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மாகாணக் கல்வித் திணைக்களம் - வட மத்திய மாகாணம்
DEPARTMENT OF EDUCATION – NORTH CENTRAL PROVINCE

SECOND TERM TEST - 2019

Grade
10

SUBJECT - Mathematics- I

School : .....

Name of the Student/ Index No : .....

.....

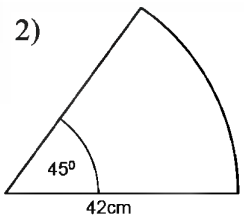
Time : 2 hrs.

Part A

❖ **Answer all the qnestions on the paper itself.**

1) If the customs duty of 12% of the value of an item is charged, find the amount that has to be paid as duty when exporting a television valued Rs.50 000.

2)

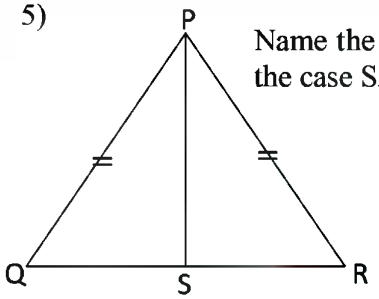


Find the arc length of the sector

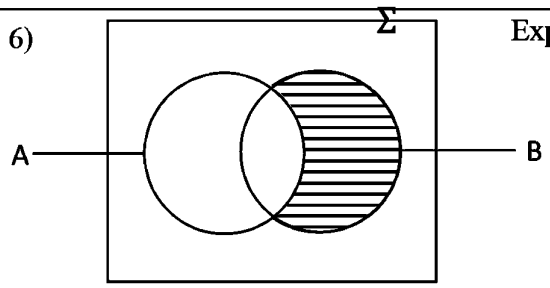
3) Find the L.C.M of the algebraic terms $4b^2$, $8a^2b$

4) Solve $3x - 2 = 7$

5)



Name the pair of angles which must be equal, to be the $PSQ\ \Delta$ and $PSR\ \Delta$ under the case SAS.

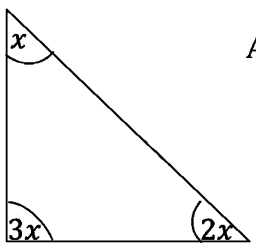
6) 

Express the shaded part in set notation.

7) Express $\log_5 x = 3$ in index form

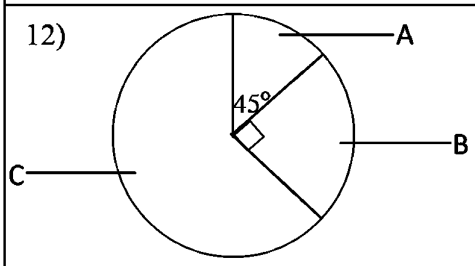
8) If the area of the sector of central angle $90°$ is $100cm^2$, find the area of the whole circle.

9) If $(5.7)^2 = 32.49$, $(5.8)^2 = 33.64$, what is the most suitable value for the first approximation of $\sqrt{33}$?

10) 

According to the given information in the figure, find the value of x .

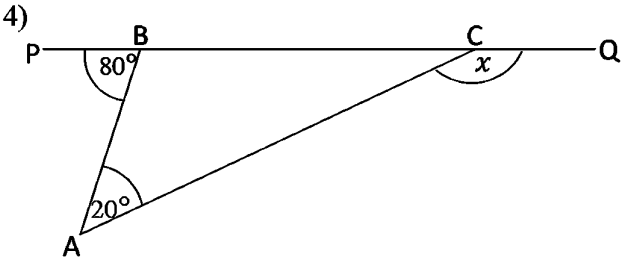
11) Factorize $a^2 + a - 12$.

12) 

The following pie chart is drawn with the information gathered from a phone shop regarding the phones sold during a month. If 800 was the total number of phones sold, find the number of type A phones sold in the shop.

13) Simplify $\frac{1}{3x} + \frac{5}{6x}$

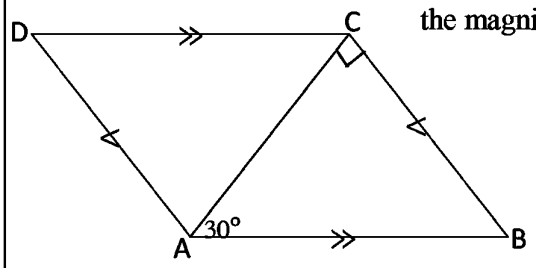
14)



Find the value of x.

15) Write the equation of the straight line of gradient 2 and passing through the point (0,4)

16)



In the parallelogram $ABCD$, $A\hat{C}B$ is a right angle. If $\hat{AC} = 30°$, find the magnitude of $A\hat{D}C$

17) Find the solutions of quadratic equation $a(a-3) = 0$

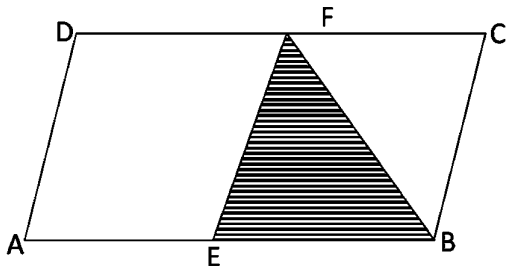
18) Eight hours are taken by 3 machines to complete a task. Find the number of hours taken by 4 machines to complete the same task.

19) If $n(P) = 10,\ n(P \cup Q) = 15,\ n(P \cap Q) = 8,$ find $n(Q)$

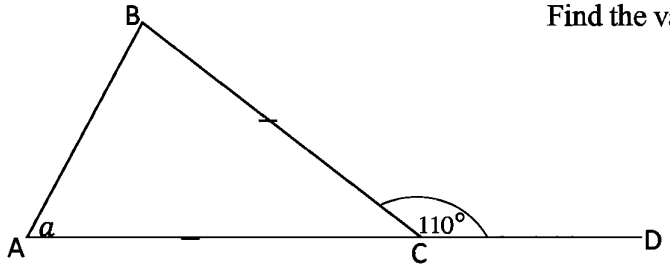
20) Find the value of a which satisfies the following pair of simultaneous equations.

$$3a - b = 5$$
$$2a + b = 5$$

21) In parallelogram $ABCD$, the mid points of sides AB and CD are E and F respectively. If the area of the $BEF\Delta$ is $24cm^2$, find the area of the parallelogram BCD.



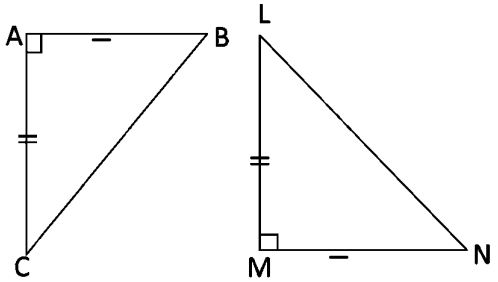
22) Find the value of a.



23) If a runner completes a $800m$ race within 1 minute and 40 seconds, find his speed in meter per second.

24) If $5=10^{0.6990}$ what is the logarithm of 5 to the base 10 ?

25) According to the given information, state whether $ABC\Delta$ and $LMN\,\Delta$ are congruent or not. If they are congruent, write their congruency case.



Part B

Answer all the qnestions

01) $C = \{x \in Z, x \text{ is a prime number}, 1 < x < 20\}$

i. List out the elements of C

C = {.....} (02 marks)

ii. $n(C') =$ (01mark)

b) A and B are not disjoint sets.

If $n(\in) = 22$
$n(A \cap B) = 4$
$n(A) = 10$
$n(A \cup B)' = 5,$

i. Draw a Venn diagram according to the given information and include the given data. (03 marks)

ii. Using the Venn diagram find

a) $n(B) =$ (01mark)

b) $n(A \cup B) =$ (01mark)

iii. Shade the region $(A \cap B)'$ in the above Venn diagram. (02marks)

02) A water tank of a house was completely filled with water. On the first day, $\frac{1}{4}$ of the water in the tank was used. On the second day, $\frac{1}{5}$ of the remained water was used.

i. What is the fraction of the remaining water on the first day, from the capacity of the water tank? (01mark)

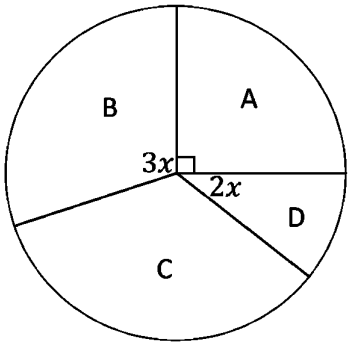
ii. What is the fraction of the water used on the second day from the capacity of the water tank? (02 marks)

iii. If the consumed water on the second day is $270l$, find the capacity of the water tank in litres.(02 marks)

iv. Find the volume of water used on the first day. (02 marks)

v. After the tank is emptied completely , it is filled again with a pump through which water flows at a uniform rate of $30l$ per minute. Find the number of hours that will take to fill the tank completely. (03 marks)

03) The following pie chart shows the information of 720 persons in 4 Gramasewa Divisions A, B, C and D. The angles at the centre of the sectors division B and D are $3x$ and $2x$.



i. Find the number of persons living in the Gramasewa Division A. (02 marks)

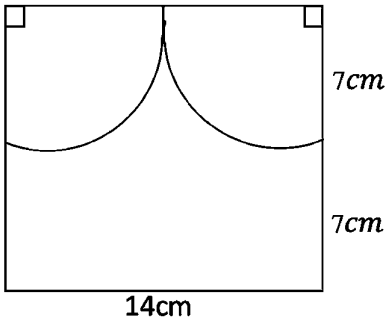
ii. If there are 220 persons in the Gramasewa Division C, find the relevant angle at the centre of the sector (02 marks)

iii. Find the value of x and find the angles at the sectors which represent the number of persons live in the Gramasewa Divisions B and D separately. (03 marks)

iv. Accordingly, find the number of persons living in Divisions B and D separately. (02 marks)

v. Find the ratio between the number of persons who live in the Divisions A and C in the simplest form. (01marks)

04) The following diagram shows a part of a sketch of a crown prepared by Nimal using a square shaped piece of cardboard.



i. Find the area of the square shaped cardboard piece. (02 marks)

ii. If the above two sectors are cut and removed, find the area of the removed parts. (02 marks)

iii. Find the area of the remaining part. (02 marks)

iv. Nimal plans to paste a red ribbon around the remaining part. Find the minimum length of the ribbon needed for it. (02 marks)

v. If the price of $1m$ of ribbon is Rs. 40, find the cost for the ribbon. (02 marks)

05) A farmer says that it takes 3 days for10 men who work 8 hours per day, to cut paddy in his field.

i. What is the magnitude of the task in man hours? (02 marks)

ii. If Rs. 175 is paid for one man hour, find the total expenditure for the whole task. (02marks)

The farmer expects to cut paddy by using some machines that can do 60 man hours at one hour.

iii. If 2 such machines are used at once, how many hours will it take to complete the task? (02marks)

iv. If Rs. 10 000 is charged for one machine for one hour, find the total expenditure. (02marks)

v. Find the profit he gained and hence mention that which method is more advantageous to cut the paddy. (02 marks)

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மாகாணக் கல்வித் திணைக்களம் - வட மத்திய மாகாணம்
DEPARTMENT OF EDUCATION – NORTH CENTRAL PROVINCE

SECOND TERM TEST - 2019

Grade
10

SUBJECT - Mathematics-II

School : .....

Name of the Student/ Index No : .....

.....

Time : 3 hrs.

- **Answer 10 questions selecting 5 questions from part A and 5 questions from part B.**
- **Each qnestion carries 10 marks.**

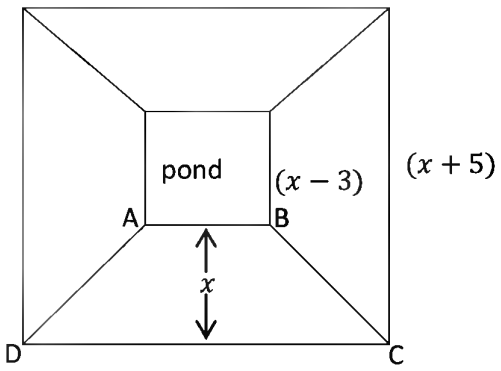
Part A

01) The following table shows the information on how the income taxes are calculated in a certain year.

Annual income	Tax percentage
Initial Rs.500 000	Tax free
Second Rs500 000	4%
Third Rs.500 000	8%
Next Rs. 500 000	10%

If the annual income of a certain businessman is Rs.1 800 000, express the annual income tax as a percentage of his annual income. (10 marks)

02) According to the following figure, 4 similar trapezium shaped flower beds are to be constructed around a pond. The total area of the 4 flowerbeds is $80m^2$.



i. Find the area of ABCD in terms of x. (03 marks)

ii. Write an equation for the total area of the 4 flowerbeds and show that $x^2+x-20=0$ (3marks)

iii. By solving the quadratic equations, find the perimeter of the pond, getting the positive value of the solution. (05 marks)

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

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

a) i. Fill in the blank of the above table. (01 mark)

ii. Using the seale of 10 small divisions as one unit along the x axis and along the y axis, draw the graph of the above funetion. (03 marks)

b) Using the graph,

i. Write the coordinates of the turning point. (01 mark)

ii. Write the maximum value of the function. (01mark)

iii. Find the roots of $x^2 - 4 = 0$ (02 marks)

iv. Find the range of values of x for whieh the function is inereasing positively. (02 marks)

(04) Simplify using logarithms table.

I47 ÷ 27.3 (04marks)

b) i. Find the L.C. M of $(x - 5) and \ x^2 - 7x + 10$ (02marks)

ii Simplify

$$\frac{x+2}{x-5} - \frac{7(x-2)}{x^2-7x+10}$$ (04 marks)

05) Factorize,

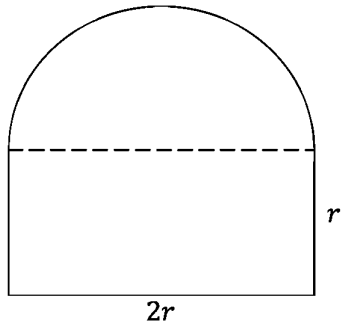
$$m^2(a - b) + n^2(b - a)$$ (03 marks)

b) Saman owns a vehicle showroom. The number of vans in his showroom is 4 less than the twice of the nuniber of busses in the showroom. After two vans were sold, the twice of the remained number of vans is equal to the number of buses.

i. Construct a pair of simultaneous equations by taking the number of vans as x and the number of buses as y. (02 marks)

ii. Solve this pair of simultaneous equations and find the number of vans and buses separately. (05 marks)

(06) The following figure shows a frame of a window shutter of a storeroom of a house which was prepared by folding and wielding a metal wire of $3m$ length without wastage. Find the area of the sheet which was used to cover it. (I0 marks)

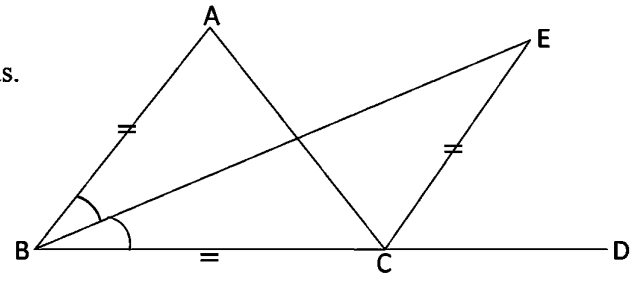


Part B

(07) BCD is a straight line. The bisectors of $A\hat{B}C$ and $A\hat{C}D$ meet at E . Also $AB = BC = CE$.

i. Prove that $A\hat{B}C = E\hat{C}D$ (05marks)

ii. Prove that $ABCE$ is a rhombus. (05 marks)

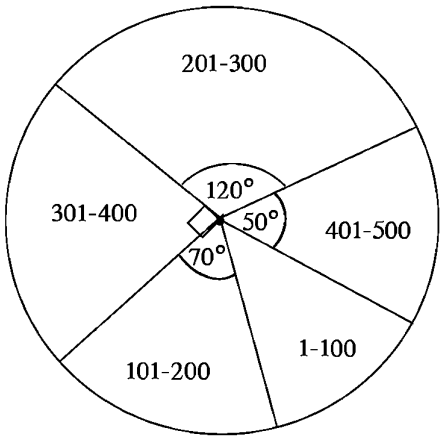


(08) The midpoint of the side of AB accute angled triangle ABC is D . The perpendiculars drawn from the point D to BC and AC are DE *and* DF. Also $DE = DF$. Prove that ABC is an isosceles triangle. (06 marks)

b) If $CE = 2BE$ prove that,

$$\frac{area\ of\ BDE\ \Delta}{area\ of BDC\ \Delta} = \frac{1}{3}$$ (04 marks)

(09) The pie chart given below shows the information gathered from the funds received at a book donating programme of a Children's Club.



i. Find the angle at the centre of the sector which represents the class interval 1- 100 in the pie chart. (02m)

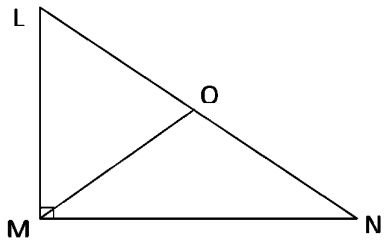
ii. If the number of donors relevant to the class interval1-100 is 12, find the total number of donors. (02m)

iii. Complete the table using information in the pie chart. (04 marks)

The amount of money donated (Rs.)	1-100	101-200	201-300	301-400	401-500
Number of donors.	12	.....	.....	.....	.....

iv. A person was made aware of this later and he came and donated Rs. 150. If the pie chart was prepared including him, find the angle at the center of the class interval 101-200. (02 marks)

(10) In $LMN\,\Delta$, $L\hat{M}N = 90°$, O lies on the side of LN , such that $O\hat{M}N = O\hat{N}M$



i. Name a side which is equal to the side MO with reasons (02 marks)

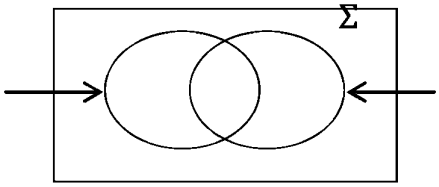
ii. If $O\hat{M}N = a$, find the magnitude of $O\hat{N}M$ and $M\hat{O}L$ in terms of a. (02 marks)

iii. Using the magnitude of $L\hat{M}N$, find the magnitude of $O\hat{M}L$ in terms of a. (02 marks)

iv. Considering the angles of the LMN , find the magnitude of $M\hat{L}O$ in terms of a. (02 marks)

v. Show that LMO is an isosceles triangle. (02marks)

(11) 20 students out of 35 students who went on a trip are girls. At the end of the trip, 8 girls submitted the assignment and the number of boys who did not submit the assignment is 5.



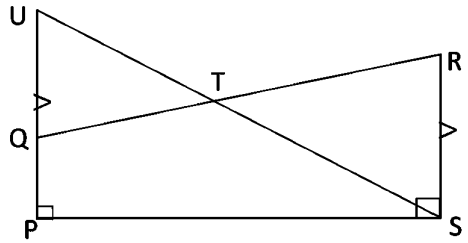
i. Complete the above Venn diagram by using the given information. (04 marks)

ii. How many boys submitted the assignment? (02 marks)

iii. Find the total number of students who submitted the assignment. (01 marks)

iv. If all the girls who participated in the trip submitted the assignment in the next week, draw a new Venn diagram to show the information. (03 marks)

(12)



In the above figure, the area of the trapezium $PQRS$ is equal to the area of the $PSU\,\Delta$. By getting the perpendicular distance between the parallel lines PQ and RS as h ,

a) i. Write an expression for the area of the trapezium $PQRS$ in terms of the sides (01 marks)

ii. Write an expression for the area of the $PSU\,\Delta$ in terms of the sides. (01marks)

b) i. Using the above two expressions prove that $SR = QU$ (03 marks)

ii. Prove that the quadrilateral $UQSR$ is a parallelogram with reasons. (03marks)

c) The ratio between the magnitudes of $U\hat{T}Q$ and $Q\hat{T}S$ is 1:3.If $U\hat{Q}T = 70°$, find the magnitude of $T\hat{S}R$ (02marks)