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புனித பேதுரு கல்லூரி, கொழும்பு 4
St. Peter's College - Colombo 04

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II ශ්‍රේණිය – දෙවන වාර ඇගයීම - 2022
தரம் 11 - விசேட மீளாய்வு - 2022
Grade 11- Second Term Examination - 2022

ගණිතය II
Mathematics II

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Three Hours

- Answer ten questions selecting five questions from part A and five questions from part B.
- All answers should show the working method and correct units.
- Each question carries 10 marks.

PART A

Answer Only 5 Questions.

1) a) Find the loan amount if the Interest paid for $3\frac{1}{2}$ years is Rs. 42000, when the annual simple interest rate is 15%.

b) Given below is a table on the Income tax percentage charged on annual income of an individual.

Annual Income (Rs.)	Income Tax
Initial Rs. 500,000	Tax Free
500 000 - 1 000 000	4%
1 000 000 - 1 500 000	8%
1 500 000 - 2 000 000	12%
Over 2 000 000	15%

If the annual income of an individual is Rs. 2 500 000, calculate the total annual income tax.

2) Given below is an incomplete table that is used to draw the graph of the function $y = x^2 - 5$.

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

a) i) Find the value of y when $x = 1$.
ii) Use a suitable scale and draw the above graph.

b) Using the graph,
i) Find the co-ordinates of the turning point.
ii) Find the equation of the axis of symmetry of the graph.
iii) What is the interval of values of , for which the function is increasing negatively ?
iv) Find the values for $\sqrt{5}$.

(4) If the area of a semi circle with radius x cm is equal to the area of a rectangle whose width is 3π cm and length is **(x + 1)** cm.

(i) show that x satisfies $x^2 - 6x - 6 = 0$.

(ii) Solve the quadratic equation in (i) above by completing the square or by some other method and show that $x = 3 \pm \sqrt{15}$

(iii) Taking $\sqrt{15} = 3.87$ find the radius of semi circle to the nearest first decimal place.

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(5) Three cities A, B and C are situated on horizontal plane. The bearing of B from A is 070° and the bearing of C from B is 120° . From city A, a car travels at a speed of 60 kilometers per hour and reaches the city of B in an hour. It travels at a speed of 50 kilometers per hour from the city of B and reaches the city of C in 1 hour and 30 minutes .

(i) Find the **distance** from city A to city B and the distance from city B to city C.

(ii) Taking the scale $10\,km \rightarrow 1\,cm$, Draw a scale diagram

(iii) Write down the shortest distance from the city **A** to city **C** according to the scale diagram

(iv) Measure and write down the bearing of C from A

(v) find the bearing of B from C

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(6) The table below details were its 100 tourist a tourist hotel in 2018

No of tourist	41 - 50	51 - 60	61 - 70	71 - 80	81 - 90	91 - 100	101 - 110
No of days (f)	4	8	16	24	20	16	12

(i) What is the class interval that the mode contains

(ii) Taking the mid value of the model class as the assume mean, Find the nearest whole number of visitors per day in 2018

(iii) If the mean number of visitors per day in 2019 is 72 . Show that tourist arrivals in 2019 are 10 % lower than in 2018

Part B

Answer five questions only.

(7.) *(a)* In an arithmetic progression, The sum of the first 3 terms of an arithmetic progression is 27 and the common difference is 4.

(i) Find the **first term** of the arithmetic progression

(ii) Find the sum of the first 10 terms.

(b) What is the name of progression in which the above arithmetic progression as the first term, the sixth term, and the thirty-first term are the first three terms? then find the fifth term in this progression.

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(8) Do the following constructions using the ruler(cm/mm) and the compass only. Show the construction lines clearly.

(i) construct a triangle such that , PQ = PR = 6 cm and $\hat{QPR} = 120^{\circ}$

(ii) construct the locus of a point moving equidistance of P and Q

(iii) construct a straight line parallel to PQ through R . name the intersecting point of the above (ii)locus and the parallel line as T and Construct the quadrilateral PQTR satisfying the above requirements.

(iv) show that RQ is the **angle bisector** of the $\hat{PRT}$

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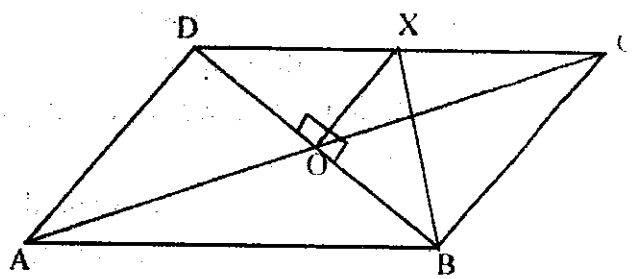
(9) The diagonals of the ABCD parallelogram intersect at O , a perpendicular at O of BD is meet CD at X

(i) show that , $\Delta BOX \equiv \Delta DOX$

(ii) show that BD is the angle bisector of the $\hat{ABX}$

(iii) show that **AB = BX + XC**



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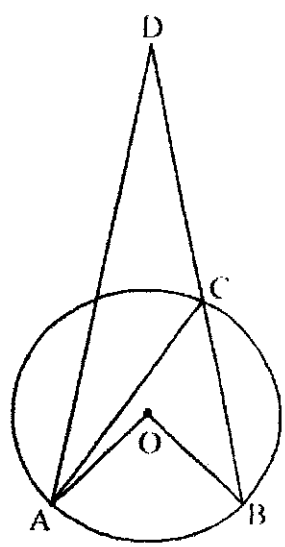
(10) The center of the circle in the given figure is O and AC = CD

Prove that,

(i) $\hat{DAC} = 90 - \frac{1}{2}\hat{ACD}$

(ii) $\hat{AOB} = 4\hat{ADC}$



(11) A solid metal cone with the radius r and the height is **three times the radius**, is melted and a solid sphere with radius ***a*** is made without wasting the metal.

Show that the radius of the sphere is $a = \sqrt[3]{\frac{3}{2}}\,r$

and if r = 6.5 cm , Find the radius (***a***) of the sphere using logarithmic tables .

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(12) Out of 65 students in an Art institute 30 students study Music .
There are 27 students study Dancing and 20 students **do not** study either Music or Dancing .

(i) Indicate the above information in a Veen diagram

(ii) Take the number of students studying both music and dancing as x and build a simple equation and solve ,find the value of x

(iii) how many students study only music

(iv) Eleven out of twenty students who do not study music and dancing intend to study only Drama.
But then out of the students who agreed to study only Drama students, 4 has been willing to study dancing also.
Five students who were studying **only** dancing have also expressed interest in studying drama.
Add the Drama set to the Venn diagram above and draw a new Veen diagram to represent the above data on it.

(v) How many students study dancing and drama are there now?

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