Grade 10

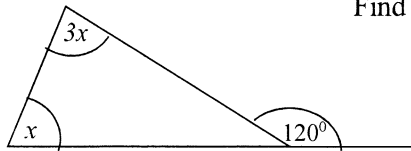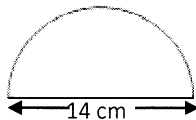| Mathematics - I | 32 E I | Time : 2 Hours |

- **Answer all questions.**

Part - A

01) There is enough food for 6 men for 8 days. After 2 days 2 more men joined the group. For how many more days will the food be sufficient?
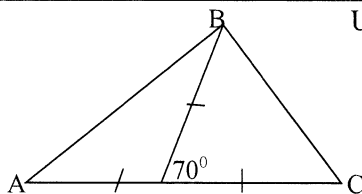
02) Factorize : $2x^3 - x$

03)

Find x

04) Fond the perimeter of the given semi circle.
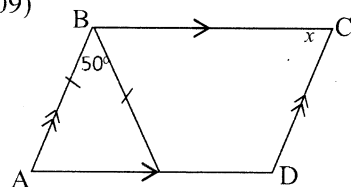

05) Simplify : $\frac{1}{2x} + \frac{1}{3x}$

06)

Using the given information find $A\hat{B}C$.

07) Find x if $\log_3(2x+1) = 2$

08) A cylindrical vessel of radius 3.5 cm has water in it. Find the height that the water level will rise when an object of volume $770cm^3$ is put inside the vessel.
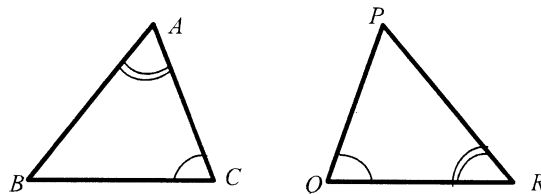
09)

Find x in *ABCD* parallelogram.

10) Solve $x^2 + 6x = 0$

11) The rate of water flow of a hose is 5 ℓ min^{-1}. Find the time it will take to fill a cuboid shaped tank of length, breadth and height 1m, ½ m and ¼ m respectively.

12) Write the other requirement for the given two triangles *ABC* and *PQR* to the congruent and state the case of congruency.

13) There are 2 blue, 3 black and 1 red unique pens in a box. A child randomly takes out a pen from the box. Write the relevant sample space.
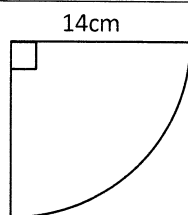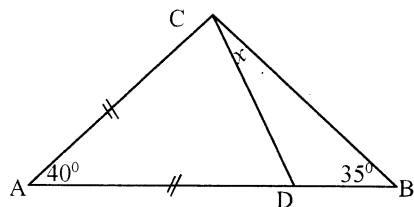
14)
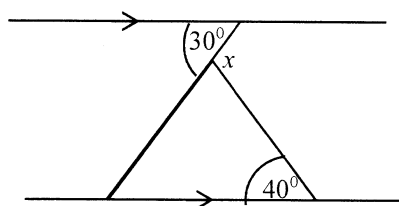
Find x

15) The assesses value of a house is Rs. 30000. As quarterly, an amount of Rs. 225 is charged. Find the annual rate percentage.
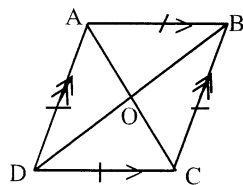
16)

Find the area of this figure.

17)

Find x

18) Without solving separately for x and y, obtain the value of $(x+y)$

$2x + 3y = 15$

$3x + 2y = 25$.

19)

ABCD is a Rhombus.

If $AC = 12$ cm and $BD = 16$cm find the length of a side.

20) Using the Venn diagram find,

i) $A' \cap B$

ii) $(A \cup B)'$
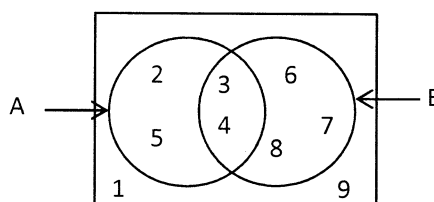
21) Make 'd' the subject of the formula $T = a + (n-1)d$

22)
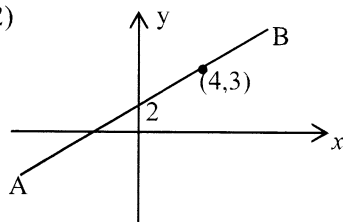
Find the gradient of the straight line AB and write its equation.

23) The mean mark of 5 subjects of a student is 64. If he got 95 for the sixth subject, calculate the new mean.

24) Find L.C.M. of $3x^2$, $4xy$, y^2

25)
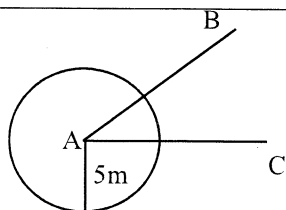
AB and AC are two roads which meets at A. The point T is situated at 5m distance from point A and at equal distance to both AB and AC. Using the knowledge of loci, show the appropriate situation of T on this diagram.

Part - B

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

01) Out of the students who are going to face O/L examination in a certain school, $\frac{2}{7}$ study music and $\frac{3}{5}$ study dancing. $\frac{1}{4}$ of the remaining students study drama. All the rest of the students study Art subject.

   i) Give the amount of students who study music and dancing as a fraction of the total amount of students.

   ii) What fraction of students study drama?

   iii) If 10 students learn drama, find the total number of students who sit for O/L examination.

   iv) If $\frac{4}{5}$ of students who studied Art received A passes, find the number of students who got A passes for Art.

02) a) The assessed value of a house is Rs. 25100. The urban council charges Rs. 502, as quarterly rates.

   i) Find the annual rate amount.

   ii) Find the annual rate percentage.

   iii) Find the amount of men needed to finish the above task in 6 more days.

   b) 12 men take 15 days to make a ground. After working for 5 days, the rest of the work is expected to be finished in 6 more days.

   i) How many man-days are needed for making the ground?

   ii) Find the amount of men needed to finish the above task in 6 more days.

03) The pie chart shows the information about farmers. (AB is the perimeter). Twice the number of farmers grow other crops than the number of Farmers who grow fruits.
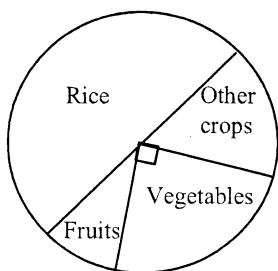
   i) What is the angle of the sector which belong to the least number of farmers.

   ii) Find the angle of the farmers who grow other crops.

iii) If 120 farmers grow vegetables, find the number of farmers who grow fruit.

iv) Each farmer will receive a set of farming equipment. Calculate the total number of farming equipment sets.

04)

C

B

Q

D·

R

5m

S

P 12m

x y 4m 3m
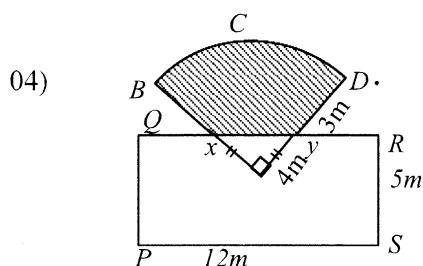
A plan of a garden is given in this figure.

i) Find the perimeter of the sector *ABCD*.

ii) Find the area of the shaded part.

iii) Find the area of the whole garden.

iv) A rectangular part is suggested to be added to the garden such that PQ is a side and the area of the new part is the same as the shaded area. Display it in the figure with relevant measurements.

05) A flower bed has red roses, white roses and other flowers.
   ★   30 plants bear white flowers.
   ★   There are 28 flower plants other than roses.
   ★   There are 20 red rose plants.
   i)   Shade the region which shows the plants which are not white and not roses.

Roses (R)

Plants with white flowers (W)

10
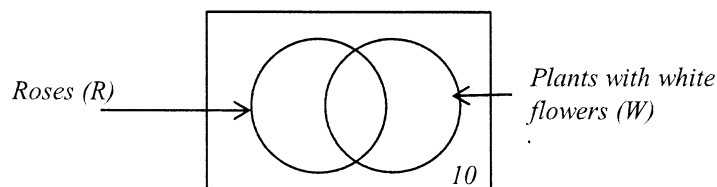
ii) Mark the given information on the Venn diagram
iii) Use set notation method to denote the region of Red roses.

iv) Find the total amount of flower plants in this flower bed.

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Second Term Test - 2019

Grade 10

Mathematics - II | 32 | E | II | **Time : 3 Hours**

- **Answer 5 questions from part - A and 5 questions from part - B**

Part - A

01) a) When importing a TV set 12% custom duty is charged. After paying the tax, the TV set was worth Rs. 84000. Find the price of the TV, before paying the tax.

b) A man borrowed Rs. 12000 and after 3 years he paid Rs. 3960 as interest to get relived from the loan. Calculate the annual interest rate.

02) a)
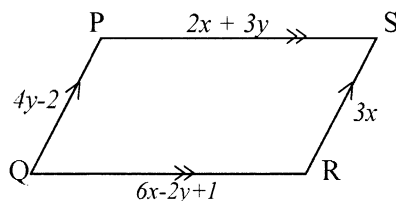
The lengths of the sides of this parallelogram is given as algebraic expressions of x and y in centimetres.

i) Considering that the opposite sides of a parallelogram are equal, build up a pair of simultaneous equations.

ii) Solve the pair of simultaneous equations and obtain the lengths of PQ and QR.

b) Solve the quadratic equation $x^2 - 4x = 77$

03) Given below is an incomplete table used to draw the graph given by the function $y = 2x^2 - 3$

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

i) Find the value of y, when $x = 0$

ii) Using the scale of 10 small divisions along x axis as one unit and 10 small divisions along y axis as two units draw the graph of the above function.

iii) Write the axis of symmetry.

iv) Using the graph, find the roots of the function $2x^2 - 3 = 0$

v) Write the range of x, where the function is negatively increasing.

vi) Write the function of the graph obtained by moving the above graph 3 units upwards along y axis.

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04) a) The length of a train which is moving at a constant speed of 72 kmh⁻¹ is 60m.

    i) Give the speed of the train in metres per second. (ms⁻¹)

    ii) Find the time this train will take, to pass a platform of length 100m.

  b) The length, breadth and height of a water tank is 3m, 2m and 1m respectively.

    i) Give the capacity of the tank in litres

    ii) Water is pumped to this tank using a pipe which pumps water at a constant rate of 20 ℓ min⁻¹. How many hours will it take to fill half of the tank.

05) i) Simplify $2a^2 \times 3a^2$

  ii) Find the value of x $\log_2 64 = x$

  iii) Evaluate $\log_{10} 25 + \log_{10} 8 - \log_{10} 2$

  iv) Find the value using logarithm table.

$$\frac{73.1 \times 25.41}{18.32}$$

06) a) Factorize the following algebraic expressions.

    i) $3a^2 - 3a$

    ii) $2ax - 2bx + a - b$

    iii) $a^2 - 8a + 15$

  b) Write the Least Common Multiple of the following algebraic expressions.

    $3(x-3)$, $4x(x-3)$, $x^2 - 9$

  c) Simplify : $\dfrac{5}{a-3} - \dfrac{3}{2(a-3)}$

Part B

07) a) The general term of a number sequence is given by $T_n = 5n - 3$

    i) Write the first three terms

    ii) Find the difference between two consecutive terms in this sequence.

    iii) Find the 20th term of this number sequence.

    iv) In this sequence, which term is 82?

  b) Show that $4(15-n)$ is the general term of the number sequence 56, 52, 48......

08) a) The following is a table of marks obtained in a practical test of grade 10.

Class of intervals	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	2	4	10	16	11	7

(0-10) interval represents frequencies 0 and below 10)

i) How many students have been included in the test?

ii) What is the class interval in which the mode is included?

iii) What is the class interval of median?

iv) Find the percentage of students who obtained the marks above 39, out of the total number of students.

b) The following is the information on the marks taken by the students of grade 9 for an assessment. (marks are obtained out of 10)

Marks	2	3	4	5	6	7	8	10
No. of students (frequency)	2	4	10	16	8	5	3	2

Find the median of the marks obtained by a student.

09) a) i) Express the shaded area of the Venn diagram is set notation.

b)
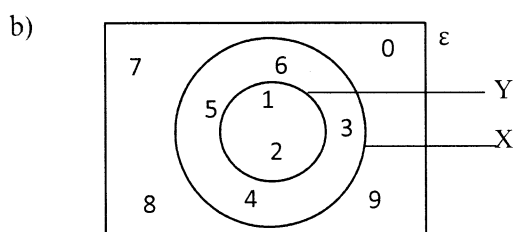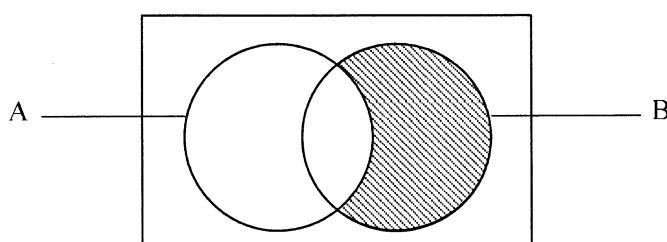
Using the above Venn diagram write the set of elements of the following sets.

i) $X \cap Y$

ii) $(X \cup Y)'$

iii) $X' \cap Y$

c) n(A) = 29, n(B) = 27, n(A∩B) = 8 and n (ε) = 58

i) Display the above information in a Venn diagram.

ii) Find n (A∪B)

iii) Find n (A∪B)'

07) Using only the *cm/mm* ruler and the compass

i) Construct triangle *PQR* such that $PQ = 7cm$, $Q\hat{P}R = 45^0$ and $PR = 4$ cm.

ii) Produce *PQ* and *PR* to *X* and *Y* respectively.

iii) Construct the bisectors of the two angles $R\hat{Q}X$ and $Q\hat{R}Y$. Name the point of the intersection of those bisectors as *O*.

iv) Construct a perpendicular bisector to RQ as Z .

v) Construct a circle of which the centre is O and the radius is OZ .

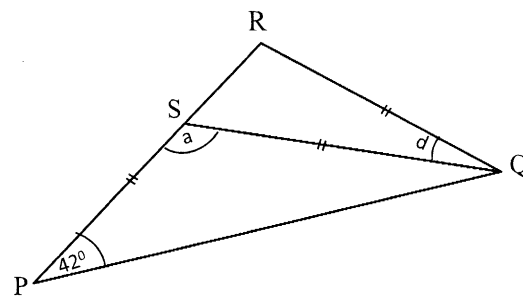Measure and write the length of the radius.

11) a)
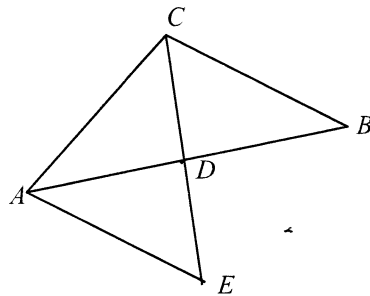
The mid point of the side of triangle ABC is D. The line drawn through A, parallel to CB meets produced CD at E.
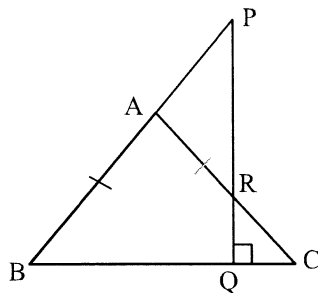
i) Copy the above diagram and mark the given data on it.

ii) Prove that $\Delta ADE \equiv \Delta CDB$

iii) Prove that $AEBC$ is a parallelogram.

b)

Using the information in the given figure, find the magnitudes of a and d .

12)

In ΔABC , $AB = AC$, BC is produced to P and the perpendicular from point P to BC is PQ. It meets AC at R .

i) If $A\hat{B}C = x$ give the value of $Q\hat{R}C$ in terms of x

ii) Show that $Q\hat{R}C = B\hat{P}Q$

(Hint : Obtain the magnitudes of angles in terms of x)

iii) Prove that $AP = AR$

iv) Show that $B\hat{A}C = 2B\hat{P}Q$

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