

MODEL QUESTION PAPERS

KALLADI HIGHER SECONDARY SCHOOL

KUMARAMPUTHUR

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SSLC QUESTION PAPER

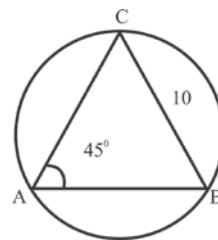
MATHEMATICS

Answer any 8 questions from 1 to 4. Each question carries 2 scores. $3 \times 2 = 6$

1. The algebraic form of an arithmetic sequence is $5n + 3$
 - a) What is the first form of the sequence?
 - b) What will be the remainder if the terms of the sequence are divided by 5?
2. A circle is drawn with the origin as centre. It passes through the point $(4, 4)$
 - a) What is the radius of the circle?
 - b) Write the coordinates of a point where the circle meets the axis?
3. The weights of 11 children in a school cricket club are 35, 39, 42, 36, 50, 30, 34, 47, 38, 33, 31 (kgs). Find the median weight.

4. AB is the diameter of the circle

- a) Find $\angle C$?
- b) Find out the length of AB



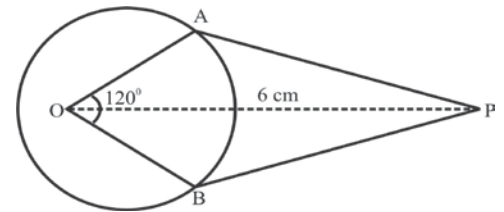
Answer any 5 questions from 5 to 11. Each question carries 3 scores. $5 \times 3 = 15$

5. The Perimeter of the base of a square pyramid is 96 cm and its height is 16 cm
 - a) What is the length of a base edge?
 - b) What is the slant height?

- c) Find the lateral surface area?
6. Draw the co-ordinate axes and mark the point (6, 0). Draw an isolated right angled triangle with the point as one of its vertex

7. P is 6 cm away from the centre of the circle.

- a) Find out the radius of the circle
- b) Find out the length of the tangent



8. The algebraic form for the sum of first n terms of an arithmetic sequence is $2n^2 + 8n$. How many consecutive terms of this sequence, starting from the first, are to be added to get 330?

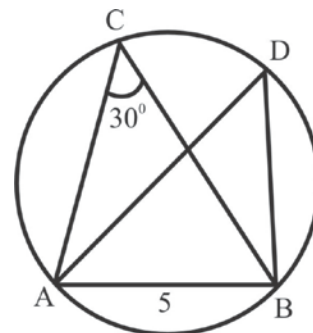
9. Draw a circle of radius 4 cm. mark a point 8 cm away from its centre. Draw the tangent of the circle from this point.

10. Draw x and y axis and mark the coordinates (2, 1), (6, 1), (4, 5). Join the coordinates and give a suitable name.

- a) Find out its height
- b) Find out its area

11. In the figure C, D are the points on the circle. AD is the diameter of the circle $\angle C = 30^\circ$, $AB = 4 \text{ cm}$

- a) $\angle D =$
- b) $\angle ABD =$
- c) What is the length of the diameter

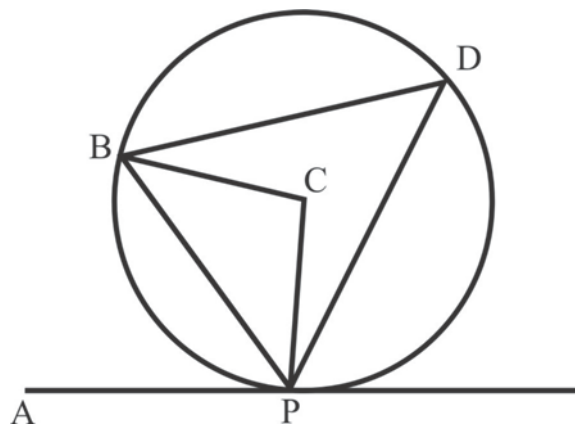


Answer any 7 questions from 12 to 21. Each question carries 4 scores. $7 \times 4 = 28$

12. Consider the polynomial $p(x) = ax^2 - x^2 - bx - 1$

- a) Find $p(7)$
 - b) What is the relation between a and b if $(x - 1)$ is a factor of $p(x)$
 - c) What is the relation between a and b if $(x + 1)$ is a factor of $p(x)$?
 - d) Will $p(x)$ have both $(x + 1)$ and $(x - 1)$ as factors for any numbers a and b? Justify
13. Draw a rectangle of length 4 cm, breadth 3 cm and draw a square of the same area.
14. A circle with centre (3, 20) passes through the point (6, 3)
- a) What is the radius of the circle?
 - b) Check whether each of the points with coordinates (0, 2), (3, 6), (0, 3) is inside, outside or on the circle.
15. A bag contains some red and green balls. If we take a ball from it, without looking, the probability of getting a red ball is $\frac{1}{4}$.
- a) What is the total number of balls, if there are 8 red balls?
 - b) What is the probability that a ball taken is green?
 - c) Find the sum of both the probabilities
 - d) From a box the probability of getting a red ball is a. What is the probability of getting a blue ball?
16. The radius of a wooden hemisphere is 20 cm
- a) What is the volume?
 - b) If the hemisphere is curved into a cone of maximum size. Find the curved surface area

17. A man on ground observe a helicopter flying at a speed of 50 m/s at an elevation of 70° . After 5 seconds it is seen at an elevation of 60° . Find the height of helicopter.
18. Draw a triangle of sides 5 cm, 6 cm and 7 cm and draw a square of the same area.
19. Prove that the none of polynomials below can be factored into a product at first degree polynomials.
- $x^2 + 3x + 2$
 - $x^2 - 3x + 2$
 - $x^2 + 4x + 4$
 - $x^2 + 6x + 7$
20. Prove that the angle between tangents and chords is equal to the angle opposite to the arc.



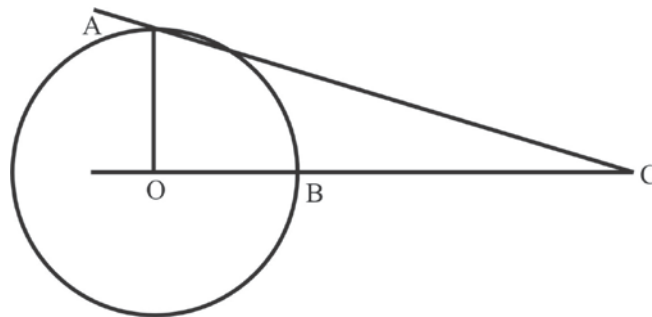
21. Make one an angle at 30° at the end point at a line and make a circle as this times are tangents.

Answer any 5 from questions 22 to 28. Each carries 5 score. $5 \times 5 = 25$

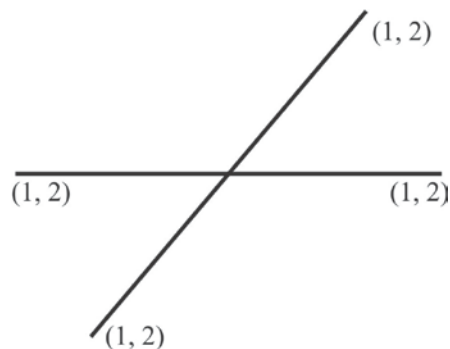
22. Find the coordinates of the point p which divides the line joining the points $A(-3, 1)$ and $B(7, 6)$ in the ratio 2:3

23. Draw ΔPQR with $PQ = 8 \text{ cm}$, $\angle P = 50^\circ$, $\angle Q = 40^\circ$. Draw the incircle and measure the radius

24. In the figure AC is tangent to the circle centered at O and CB is the perpendicular to C to OA . If the radius of the circle R show the $OA \times OB = r^2$



25.



a) Find the point of intersection of the line joining $(1, 2)$, $(4, 11)$ and the line joining $(1, 3)$, $(7, 15)$.

b) Write coordinates of any 2 points on the line $3y - 2x + 5 = 0$

26. In copying a second degree equation, the number without x was written as 24 instead of -24. The answer found were 4 and 6. What are the numbers of the correct problem?
27. Draw a rectangle of length 5 cm breadth 4 cm. then draw a square of the same area.
- 28.

Age	No. of workers
25 – 30	6
30 – 35	8
35 – 40	12
40 – 45	20
45 – 50	16
50 – 55	6
Total	68

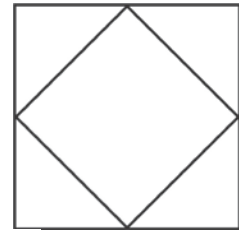
The ages of some workers in an office are tabulated above.

- a) Find the median
- b) Find the mean

Answer any 3 questions from 1 to 4. Each question carries 2 scores.

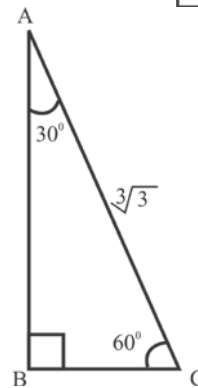
1. The algebraic form of an arithmetic sequence is $9_n - 6$
 - a. What is the remainder on dividing each term of this sequence by 9?
 - b. Whether 2031 is a term of this sequence?

2. A square got by joining the mid points of a bigger square is shown in the figure what is the probability of marking a dot in the small square without looking?



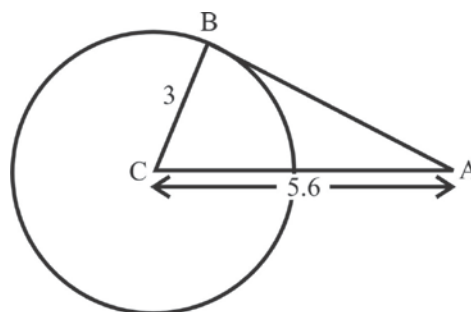
3. ABC is a right triangle, $AC = 3\sqrt{3}$ $\angle A = 30^\circ$

- a. Find the length AB and BC



4. AB is the tangent of circle

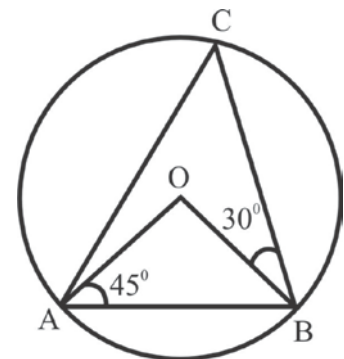
- a. Find the $\angle B$
- b. Find the length of AB



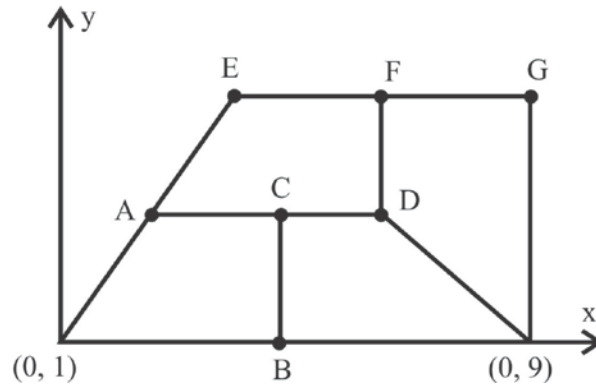
Answer any 5 questions from 5 to 11. Each question carries 3 scores (5x3=15)

5. In the figure $\angle A = 45^\circ$ $\angle OBC = 30^\circ$ and $AB = \sqrt{2}$

- a. Find $\angle AOB$
- b. Find $\angle C$ and $\angle CAO$
- c. Find the radius?



6. 2 is added to the product of 2 consecutive odd numbers gives 101. What are the numbers?
7. A large trapezium made up of 4 equal trapeziums is shown in the figure. Find the coordinates of the vertices of all these trapeziums.



8. The base perimeter of a square pyramid is 64 cm and height is 20 cm
- What is the length of base edge?
 - Find slant height?
 - Find its total surface area?
9. The equation of a line is $2x - 3y + 8 = 0$
- Find the slope of the line?
 - Find the coordinates of the points where the line cuts the x-axis and y-axis
10. In the polynomial $x^2 + kx + 9$
- What number is to be taken as k to get a polynomial with factor $(x + 1)$?
 - Find another factor of this polynomial with polynomial

11. The distance covered by an athlete e in a long jump practice are 5, 5.5, 6, 5.2, 6.3, 5.6, 5.9 in meters. Find the mean and median?

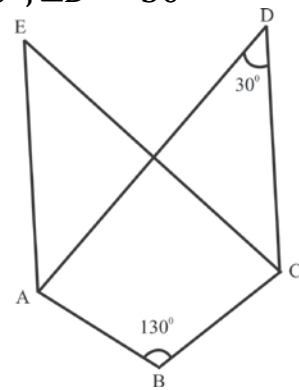
Answer any 7 questions from 12 to 21. Each question carries 4 scores. ($7 \times 4 = 28$)

12. Sum of first 5 of an arithmetic sequence is 35. Sum of 5 consecutive terms from 7 to 11 of this sequence is 125.

- Which number to be multiplied with 6th term to get the sum of first 11 numbers?
- Which number is to be added to 5th term to get sum of first 11 term and common difference?

13. In the figure $\angle EAB + \angle BCE = 180^\circ$, $\angle B = 130^\circ$, $\angle D = 50^\circ$

- Find $\angle E + \angle B = ?$
- Find $\angle E$?
- Prove that $ABCDE$ is a cyclic polygon?



14. A boy saw the top of a tree at an elevation of 30° . After 6 years he saw the top at an elevation of 60° from the same spot and he found that the tree was grow 1 cm in each year

- Draw a rough figure?
- What is the distance between tree and the boy?
- What is the height of the tree?

15. A circle with centre $(2, 4)$ passes through the origin.

- What is the radius of the circle?

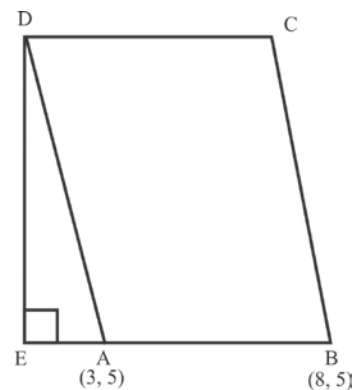
- b. Find the equation of the circle and 2 points on the circle?
- c. Check if the point $(-3, 2)$ lies on this circle?

16. Cards marked with numbers 1, 2, 3, ..., ..., ..., 20 are well shuffled and a card is drawn from it. What is the probability that the number on the card is a:-

- a. Prime number?
- b. Divisible by 3?
- c. A perfect square?
- d. Even number?

17. In the figure $ABCD$ is a parallelogram. $\angle E = 90^\circ$, $A(3, 5)$, $B(8, 5)$

- a. Write the coordinates of D
- b. What are the coordinates of C
- c. Find the coordinates of meeting points of the diagonals of the parallelogram



18. Draw a circle of radius 2 cm. Mark a point 6 cm away from the centre. Draw a tangent to the circle from that point.

19.

- a. What is the sum of first n even numbers
- b. Sum of first n even numbers is 110 form a second degree equation and find n

20. A circular sheet with radius 10 cm is divided into 6 equal parts and its one part bent to make a cone

- a. What is its slant height?
- b. Find the radius of the cone?
- c. Find its total surface area?

21. The table shown below is the group of children in a class according to their marks in a test

Marks	15 to 25	25 to 35	35 to 45	45 to 55	55 to 65	65 to 75
No. of children	5	8	3	15	13	2

- a. If children are arranged in the order of marks. Then which child's (position) marks is considered as median?
- b. What is the median mark?

Answer any 5 questions from 22 to 28. Each carries 5 scores (5x5=25)

22. $A(2, 6), B(4, 6)$ is the diameter of the circle

- a. Find the centre of circle?
- b. Find the radius of circle?
- c. Write the equation of circle?
- d. Write 2 points on the circle?

23. There is a 10 floor building with each floor has the same height. A boy look to the top of a tree from the bottom of the building at an angle of elevation 60° and he look to the bottom of the tree from 5th floor of the building at an angle of depression 25° and the height of tree is $10\sqrt{3}m$.

- a. Draw a rough figure?
- b. Find the distance between tree and building?

c. Find the height of the building? ($\tan 25 = 0.46$, $\sin 25 = 0.42$)

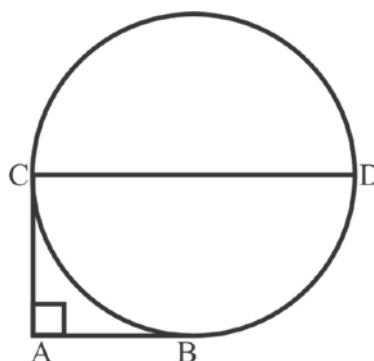
24. Draw a circle of diameter 8 cm and construct a rhombus with one angle 50° and all its sides touch the circle.

25. Draw an equilateral Δ of length 6 cm and draw a rectangle with same area and then construct a square with same area?

26. In the figure AC and AB are the tangents to the circle and CD is the diameter and $\angle A = 90^\circ$

a. Prove that $CA = BA$

b. Prove that $CA + BA = CD$



27. A rectangular plot includes a path near a shorter side with width 2m. The area of plot excluding the path is 12 cm^2

a. Draw a rough figure?

b. Calculate the length and breadth at the plot?

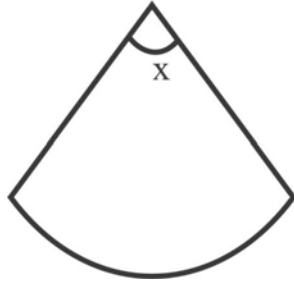
28. A solid metal cylinder of base radius 10 cm and height 14 cm is melted and recast into solid cone of radius 2 cm and height 5 cm. How many such cone can be made?

Read the concept carefully and write answers to the following questions.

Each carries one score

(6x1=6)

A cone has a curved surface. The part which rises up at a slant. The area of this curved surface is the area of the sector used to make the cone. If the central angle of the sector is x and base radius of the cone is r and its slant height is l .



Then $\frac{r}{l} = \frac{x}{360^\circ}$. The surface area of a cone is the sum of its base area and curved surface area.

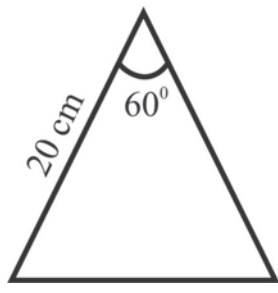
Curved surface area is the product of radius, slant height and π .

If a circular sheet is of radius 6 is divided into 4 equal parts to form a cone:-

- a) Find x ?
- b) Find slant height of the cone?
- c) What is the answer, when radius of the cone is divided by slant height?
- d) Find the radius of cone?
- e) Suppose it has a bottom, find total surface area of the cone?
- f) Find the area of the sector?

Answer any questions from 1 to 4. Each question carries 2 scores. $3 \times 2 = 6$

1. Consider the arithmetic sequence 15, 25, 35
 - a. What is the common difference
 - b. What is the first three digit term of this sequence
2. If $x - 1$ is a factor of the polynomial $4x^3 - 2x^2 + x - k$. What number is it?
3. What is the in radius of the triangle with perimeter 40 cm and area 10 sq.cm
4. The measurement of the lateral surface of a square pyramid are shown in the figure. Calculate the base edge and slant height of pyramid.



Answer any five questions from 5 to 9. Each carries 3 scores. $5 \times 3 = 15$

5. If $4x^2 - 12x + k$ can be expressed as the product of two first degree polynomials. Find out the maximum natural number value of k
6. 20 paper slips numbered 1 to 20 each are put in two boxes. One slip is drawn from each box.
 - a. What is the probability of getting two prime numbers?
 - b. What is the probability of getting a prime number and a perfect square?
 - c. What is the probability of getting at least one prime number?

7. $p(x) = 8x^3 + 4x^2 - 18x - 5 = (2x + 3)q(x) + r$

a. Write $q(x)$ and r

b. Write $8x^3 + 4x^2 - 18x - 5$ as the product of three first degree polynomials

8. Draw a circle of radius 6 cm. mark a point p on the circle. Draw a tangent through p without using centre.

9. The ratio of slant height of a cone is 4:5 find the central angle of the sector to make a cone. Find ratio of curved surface area and base area of the cone.

Answer any 7 questions from 10 to 20. Each carries 4 scores. $7 \times 4 = 28$

10. Draw x and y axis and marks the point $A(5, 8)$ & $(3, 2)$

a. If we draw triangle ABC such that the side BC is parallel to the x - axis what will be its height?

b. Draw triangle ABC such that the side BC is parallel to the x - axis and area of the _____ is equal to square units.

11. Find the sum of natural numbers from 1 to 20

a. Common difference of an arithmetic sequences is 4 and sum of first 20 term is 900 write the algebra of the sequence

12. Draw a circle of radius 4 cm. mark the point 8 cm away from its centre. Draw the tangents to the circle from the point.

13. Consider the polynomial $p(x) = 2x^2 - x^2 - 4x - 1$

a. Find $p(1)$

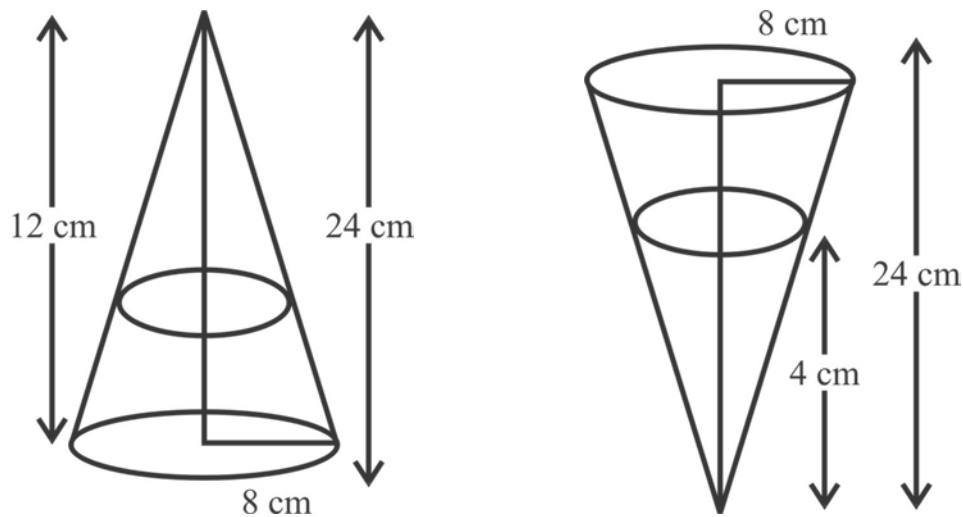
b. What is the relation between 2 and 4 if $x - 1$ is a factor of $p(x)$?

- c. What is the relation between 2 and 4 if $x + 1$ is a factor of $p(x)$?
- d. Will $p(x)$ have both $(x + 1)$ and $(x - 1)$ as factor for any numbers 2 and 4? Justify?

14. A metal cone of base diameter 20 cm is melted and recasted to form a hemisphere of same diameter. Find the height of the cone. Also find the ratio of curved surface area of cone and hemisphere.

15. A conical vessel with base radius 8 cm and height 24 cm contain a liquid up to height.

- a. Find the radius of the liquid level
- b. Find the volume of the empty portion
- c. Find the volume of the liquid present in the vessel
- d. When the vessel is reversed the liquid form a conical shape as in the figure. Find the height of the liquid level.



16. A circle is drawn in centre $c (3, 0)$ it passes through the point $(8, 0)$

- a. Find the point where the circle cuts x-axis
- b. Find the point where the y-axis cut

- c. Find two points diametrically opposite to point A
- d. Find two points other than the above points
17. A boy 1.4 meters tall standing at the edge of a river bank sees the top of the tree on the edge of the other bank at an elevation of 55° standing back by 3 meter its elevation is 45°
- a. Draw a rough figure showing these facts
- b. How wide is the river and how tall is the tree?
18. A bag contains same red and green balls. If we take a ball from it, without looking the probability of getting a red ball is $\frac{1}{6}$
- a. What is total number of balls, if there are 9 red balls?
- b. What is the probability that a ball taken is green?
- c. Find the sum of both the probabilities?
- d. From a box, containing some red balls and some blue balls the probability of getting a red ball is $\frac{9}{6}$ what is the probability of getting a blue ball?
19. Monthly income of employees of a company is given in the following table

Income	Number of employees
15000 – 15500	4
15500 – 16000	12
16000 – 16500	25
16500 – 17000	20
17000 – 17500	9
17500 – 18000	5

ഇതിന് ചോദ്യമില്ലേ...

20. The sides of a rectangular prism are 4, 6, 10 centimeters.
- What is the maximum volume of a square pyramid which can be carried out from this prism?
 - Find the maximum volume of a sphere which can be carried out from this prism

Answer any five questions from 22 to 28 carries 5 scores. $5 \times 5 = 25$

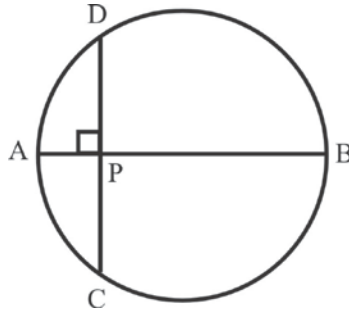
21. Draw a triangle of sides 4 cm, 5 cm and 6 c. draw its incircle.
22. The sum of first 7 term of an arithmetic sequence is 40 and the sum of first 16 term is 17.
- What is the sum of its 8th to 16th terms?
 - What is its 5th term?
 - What is its 12th term?
 - Find its sum of 5th to 12th terms?

23. $A(2, 3)$ and $B(11, 9)$ are two points on a circle
- Find the slope of the line
 - Find the equation of the line
 - Find the coordinates at two positions of the point C satisfying $BC = 2AC$

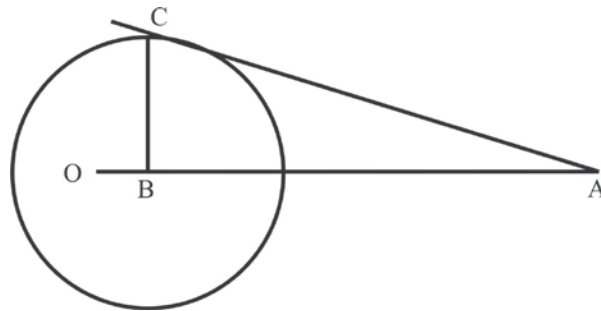
24. In the figure AB is the diameter of the circle $\angle DPA = 90^\circ$ $AP = 2 \text{ cm}$, $PB = 4 \text{ cm}$
- What is the radius of line circle

b. Find the length of PD

c. Draw an equilateral Δle of side $\sqrt[2]{3} \text{ cm}$



25. In the figure AB is the diameter of the circle centered at O and CB is the perpendicular from C to OA . If the radius of the circle is r show that $OA \wedge OB = r^2$



26. For making cones children cut out several sectors of circles. The table shows the number sector __ made classified according to central angles.

Central angle	Number of sectors
0 – 45	1
45 – 90	3
90 – 135	10
135 – 180	12
180 – 225	11
225 – 270	8
270 – 315	3
315 – 360	2

Find the median angle

27. Two boxes contain paper slip with numbers written on them. One box contain 10 even numbers and 15 odd numbers the other has 20 even and 30 odd. If one slip is drawn from each box:-

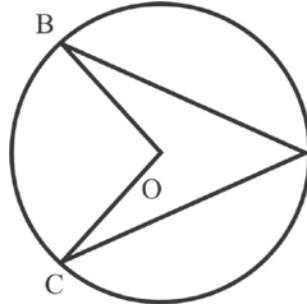
a. What is the probability of both being odd?

b. What is the probability of at least one of them being odd?

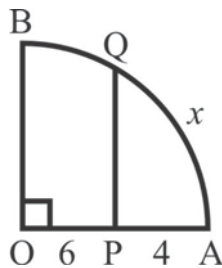
28. Find the coordinates of the point P which divides the line joining the point $A(-5, 1)$ and $B(6, 5)$ in the ratio 3:2

∠Δ

- 1, (1+2), (1+2+3), (1+2+3+4), is given a sequence. Find its 27th term?
- In the given circle with centre 'O'. The central angle at arc BYC is 160°. Calculate $\angle B$?

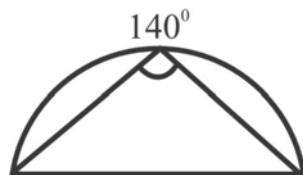


- 15 444 term at the sequence $4m + 3$? Why?
- Two coins are tossed together. Find the probability at getting atleast one head?
- Given diagram is a sector with central angle 90° $OP = 6\text{ cm}$, $PA = 4\text{ cm}$ PQ is perpendicular to OA . Find the length of PA ?

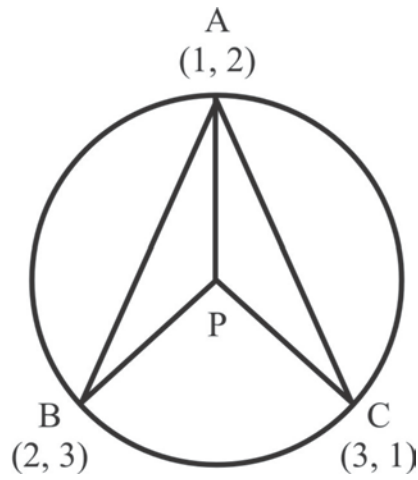


- Each at the 11 letters at the word MATHEMATICS is written on separate cards and put into a bx. If we take one card:-
 - What is the probability at getting the letter A?
 - What is the probability at getting the letter vowel?
- The first term at an arithmetic sequence is 15 and the sum at 1st 5 term is 85

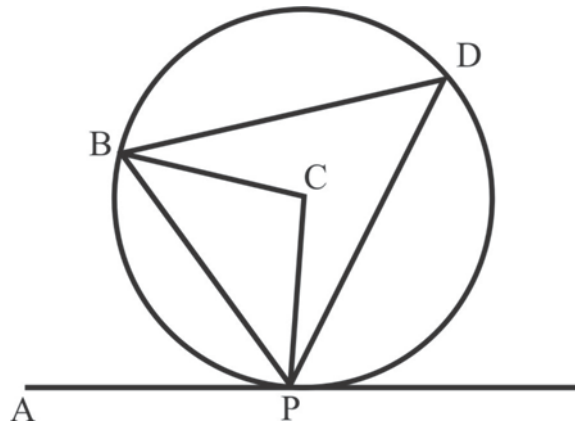
- a. What is its 3rd term?
 - b. Find common difference?
 - c. Write algebraic form?
8. All the edges at a square pyramid are of length 12 cm
- a. What is the total length at all edges?
 - b. What is its slant height?
 - c. Find its lateral surface area?
9. In the figure $\angle B = 80^\circ$ $\angle C = x^\circ$ $\angle A = y^\circ$
- a. What is $x + y$
 - b. Prove that $\sin x = \cos y$
10. Draw a $\Delta l e$ at sides 5, 6, 7. Draw incircle at the $\Delta l e$ and find radius
11. The picture given below shows a part at a circle what is its radius?



12. Find the radius at centre at circle?

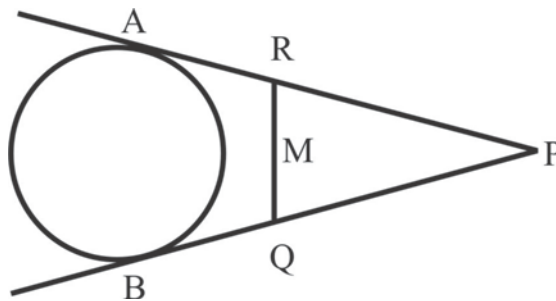


13. Prove that the angle between tangents and chords is equal to the angle opposite to the arc



14. Prove that half at the perimeter equal to the tangents $PA \Delta le$

PQR



15. Make on an angle at 30° at the end point at a line and make a circle as this lines are tangents.

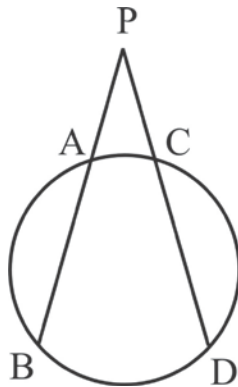
16.

- a. What is the volume of a solid metal cylinder at height 4 cm and radius 4 cm?
- b. This solid is melted and recast into 5 cones and radius = 2 cm. find the height of cones?

17. If the sum of n terms of an arithmetic sequence is $52^2 - 4n$

- a. Find common difference?
- b. Write its 1st term?
- c. Calculate the n^{th} term?
- d. Find the sum of 1st 25 terms?

18. In the figure $PA = DC$ which are the Δ s formed when AC and BD are joined? Prove that $ABCD$ is an isosceles trapezium.



19. Draw a square with side 4 cm and draw a rectangle with length 6.5 cm having the same perimeter.

20. A boy standing on a level ground sees the top of a tower at an elevation of 40° . After walking 20 m towards the tower he sees it at an elevation of 80°

- a. Calculate the height of the tower?

21. The picture shows the shape of a boiler. The total height of the boiler is 12 m and the diameter is 6 cm. The height of the cylinder part is 6 cm.

- a. What is the height of the cone?
- b. How many liters can the boiler hold?



22. Consider an arithmetic sequence $3x - 5, 4x - 4, 5x - 3, \dots$

- a. Find common difference?
- b. Find n^{th} term?
- c. Find a_n when $x = 2$
- d. Taking the sequence when $x = 2$, find the sum of n terms

23. There are 3 red balls and 7 green balls in bag 1. 8 red and 7 green balls in another bag.

- a. What is the probability of getting a red ball from the 1st bag?
- b. From the second bag?
- c. If all the balls are put in a single bag, what is the probability of getting a _____ from it?

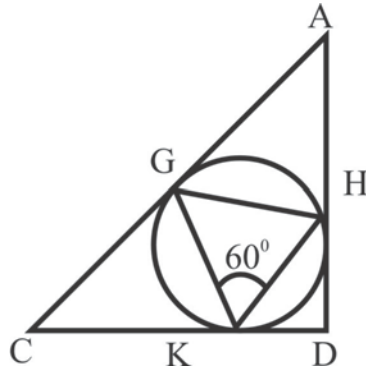
24. In the arithmetic sequence 10, 16, 22, ...

- a. What is the 26th term?
- b. Which term is the 21st term?
- c. In this sequence, is the difference between any two terms equal to 200?
- d. 280 is a term of this sequence?

25. In the figure angles at smaller ΔGKH are given

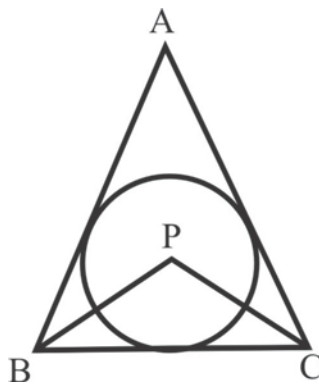
a. Find $\angle HKD, \angle KHD, \angle HDK$

b. Find angles at larger ΔACD

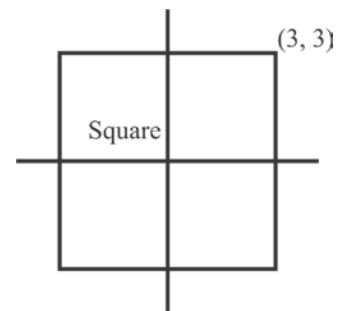
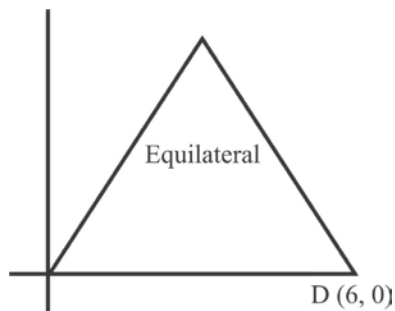
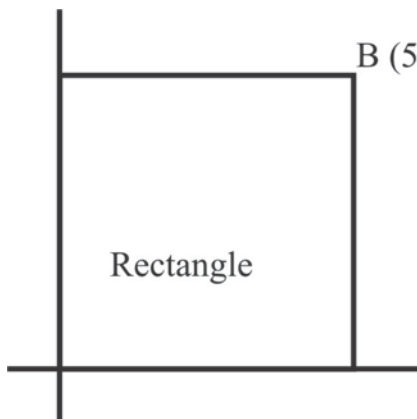


26. If the angle measures at Δ are x, y and $\frac{1}{2}x + \frac{1}{2}y + \frac{1}{2} \dots \dots$

a. In the figure p is the incentre and $\Delta A = 8$. Find ΔBDC ?



27. Find the coordinates at vertices



28. Mark a dot without looking into any one at the rectangle shown below.



In which rectangle the probability at winning more?

$$29. 1 + 2 = 3$$

$$4 + 5 + 6 = 7 + 8$$

$$9 + 10 + 11 + 12 = 13 + 14 + 15$$

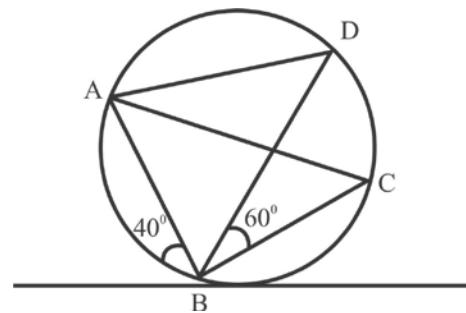
- a. Write two more lines?
- b. What is the first terms at 9th row?
- c. What is the first term of 10th row?
- d. Which lines at this sequence containing the number 240?
- e. Write a sequence like this using the number 2, 4, 6, 8,
- f. Sum of 11 consecutive natural numbers is equal to sum at next 10 consecutive natural numbers. Then what is the difference between the corresponding terms on both sides?

Answer any 3 questions from 1-4. Each carries 2 marks. (3 x 2 = 6)

1. 111, 121, 131, is an arithmetic sequence. Find its algebraic expression.

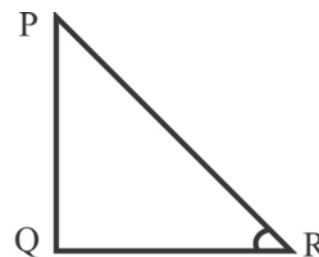
2. If line passing through the points (6, 9) and (10, 13). Find its slope.

- 3.
- a. Find measure of $\angle ADB$
 - b. Find measure of $\angle BDC$



4. ΔPQR is a right angle triangle. If $\sin R = \frac{14}{16}$

- a. Find length of QR
- b. Find $\cos R$



Answer any 5 questions from 5 – 10. Each carries 3 marks (5 x 3 = 15)

5. The sum of a number and its reciprocal is $\frac{17}{6}$. Find the number?

6. Draw an equilateral triangle of sides 6 cm and draw its incircle

7. The angles of pentagon are in arithmetic sequence. Prove that its smallest angle is greater than 36.

8. The surface area of a metallic sphere is 2464 cm^2 . It is melted and recasted into a solid circular cones of radius 3.5 cm and height 7 cm.

- a. Calculate the radius of sphere.(use $\pi = \frac{22}{7}$)
- b. Find number of cones

9. Write the second degree polynomial $p(x) = x^2 + 7x - 98$ as the product of two first degree polynomial. Find also the solution of the equation $p(x) = 0$
10. The coordinates $A(-2, 4), B(6, 4), C(3, 12)$
- If $CD \perp AB$. Find D
 - Find length of AB
 - Find area of ΔABC

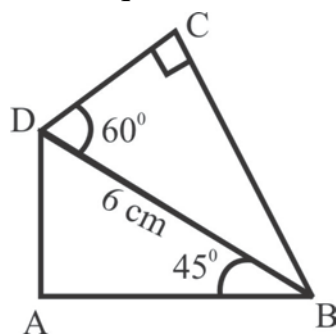
Answer any 7 questions from 11 – 18. Each questions carries 4 marks. ($7 \times 4 = 28$)

11. The table shows the children in a class sorted according to their mark in the science exam.

Marks	Number of children
10 – 20	3
20 – 30	7
30 – 40	10
40 – 50	9
50 – 60	8

Calculate the median mark of the class

12. Draw a circle of radius 4 cm. mark a point at a distance 9 cm from the centre. Draw tangents from that point.
13. Find in the equation $2^2x + 2^4x + 2^6x + \dots + x2^n = (0.008)^{-30}$
14. ABCD is a quadrilateral. If $BD = 6$ cm, $\angle BDC = 60^\circ, \angle DBA = 45^\circ$. Find length of all sides of the quadrilateral.



15. A box contains 4 red balls, 7 white balls and 8 green balls. If we take a ball from the box without looking into it, then;
- What is the probability that the ball is red?
 - What is the probability that the ball is green?
 - What is the probability that the ball is not white?
 - What is the probability that the ball is either red or white?
16. Draw a triangle with circum radius 4 cm and two of its angles are 70° and 60°
17. Prove that the points (-2, -2), (2, 2), (6, 6) are lie on a line.
18. A boy 2 cm tall, standing at the edge of a river bank, sees the top of a tree on the edge of the other bank at an elevation of 70° . Standing back by 20 m, he sees it an elevation of 35° .

$$\sin 70^\circ \approx 0.93$$

$$\cos 70^\circ \approx 0.34$$

$$\tan 70^\circ \approx 2.74$$

$$\sin 35^\circ \approx 0.57$$

$$\cos 35^\circ \approx 0.81$$

$$\tan 35^\circ \approx 0.70$$

- Draw a rough figure
- How wide is the river and how tall is the tree?

Answer any 5 questions from 19 – 25. Each carries 5 marks ($5 \times 5 = 25$)

19. A pair of coordinates x, y marked on axis. Then find the following
- What is the name of the point of intersection of x, y axis. Find coordinate?
 - Find coordinates of a point on the x-axis

c. Find coordinates of a point on y-axis

d. Draw the axis x and y. mark $A(-5, 0), B(0, 5), C(-5, 5) D(5, 5)$

20. Prove that the coordinate $(-3, -4), (3, -4), (3, 4)$ and $(-3, 4)$ are vertices of a rectangle

21. Draw a rectangle of sides 7 cm, 4 cm, then draw a square of same area. Also find area and side of a square.

22. In the square EAF is a tangent, $\angle CAF = 90^\circ$. Find measures of

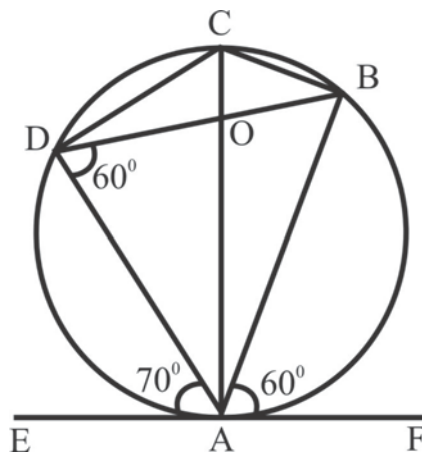
a. $\angle DCA$

b. $\angle DBA$

c. $\angle DOA$

d. $\angle DAB$

e. $\angle BCA$



23. The sum of first n terms of an arithmetic sequence is $5n^2 + 2n$

a. Find its term and common difference

b. Find its algebraic expression

c. Find the sum of first 20 terms of the sequence

d. Calculate the difference between its 10th term and 20th term

24. 1

3 5

7 9 11

a. Write the next two lines of the above pattern

- b. Write its algebraic expression
- c. Calculate the first and last term of the 20th line

25. The table below shows the workers a factory sorted according to their daily wages

Daily wages	Number of workers
100 – 200	4
200 – 300	9
300 – 400	10
400 – 500	7
500 – 600	5

Calculate the median daily wage

26. Read the mathematical concept explained below and answer the questions that follow

The follow table gives the remainders obtained on dividing each power of 3 by 5.

Number	3^1	3^2	3^3	3^4	3^5	3^6	3^7
Remainder	3	4	2	1	3	4	2

When the powers are 1, 5, 9, the remainder is 3.

When the powers are 2, 6, 10, the remainder is 4.

- a. What is the remainder on dividing 3^n by 5?
- b. Write the sequence of power of 3, which leave remainder 2 on division by 5.
- c. Is 1029, a term in the arithmetic sequence 3, 7, 11,?

- d. What is the remainder on dividing 3^{1029} by 5?
- e. Write the algebraic form of the arithmetic sequence 2, 6, 10,
- f. Write the algebraic form of the sequence $3^2, 3^6, 3^{10}, \dots$

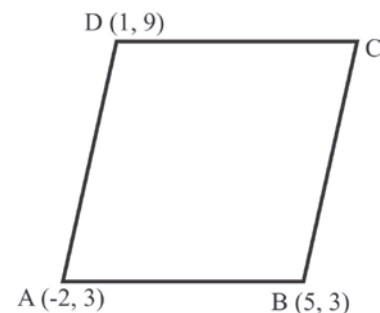
Answer any three questions from 1 to 4 ($3 \times 2 = 6$)

1. 5^{th} term is 20 and 8^{th} term is 26 of an arithmetic sequence
 - a. Find common difference and first term?
 - b. Find algebraic form of the sequence
2. The marks of 5 students are given, find mean and median 10, 12, 15, 14, 13
3. Find the equation of the line (6, 3)
4. Find the midpoints of the line coordinates are (2, 6) and (7, 1)

Answer any six questions from 5 to 11

($6 \times 3 = 18$)

5. Base edge of a square pyramid is 35 cm and its slant height is 30 cm
 - a. What is the height of the pyramid?
 - b. What is the lateral surface area?
6. In the figure find the coordinate of vertex C on the parallelogram
 - a. What is the height of the parallelogram?
 - b. Find area of the parallelogram

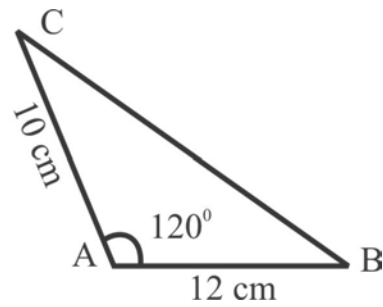


7. Write $x^2 - 20x + 51$ as the product of two first degree polynomials.
8. Draw a circle of radius 3.5 cm. mark a point P 7 cm away from the centre. Draw tangents from P to the circle

9. In the figure $\triangle ABC$, $\angle A = 120^\circ$. $AC = 10$ cm, $AB = 12$ cm

a. What is the height from C to AB

b. Find the area of $\triangle ABC$



10. The algebraic form of sum of first n terms are $2x^2 + 4n$

a. Find its common difference and first term?

b. Firm the algebraic form of arithmetic sequence?

c. Find 25th term?

11. In radius of a right angles triangle triangle is 3 cm and its hypotenuse is 21 cm

a. What is perimeter of the triangle?

b. What is the area of a triangle?

12. Radii of two spheres are in the ratio 3:4

a. What is the ratio between their surface areas

b. What is the ratio between their volumes

13. Perimeter of a rectangle is 72 cm

a. Write two pairs of lengths that can be sides of the rectangle

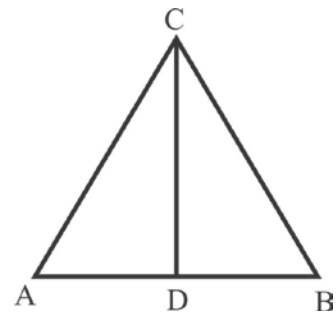
b. If area of a rectangle is 308 sq.cm. What the lengths of the sides

14. In radius of a triangle is 3 cm. two of its angles are 50° and 70° . Draw the triangles.

15. Of the numbers between 100 and 300 when divided by 3 gives remainder 2
- What is the first number?
 - Which is the last number?
 - How many terms are in the sequence?
 - Find the sum of all the terms of the sequence?

16. In $\triangle ABC$ A (-3, 4), B (6, 4), C (3, 12) are the coordinates

- What is the coordinates of D?
- What is the length of AB?
- Find the area of $\triangle ABC$?

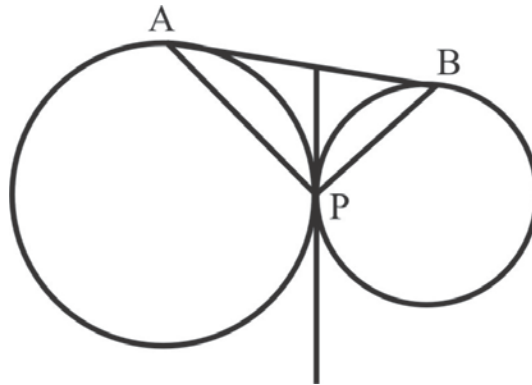


17. The table shows daily wages of workers in a company

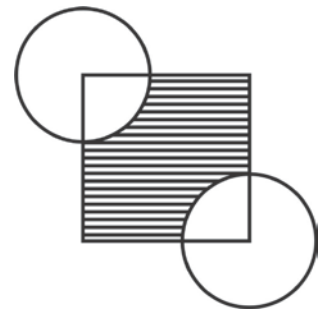
Daily wages	Number of workers
400 – 500	6
500 – 600	7
600 – 700	10
700 – 800	9
800 – 900	5
900 – 1000	4

- Which position the median is cones?
- Consider it is an arithmetic sequence and find t_{14} ?
- Calculate the median?

18. In the figure below a common tangent is drawn between two circles.
- Prove that another common tangent bisects the tangent?
 - The triangle from a right angled triangle?

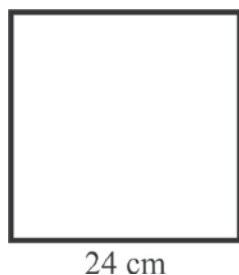


19. In the figure a square of side 14 cm is drawn, circles of radius 7 cm is drawn at two opposite vertices as centre. If a dot is put into the figure without looking into it, what is the probability that the dot is on the shaded part?

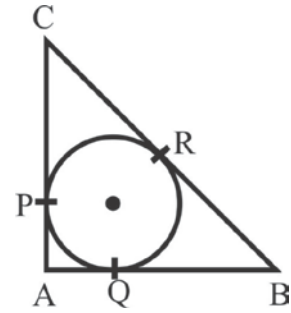


Answer any six questions from 20 to 27 ($6 \times 5 = 30$)

20. A square pyramid is to be made using square and four triangles as shown in the figure.
- What is the slant height of the pyramid?
 - What is the area of one lateral?
 - What is the least area of paper needed to make this pyramid?

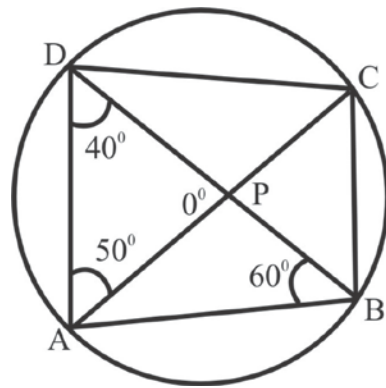


21. Hypotenuse of right angle triangle is 'h' and inradius 'r' then prove that area of right angle triangle is $r + (h + r)$, then find the area of right angle triangle if the hypotenuse is 20 cm and inradius 1.25 cm.



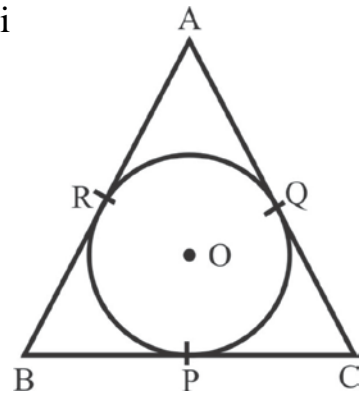
22. In the figure O is the centre and A, B, C, D are points of the circle. Find the measures of the angles given below:-

- $\angle ACB$
- $\angle CBD$
- $\angle BCD$
- $\angle BAC$
- $\angle DPC$



23. A circle passes through the points (5, -8), (2, -9) and (2, 1)
- Find the centre of the circle?
 - Find the radius of the circle?
 - Write the equation of the circle?
24. The diameter of a solid metal sphere is 42 cm. It is melted and draw into a cylindrical wire of 28 cm diameter. Find the length of the wire.
25. A person standing on the bank of a river observes that the angle of elevation of the top of a tree standing on the other bank is 60° . When the moves 40 meters away from the bank is 60° . When he moves 40 meters away from the bank, he finds the angle of elevation to be 30°
- Draw a rough figure
 - Find the height of the tree
 - Find the width of the river

26. In the figure, the circle centered O touches the sides AB, AC and BC at P, Q and R. $AB = AC$, $AQ = 4$ cm, $CQ = 6$ cm

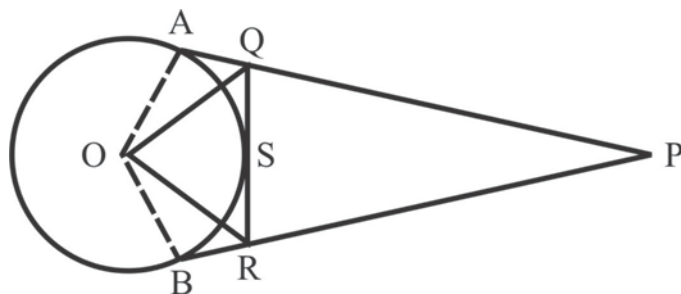


- What is the length of AR?
 - Find the perimeter of the triangle?
 - What is the inradius?
 - Find the area of the triangle?
27. Read the mathematical concept and answer the questions as follows
(6x1=6)

Tangents drawn from a point to the circle are equal length

In the figure PA, PB and CD are tangents to the circle $\angle P = 60^\circ$

- What is $\angle AOB$?
- $\angle OQR + \angle ORQ =$ _____
- If $\angle BOD = 30^\circ$, $\angle AOC =$ _____
- $\angle ROQ =$ _____
- If $PB = 25$ cm, $PA =$ _____ cm
- Perimeter of $\Delta PQR =$ _____ cm

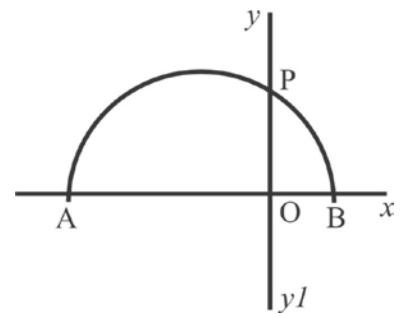


Answer any 3 from 1 to 4. Each carries 2 scores?

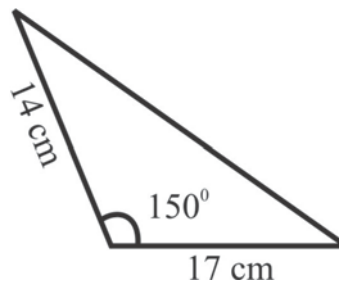
1. In the figure, the semicircle with AB as diameter passes through the point P

- a. What are the length of OA and OB?
b. What are the coordinate of B?

2. The numbers from ___ to 25 written in paper slips and put in a box. If one slip is drawn from it. What is the probability of being prime numbers?



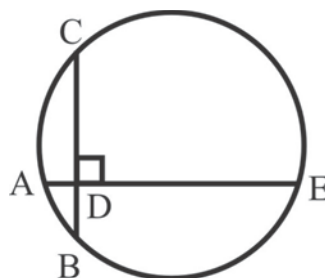
3. Find the area of the triangle shown



4. The first term of an arithmetic sequence is 10 and the third term is 24. What is its common difference?

Answer any 5 questions from 5 to 11. Each carries 3 marks.

5. In the given figure $AB = 5$ cm, BD is 4 cm, $CD = 9$ cm.



Find DE?

6. Check whether the coordinate points (5, 3), (6, 2), (4, 5), (7, 9) are in, out, on the circle and the radius of the circle is 6 cm. Find 8 points on the circle.
7. Draw a circle of radius 5 cm. Make a point at a distance 7 cm from the centre. Then draw tangents from that point to the circle.
8. The following scores are 12 students in a class.
 - a. Find the mean?
 - b. Find the median?

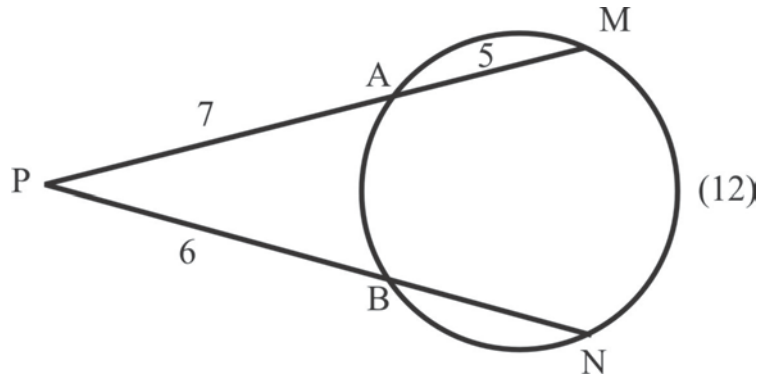
13, 15, 12, 17, 19, 20, 16, 18, 14, 21, 20, 17
9. Check whether $(x - 5)$ and $(x + 3)$ are the factors of the polynomial $x^2 - 2x - 15$
10. When the sun is at an angle of elevation 45° , the length of the shadow of a tree is 10 meters.
 - a. Calculate the height of the tree?
 - b. Calculate the length of the shadow when the sun is at an elevation of 30°
11. Height of a cone is 40 cm. Slant height is 41 cm
 - a. Find diameter of its base
 - b. Find volume

Answer any 7 questions from 12 to 21. Each carries 4 scores

12. In the figure $MA = 5$ cm, $PA = 7$ cm, $PB = 6$ cm
 - a. Find PM

b. Calculate the length of NB

13. What is the volume of the square pyramid base edge 10 cm and slant height 15 cm?



14. Draw a rectangle 4 cm and 6 cm side, then draw a square with equal area.
15. Write the series which divisible by 7 between 100 and 400.
- Find the 12th term of the series
 - Find the sum of all numbers between 100 and 400
16. 42 cm long wire is to be bent to form a rectangle. Length of the diagonal of a rectangle is 15 cm
- Find the length and breadth of a rectangle?
 - Find area of the rectangle?
17. Consider the second degree polynomial $p(x) = x^2 + 6x + k$
- Prove that if $k = 10$, this polynomial has no first degree factors
 - What should be the maximum value of k so that $p(x)$ has a first degree factor?
 - Give any negative value for k . Write the resulting polynomial as a product of two first degree polynomials.

- d. Prove that for any negative value of k , $p(x)$ has two distinct first degree factors.
18. a. Find the distance between the points (2, 3) and (3, -1)
- b. Does the line joining points (2, 3) and (3, -1) pass through the point (5, -9)?
19. In a box there are 6 black beads and 9 white beads. In another box there are 3 black and 7 white beads. Without looking into the box take one bead from each box
- a. What is the probability of getting same color beads?
- b. What is the probability of getting at least one black bead?
- c. What is the probability of getting more than one white bead?
20. A man 1.7 meters tall, standing at the foot of a tower sees the top of a building 50 meter away at an angle of elevation 60° . On climbing the top of the tower, he sees it at an angle of elevation of 50° .
- a. Draw a rough figure
- b. Compute the height of the tower and the building
- $(\sin 50^\circ = 0.77, \cos 50^\circ = 0.64, \tan 50^\circ = 1.19$
- $\sin 60^\circ = 0.87, \cos 50^\circ = 0.50, \tan 50^\circ = 1.73)$
21. The following table gives the classification of cows in a dairy farm according to the quantity of milk given by each in a day.

Amount of milk	Number of cows
0 – 2	1
2 – 4	3
4 – 6	14
6 – 8	17
8 – 10	26
10 – 12	10
12 – 14	13
14 – 16	12
16 – 18	10

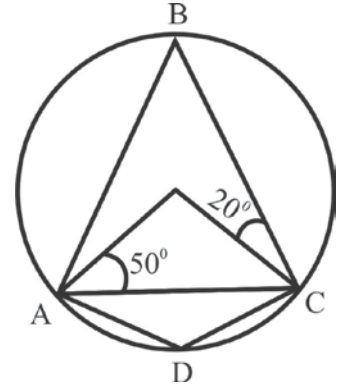
Answer any 5 questions from 22 to 28. Each question carries 5 scores.

22. A sector of central angle 288° is cut from a circle of radius 25 cm and it is rolled up into a cone
- What is the base radius?
 - What is the height of the cone?
 - Find the CSA ?
 - Find the surface area of cone?
 - Find the volume of the cone?
23. a) Write an equation of line through A(3, 5), B (1, 2)
- b) Write the coordinates of the point when the line $3x - 2y - 6 = 0$ cuts the x-axis
- c) State in which of the box lines the (1, 3) belongs
- d) If there are any common point for the above line. Justify your answer.

24. In a right angled triangle, one of the perpendicular sides is 4 cm longer than the other side. The area of the triangle is 96 sq.cm. Find the length of the three sides of the triangle.

25. In the figure O is the centre of the circle

- a. Find $\angle OCA$?
- b. Calculate $\angle AOC$
- c. Compute three angles of the triangle ABC
- d. Find the $\angle \Delta ADC$



26. Draw a quadrilateral ABCD with $AB = 7$ cm $BC = 4.5$ cm, $AD = 6$ cm, $CD = 5$ cm and $\angle A = 70^\circ$

- a. Draw the circle touching the sides AB, BC and Ad.
- b. In the side CD also a tangent to the circle

27. A line is drawn through the points (0, 2) and (2, 4)

- a. What is the slope of the line?
- b. Find the coordinate of another point on this line?
- c. Prove that y-coordinate of any point of this line is 2 more than x-coordinate

28. The polynomial $p(x) = (x - 3)(x + 5)(x - 1) + 7$

- a. Check whether $(x - 3)$ is a factor of $p(x)$
- b. Find the remainder on dividing $p(x)$ by $(x - 1)$
- c. Which number added to $p(x)$ to get $(x + 5)$ is a factor

Answer any three questions from 1-4. Each carries 2 scores ($3 \times 2 = 6$)

1. 5, 8, 11, 14, etc. is an arithmetic sequence

a. Find the common difference

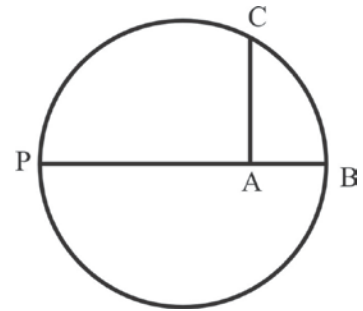
b. Find the algebraic form

2. In the figure $PA = 4, PB = 3$

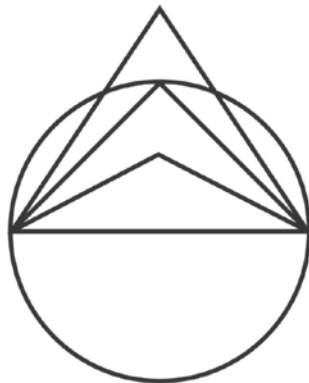
a. Find PC

b. If we draw a square with side PC

find area of square



3. In the figure 3 triangles are placed. What will be the possible angles of this triangle and write reason for this.

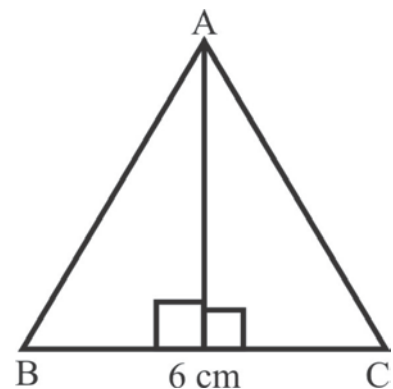


4.

ABC is an equilateral Δ $BC = 6 \text{ cm}$

a. Find the sides of this Δ

b. Find the height of Δ



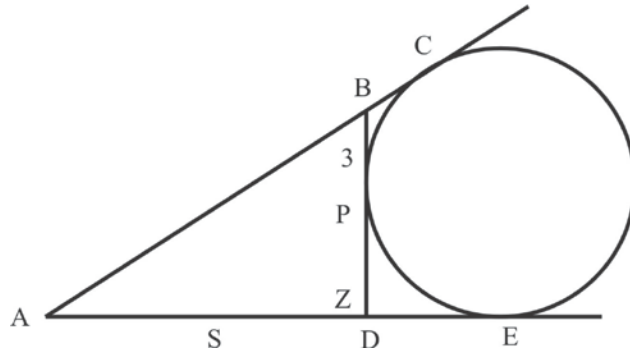
Answer any five questions from 5-10 each carries 3 scores ($3 \times 5 = 15$)

5. A box contains 15 chocolates, some are mango flavoured and some are orange flavoured. Probability of getting mango flavour is $\frac{1}{3}$
 - a. Find number of mango flavour chocolate?
 - b. Find number of orange flavour chocolate?
 - c. In one mango chocolate is removed what is the probability of getting mango chocolate
6. Draw a circle of radius 4 cm construct an equilateral triangle which pass through all vertices.
7. The third term of arithmetic sequence is 346^{th} term is 67
 - a. Find common difference?
 - b. Write the first term?
 - c. Form an AP?
8. When all side of a square increased by 8 cm the area become 1225
 - a. Form an equation?
 - b. Find the value of x?
 - c. Find side of large one?
9. The equation of a circle is $x^2 + y^2 - 6x - 8y + 9 = 0$
 - a. Find the centre?
 - b. Find the radius?

10. $p(x) = x^2 + x - 1$
- Check whether $(x - 2)$ is a factor of this $p(x)$
 - What number should be added to $p(x)$ if $(x - 2)$ is a factor?

Answer any 7 questions from 11 – 19. Each carries 4 scores. ($4 \times 7 = 28$)

11. A child standing at the edge of the river sees the top of the tree at other edge at an angle of elevation 60° steppen 20m backward see the top of the tree at an angle of elevation 30°
12. The radius and height of a cone are 14 cm and 8 cm
- Find its volume?
 - If the cone is cut parallel to its base along midpoint of height, what is the radius?
 - Find volume of small cone?
 - Find ratio of volume of small cone and the larger cone?
13. Draw a circle of radius 4 cm. make a point 9 cm away from its centre. Draw tangents to the circle from that point.
14. Write the sequence of odd number greater than 1
- Write its algebraic form
 - What is the algebraic form of the sequence $\frac{3}{6}, \frac{5}{6}, \frac{7}{6}$
15. In the figure $AD = 5 \text{ cm}$ $DP = 2 \text{ cm}$, $BD = 3 \text{ cm}$
- Find length of AE?
 - Find the perimeter of $\triangle ADB$?
 - Find area of $\triangle ADB$?
 - Find an radius of $\triangle AOB$?



16.

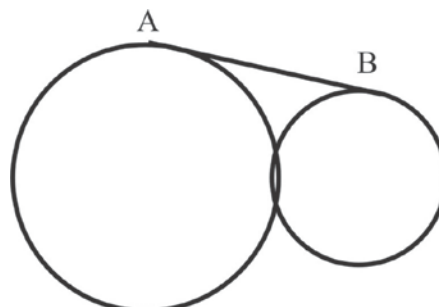
Class	Frequency
80 – 90	3
90 – 100	6
100 – 110	5
110 – 120	8
120 – 130	9
130 – 140	4

- a. Find the median class?
- b. Find the median?

17. In ΔABC , $\angle A = 80^\circ$, $AB = 15$, $AC = 8$ [$\sin 80^\circ = .98$, $\cos 80^\circ = .17$]

- a. Find the height of Δ ?
- b. Find area of Δ ?
- c. Find the 3rd side?

18. Prove $AB = \sqrt[2]{rv}$



19. The radius of large circle 9 cm the radius of small circle 4 cm. find length of PQ
20. ABC is a right angle triangle. The coordinate of a(4, 2), b(8, 2) coordinate at c-(4, 5)
- Draw the side?
 - Draw circum radius?
 - Draw circum centre?
21. Draw an equilateral Δ with side and construct a square with same area of Δ
22. A sector of centre angle 288 is out from a circle of radius 25 cm and it is rolled into a cone.
- Find radius of the cone
 - Find height of cone
 - Find curved surface area
 - Find total surface area
 - Find the volume
23. $x^3 + 4x^2 + x - 6$ factorise the polynomial and write the polynomial the product of 3 first degree polynomial.
24. $p(1) = 3$
- $p(3) = 0$
- $p(-3) = 0$

Find 3rd degree polynomial

25.

- a. Draw x and y axis mark the co-ordinate $(2, 1)$, $(6, 1)$, $(4, 5)$ the co-ordinate and give suitable name
- b. Find base of Δ
- c. Find height of Δ
- d. Find its area

Read the question carefully and answer the questions given ($6 \times 1 = 6$)

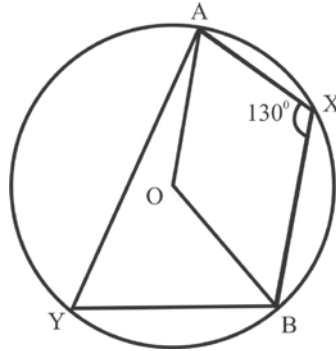
26. $a = (0, 1)$ $b = (-4, 5)$ is the diameter of the circle

- a. Find its centre
- b. Find the radius
- c. Find the equation of circle
- d. The circle cut x axis find the coordinate
- e. Circle ___ axis find the coordinate

1. (a) Write the first integer term of an arithmetic sequence $\frac{1}{2}, \frac{2}{5}, \frac{3}{5}, \dots \dots$
- (b) What is the sum of the first 5 terms of the sequence

2. In the figure O is the centre of the circle and $\angle AXB = 130^\circ$

- a. Find $\angle AYB$
- b. Find $\angle AOB$

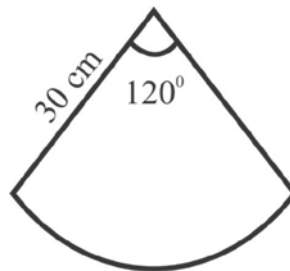


3. If $(x - 2)$ is the factor of the polynomial $3x^3 - 2x^2 + kx - 6$, then what is the value of k ?
4. The centre of a circle is the origin and it passes through the point $(9, 12)$
 - a. Find the radius of the circle
 - b. Write the coordinates of the points the circle intersects the axis

Answer any five questions from 5 – 11. Each question carries 3 score.

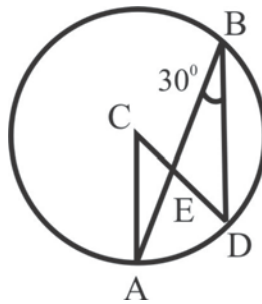
5. A sector shown in the figure is rolled up and made a cone. Find its

- a. Slant height
- b. Base radius
- c. Volume

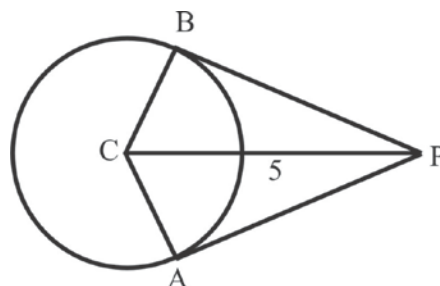


6. Prove that $A(1, 1), B(-1, -1), C(\sqrt{3}, \sqrt{3})$ are the points of vertices of an equilateral triangle.
7. Draw a rectangle of width 5 cm and height 4 cm.
 - a. Draw a rectangle of the same area with width 6 cm

- b. Draw a square of the same area
8. Algebraic expression of an arithmetic sequence is $5n + 6$
- Write the sequence
 - What will be the remainder when the terms of this sequence are divided by 5
 - Is '1000' a term of this sequence? Justify
9. The area of a rectangle with length 6 cm more than the breadth is 135 sq.cm. Find the length and breadth of the rectangle.
10. In the figure C is the centre of the circle and $\angle ABD = 30^\circ$
- What is the measure of $\angle ACD$?
 - If $\angle ABD = \angle CAB$ and $AB = 6 \text{ cm}$, find the radius of the circle



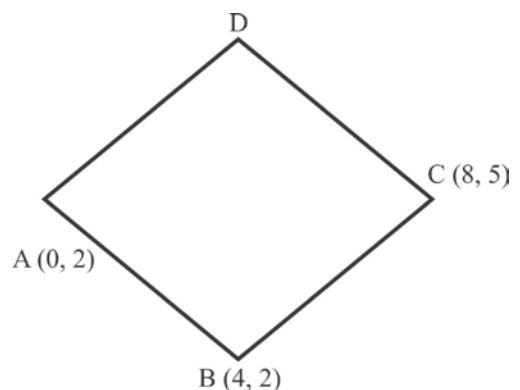
11. In the figure C is the centre of the circle PA & DB are tangents. $PC = 5 \text{ cm}$ and radius of circle is 3 cm.
- Find the length of PA
 - What is the area of quadrilateral $PACB$?



12. a. Draw x and y axes and mark the points $A(5, 8)$ & $B(3, 2)$
- b. Draw triangle ABC such that the side BC is parallel to the x -axis and area of the triangle is equal to 15 square units.
- c. If we draw triangle ABC such that the side BC is parallel to the x -axis, what will be its height
- d. Find the coordinate of c
13. a. Show that the polynomial $x^2 + x + 1$ has no first degree factors.
- b. What is the remainder when the polynomial $(x - 1)(x - 2)(x - 3)$ is divided by $(x - 1)$?
- c. When $(x - 1)(x - 2)(x - 3) + 2x + k$ is divided by $(x - 1)$ the remainder is 10. Then find out the remainder when it is divided by $(x - 2)$
14. A petrol tank is in the shape of a cylinder with hemisphere on the same radius as the base of the cylinder attached to both ends. If the total length of the tank is 5 meters and the base radius of the cylinder is 1 meter, how many liters of petrol can it hold?

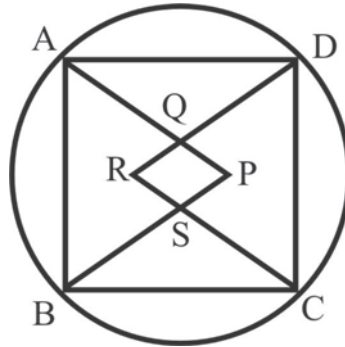
15. In the figure, $ABCD$ is parallelogram

- a. Write the coordinates of D
- b. What is the height of this Parallelogram?
- c. Find the perimeter and area of it

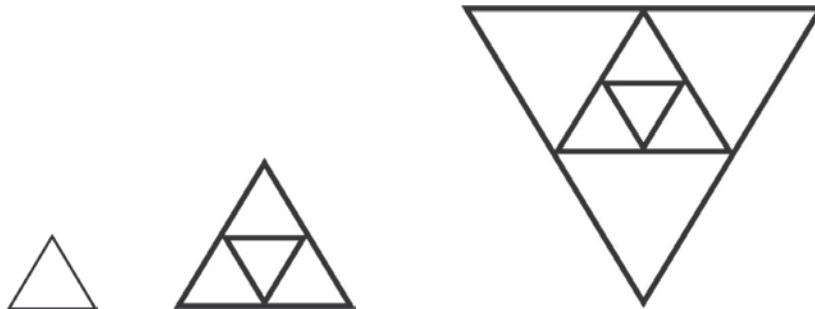


16. Draw a circle of radius 3.5 cm. Draw two diameters which are not perpendicular to each other. Draw tangents through the end points of diameters. What is the name of the quadrilateral formed by the tangents?
17. Length of two sides triangle are 20 cm and 16 cm and the angle between them is 135°
- Draw a rough figure and mark the measurements
 - Find the perpendicular distance of the vertices to the sides of length 20 cm
 - Find the area of the triangle
18. 23rd of an term of arithmetic sequence is 32. 35th term is 104. Then
- What is the common difference
 - Which is the middle term of first 35 terms of the sequence
 - Find the sum of first 35 terms of this sequence
19. There is one spot at one side of the cube, two on another side, three on the third side and so on. These are spots in all the six faces; in this order. Another cube which is marked in the same way is taken.
- If both the cubes are thrown, what is the probability that the total number of spots on the upper face is 6?
 - What is the probability that the sum of the spots on the upper face is a ?
 - What is the probability that the sum of the spots be one?
 - What is the probability that the sum of the spots be a prime number?

20. In the ABCD is a cyclic quadrilateral AP, BP, CR and DR are angles bisectors of $\angle A$, $\angle B$, $\angle C$ and $\angle D$. Prove that PQRS is a cyclic quadrilateral.



- 21.



The first figure above is an equilateral of side 2 cm. the second figure is obtained by drawing line passing through the vertices and parallel to the sides of the triangle in the first figure. The third figure is got by drawing line passing through the vertices and parallel to the sides of triangle in the second figure.

- Write the sequence of the perimeters of biggest triangle in each figure obtained by continuing this process.
- Write the sequence of the areas of biggest triangle in each figure
- Write algebraic forms of both the above sequence

Answer any five questions from 22 to 28. Each question carries 5 scores (5x5=25)

22. The table below shows group of children in a class according to their heights.

Height (CM)	Number of childrens
135 – 140	5
140 – 145	8
145 – 150	10
150 – 155	9
155 – 160	6
160 – 165	3

- a. If the children are lined up according to their heights, the median is the height of the child in which position
 - b. According to the table, the height of this called is between what limits?
 - c. What are the assumptions used to compute the median?
 - d. What is the median height according to these assumptions?
23. A solid cylinder made of wax is of base radius 6 cm and height 12 cm. a cone of same radius and height is carried out from this.
- a. Draw rough figure?
 - b. What is volume is cone?
 - c. How many candles cylindrical shape of 1 un radius and 12 cm height can be made with the remaining wax?
24. Draw a triangle of sides 5 cm, 6 cm and 7 cm. draw its incircle.

25. Rashid standing on the top of the building, sees the top of a tower at an angle of elevation 50° and the foot of the tower at an angle of depression 20° . Height of Rashid is 1.6 meter and height of the building on Rashid standing is 9.2 meter.

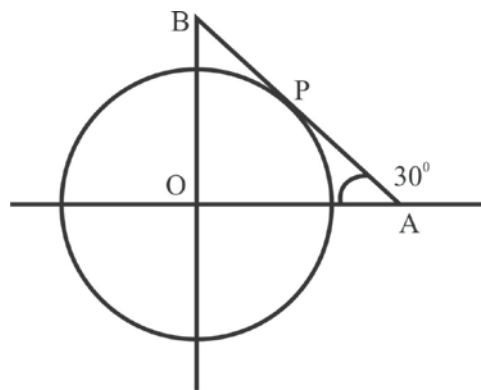
- Draw a rough figure
- How far is the tower from the building
- Calculate the height of the tower

$$[\sin 20^\circ = 0.34, \cos 20^\circ = 0.94, \tan 20^\circ = 0.36]$$

$$[\sin 50^\circ = 0.77, \cos 50^\circ = 0.64, \tan 50^\circ = 1.19]$$

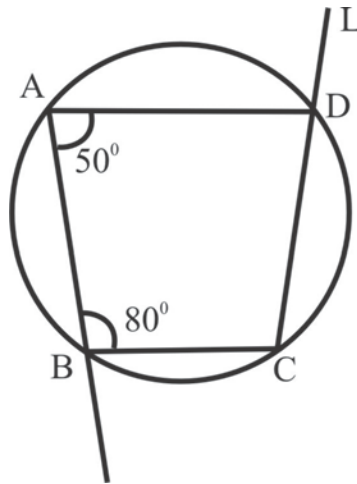
26. The radius of a circle is 6 unit, O is the centre of the circle $\angle OAB = 30^\circ$

- Find out the coordinate at A and P
- Equation of the line AB



27. Quadrilateral ABCD is a cyclic. $\angle GBC = 80^\circ$ $\angle A = 50^\circ$

- Find other angles of the quadrilateral. What is $\angle ADL$?
- Justify sum of the exterior angles in the opposite vertices of the cyclic quadrilateral is 180°



28. A pattern is given below

3

7, 11

15, 19, 23

27, 31, 35, 39

.....

.....

- a. Write next two lines
- b. What is the position of last term in the 15th line of the sequence
- c. What is the first term and last term of the 15th line

29. Read the following: understand the mathematical idea expressed in it and answer the questions the follow

The difference of y coordinates divided by the difference of the x coordinates is called the slope of the line. If the equation of the line is $ax + by + c = 0$ will never join. It always be parallel. When the slope of two lines product is -1 then that two lines are perpendicular to each

other. For the equation of the circle there needed a centre (x, y) and radius from the equation of the circle and we can understand easily the centre Eg: $(x - 2)^2 + (y - 3)^2 = 25$ then the centre is $(2, 3)$, we have to check out the Substitution also. When there is prove that any coordinates on that line or check out then we give the x as given number and also the y . Eg: $4x - 3y - 10 = 0$ check whether $(4, 3)$ is in this line we have to do $4 \times 4 - 3 \times 3 - 10 = 0$ so this line is on this circle.

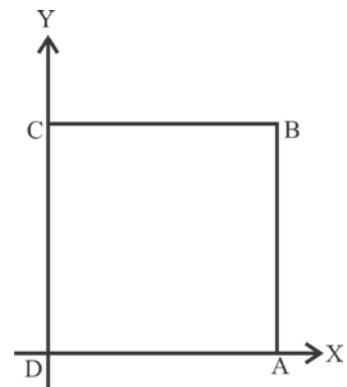
- a. $A(2, -3)B(6, 3)$ find out the slope of AB
- b. $4x - 3y - 10 = 0$ is an equation of the line. Find the slope
- c. Is $3x - 2y + 1 = 0$ and $3x - 2y - 6 = 0$ has a common point. Justify?
- d. The slope of $x - 2y + 5 = 0$ is $\frac{1}{2}$ and the slope of $2x + y - 5 = 0$ is -2 . Check these lines are perpendicular to each other.
- e. Write the equation of the line with centre $(2, 3)$ and radius 5 (five)
- f. Write the equation of the line $A(1, 3) B(3, 3)$

Answer any three questions from 1 to 4. Each question carries 2 scores.

1. Consider the arithmetic sequence 15, 25, 35, ($3 \times 2 = 6$)
 - a. What is the common difference?
 - b. What is the first three digit of this sequence?
2. What is the slant height of a cone of base perimeter 14π cm and height 10 cm?
3. A(1, 2), B(6, 4) and C(8, 9) are the vertices of the parallelogram ABCD. Find the coordinates of D?
4. The weight of 10 students in a class is given below. Find the mean and median of the weight
50, 28, 43, 39, 47, 53, 36, 40, 45, 41

Answer any five questions from 5 to 11. Each question carries 3 scores.
($5 \times 3 = 15$)

5. In the figure ABCD is a square. If A = (12, 0), C = (0, 5), then
 - a. What is the coordinates of D and B?
 - b. What is the length of DB?

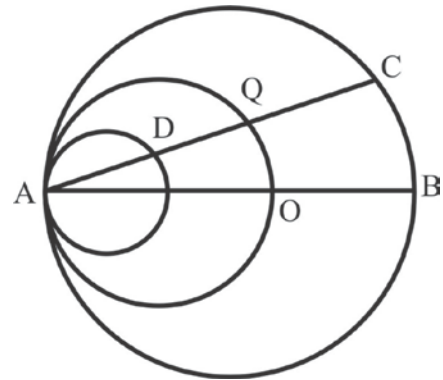


6. Draw the circumradius of an equilateral triangle is 6 cm. Draw the triangle
7. For a rectangle, area is 40 sq.cm and perimeter 28 cm. Find the length and breadth of the rectangle

8. a. (1, 2), (2, 4), (3, 6) etc. Find the slope of this line.
 b. Write down the y coordinates of the points as a sequence
 c. Which type of sequence is this?

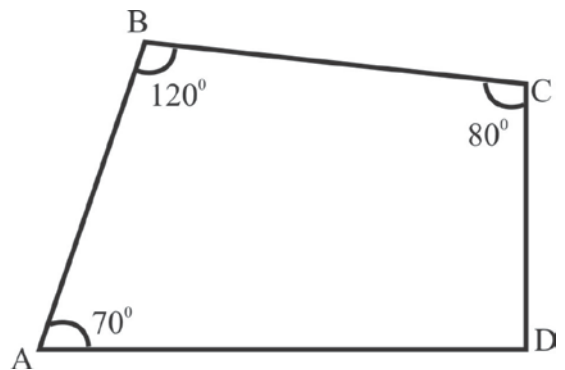
9. In the figure O is the centre and AB is the diameter of the outer circle. O is the centre and AO is the diameter of middle circle.

- a. If $AQ = 4$ cm write the length
 b. What is the ratio of $AD:DQ:QC$?



10. ABCD is a quadrilateral in which $\angle A = 70^\circ$, $\angle B = 120^\circ$ and $\angle C = 80^\circ$

- a. What is the measure of $\angle D$?
 b. What is the position of B and D?
 c. What is the position of A and C based on the circle with diameter BD?



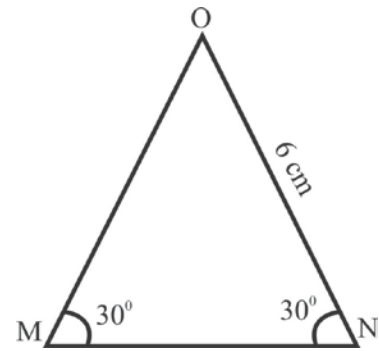
11. Look at the sequence 5, 7, 9,

- a. What is the first term and common difference?
 b. Find the algebraic form of this sequence
 c. Write the 10th of this sequence

Answer any seven from 12 to 21. Each questions carries 4 scores (7x4=28)

12. In the figure $\angle M = 30^\circ = \angle N$, $ON = 5 \text{ cm}$

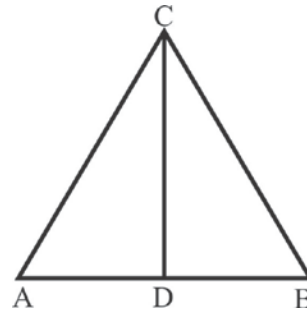
- What is the length of MO ?
- What is the length of MN ?
- Draw triangle MNO



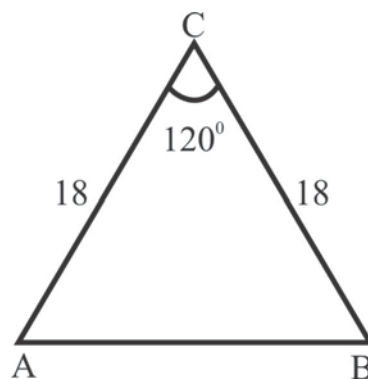
- Find the sum of first 20 natural numbers
 - Find the sum of first 20 even numbers
 - Find the sum of first 20 odd numbers
 - Find the sum of natural numbers from 20 to 40

14. ABC is an equilateral triangle, coordinates of A are $(1, 4)$ and that of D are $(4, 4)$. D is the midpoint of AB .

- What are the coordinates of B ?
- Write the coordinates of C ?

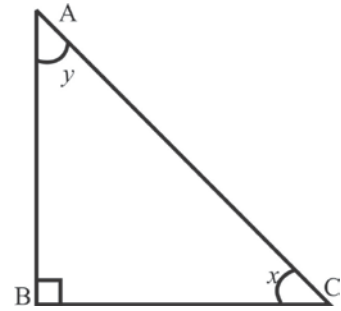


15. Draw the triangle, two of its angles are $60^\circ, 50^\circ$ and its inradius is 2.5 cm.



16. Radii of two spheres are in the ratio 3:4
- What is the ratio of their surface areas?
 - Find the ratio of their volume?
17. In ΔABC , $AC = BC = 18 \text{ cm}$ and $\angle ABC = 120^\circ$
- Find $\angle A$ and $\angle B$?
 - Find the perpendicular distance from C to AB
 - What is the area of the triangle?
 - What is the ratio of sides of the triangle with angles $120^\circ, 30^\circ$ and 30° ?
18. If triangle PQRm $PR = QR$ and $PQ = 14 \text{ cm}$, the $\angle PRQ = 80^\circ$ compute the following.
- The perpendicular distance from R to PQ
 - The area of triangle AQR
 - The length of sides PR and QR
- [$\sin 80^\circ = 0.98, \cos 50^\circ = 0.77, \tan 80^\circ = 5.67 \tan 50^\circ = 1.19$]
19. Draw a triangle of sides 6 cm, 7 cm and 8 cm and draw its incircle. Calculate its radius?
20. Draw a circle of radius 3 cm. draw a triangle of angles $50^\circ, 60^\circ, 70^\circ$ with all its sides touching the circle.
21. Find the figure $\angle B = 90^\circ, \angle C = x^\circ$ and $\angle A = y^\circ$

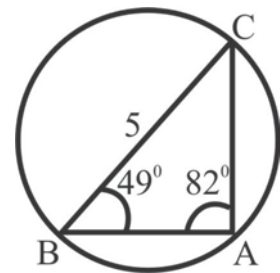
- a. Find $x+y = \underline{\hspace{2cm}}$?
- b. Prove that $\sin x = \cos y$?
- c. If $\sin x = \cos x$ then how much is x ?



Answer any five from questions 22 to 28. Each question carries 5 scores
($5 \times 5 = 25$)

22. In the figure $\angle A = 82^\circ, \angle B = 49^\circ, BC = 5 \text{ cm}$

- a. Calculate circumradius of the triangle
- b. What is the length of AC?
- c. Find the perimeter of the triangle



$$[\sin 82^\circ = 0.99, \cos 82^\circ = 0.14, \sin 49^\circ = 0.75, \cos 49^\circ = 0.66]$$

23. 301, 308, 315, is an arithmetic sequence

- a. What is the common difference of this sequence?
- b. Write the remainder when the term of this sequence are divided by 7
- c. Find the sum of all natural numbers between 300 and 500 that leave remainder 2 on division by 7.

24. The table below shows the children in a class sorted according to their marks in the English exam. Calculate the median mark of the class?

Marks	Number of children
10 – 20	4
20 – 30	8
30 – 40	3
40 – 50	10

25.

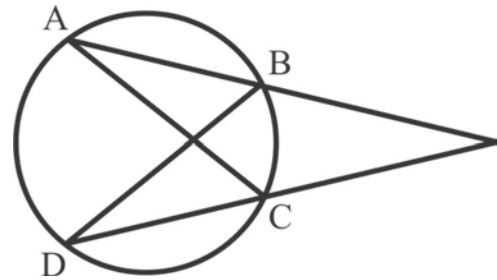
				1				
			2	3	4			
	5	6	7	8	9			

.....

.....

- a. Write the next two lines of the pattern
- b. Write last number of 10th level
- c. Write the 1st number of 10th line
- d. Find the sum of numbers of the first 10 lines

26. In the figure the chords AB and CD are extended to meet at P.



- a. Write the pair of equal angles
- b. Prove that $PA \times PB = PC \times PD$

27. The height of 10 students are given below

148, 161, 143, 133, 154, 175, 135, 167, 150, 141

- a. Find the mean
- b. Find median
- c. Avoid most highest student and find the mean and median

28. Draw a square having same area of a rectangle with sides 5, 3 cm

Read the following, understand the mathematical idea expressed in it and answer the questions that follow (6 x 1 = 6)

$$1 = 1$$

$$1 + 2 = 3$$

$$1 + 2 + 3 = 6$$

$$1 + 2 + 3 + 4 = 10$$

.....

1, 3, 6, 10, this sequence is the sum of numbers adding from 1 to continuous numbers. This numbers is known as triangle numbers.

$$1 + 3 = 4, 3 + 6 = 9, 6 + 10 = 16$$

1, 4, 9, 16, this numbers is known as rectangle numbers. This is the addition of the triangle numbers.

- a) What is the next number of 1, 3, 6, 10,?
- b) What is the 5th number in rectangle numbers?
- c) Write the algebraic form of triangle numbers?
- d) Write the algebraic form of rectangle numbers?
- e) If 20th t of triangle number is x and 21st term is y, then what is y-x?