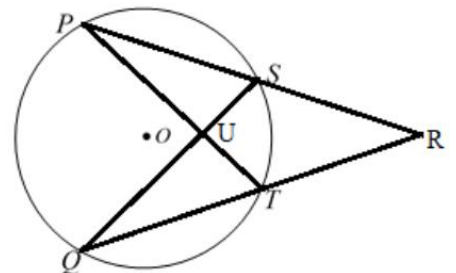
- (i) Construct a straight line segment PQ of length 7.5 cm.
- (ii) Construct the perpendicular bisector of the line PQ .
- (iii) Find the point R which is located such that $PR = 6.0$ cm and $\angle PRQ = 90^\circ$, find the RQ length.
- (iv) Construct the line through R parallel to PQ . Find the point S , which is situated on that line such that $\angle RPQ = \angle RSQ$.
- (v) Give reason why $\angle QSP = 90^\circ$.

09. In the quadrilateral $PQRS$, $PQ \parallel SR$ and $PQ > SR$. The mid point of the side PS is T . Line drawn through T parallel to PQ meets QR at U . A line drawn through U , parallel to PS meets line PQ at V and line SR produced at X . Lines TU and SQ intersect at O .

Show that $TU = \frac{1}{2} (PQ + SR)$ and area of the quadrilateral $PQRS$ is twice the area of the triangle PSU .

10. PS and QT are two chords of a circle with centre O . The chords PS and QT produced meet at R . The lines PT and QS intersect at U . If $\angle QP = 40^\circ$ and $\angle SPT = 30^\circ$, by giving reasons, find the magnitudes of the following angles.

- (a) (i) $\angle PSQ$
- (ii) $\angle PUQ$
- (iii) $\angle PTR$
- (iv) $\angle PRQ$



(b) Using the values you found above show that $\angle POQ = 5\angle PRQ$

11. (a) Find the value of $n(B)$ when $n(\epsilon) = 30$, $n(A) = 17$, $n(A \cap B) = 7$, and $n(A \cup B)' = 5$

(b) 40 students in a class chose sports A and B as follows. 5 have chosen only sport A and 10 have not chosen sport B. The number of students who have chosen both sports A and B is twice the number of students who has chosen sport B only.

- (i) Represent the above information in a Venn diagram.
- (ii) How many of them chose both the sports.
- (iii) How many of them chose only one sport.
- (iv) How many of them chose sport **B**.
- (v) Find $n(A \cup B)$.

12. The figure shows a model of a fancy toy. It is made by removing a conical shaped part of the base radius $a \text{ cm}$ and a height $3a \text{ cm}$ with a solid sphere of glass of radius $3a \text{ cm}$. When the model is sinks into a cylindrical vessel filled with water to a height of $b \text{ cm}$ with a base radius $r \text{ cm}$ its water level rises to 40 cm . Show that $r^2 = \frac{35a^3}{40-b}$.

When $a = 14 \text{ cm}$ and $b = 15 \text{ cm}$ using the logarithms table, find the value of r correct to first decimal place.

