

VIJAYABHERI- MATHEMATICS SMPLE QUESTION PAPERS

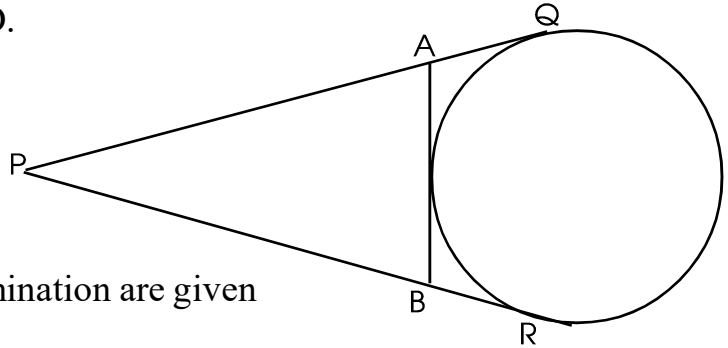
ശിൽപശാലയിൽ പങ്കെടുത്തവർ

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MATHEMATICS SAMPLE QUESTION PAPER - SET I

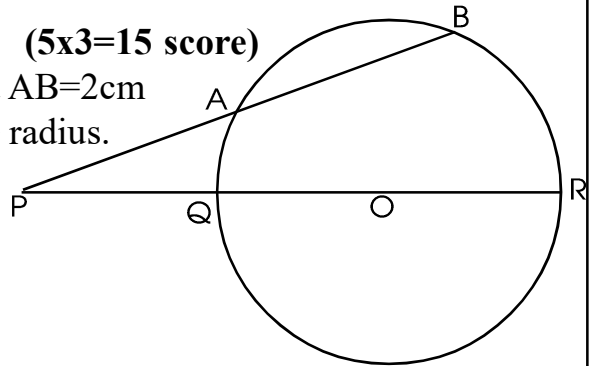
Answer to any 3 of the questions from 1 to 4 (3x2=6 score)

1. Algebra of a number sequence is n^2+n .
 - (a) Write this sequence.
 - (b) Is this an arithmetic sequence? Why?
2. ABCD is a square with sides are parallel to the axes and A(2,3), B(7,3). Find the coordinates of the vertices C and D.
3. In the figure, PQ, PR and AB are tangents. PQ = 14 cm.
 - (a) Find the length of PR
 - (b) Find the perimeter of $\triangle PAB$
4. Scores of 8 students got in an examination are given 10,12, 16, 18, 20, 22, 24
 - (a) Find the mean score.
 - (b) Find the median of scores

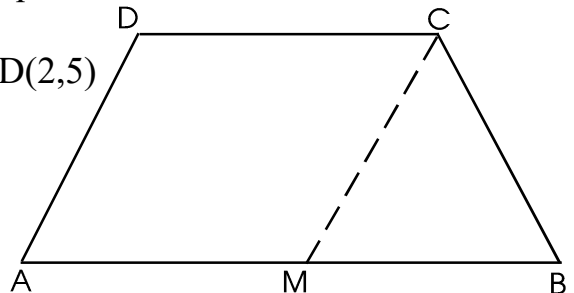


Answer to any 5 of the questions from 5 to 11 (5x3=15 score)

5. In the figure, 'O' is the centre, PA=6cm and AB=2cm
 - (a) If PQ is equal to the radius, then find the radius.
 - (b) Find the length of PR



6. A bowl containing paper slips numbered even numbers below 10. Another box containing paper slips numbered prime numbers below 10. One paper slip is taken from box and pair them.
 - (a) Write all possible such pairs.
 - (b) What is the probability of both numbers are even?
 - (c) What is the probability of one number is square of other?
7. In the figure, ABCD is a trapezium. M is the midpoint of AB and A(2,3), M(6,3), D(2,5)
 - (a) Find the coordinates of C
 - (b) Find the coordinates of B
 - (c) Find the length of MC
8. $P(x) = x^2-6x+10$ is a polynomial
 - (a) Find P(0) (b) Find P(3)
 - (c) Prove that for any number 'x', what is the least number for P(x)

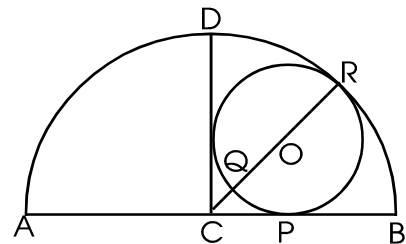


9. Base edge of a square pyramid is 20cm and height 24cm
 (a) What is the total surface area?
 (b) Find the volume of the pyramid
10. Sum of a positive number and its reciprocal is $3\frac{3}{4}$.
 (a) If the number is 'x', Write its reciprocal.
 (b) Find the number
11. Sides of a triangle are a,b,c and its inradius is R. Prove that area of this triangle is $\frac{abc}{4R}$

Answer to any 7 of the questions from 12 to 21 (7x4=28 score)

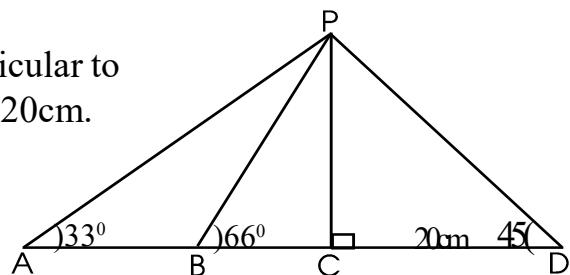
12. Sum of 5th term to 8th term of an arithmetic sequence is 70. Sum 10th term to 13th term is 130.
 (a) What is the 9th term of this sequence?
 (b) What is the 7th term?
 (c) Find the common difference of the sequence.

13. In the figure, C is the centre of the semicircle, CP is a tangent to the small circle. If O is the centre, $\angle DCB=90^\circ$ and CP=3cm then,
 (a) Find the radius of the small circle.
 (b) Find the length of CQ.
 (c) Find the radius of the circle.

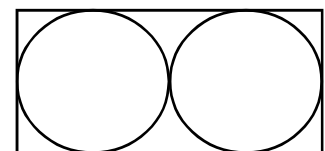


14. (a) Construct an equilateral triangle with sides 6cm.
 (b) Construct a rectangle with equal area of this triangle.
 (c) Construct a square of equal area.
15. Draw a rectangle of one side 6cm and area equal to the area of the square with sides 5cm.

16. In the figure $\angle D=45^\circ$. The line PC is perpendicular to the line AB. Also $\angle B=66^\circ$, $\angle A=33^\circ$ and CD=20cm.
 a) what is the length of the line CP?
 b) Find length of the lines BC and BP
 c) Find length of the line AD
 ($\sin 66^\circ = 0.90$, $\cos 66^\circ = 0.40$, $\tan 66^\circ = 2.25$)

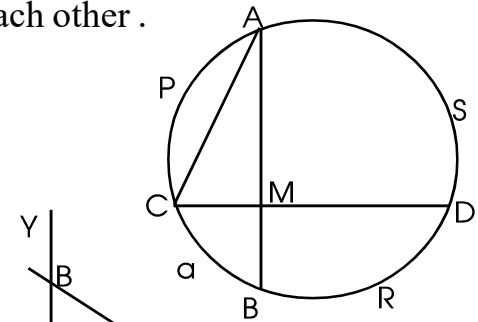


17. Two identical circles are drawn in a rectangle as shown in the figure. If a point is marking in the picture without looking in it,
 a) What is the probability of that point is in the first circle?
 b) What is the probability of marking the point in any of the two circles?
 c) What is the probability of marking the point outside the circles?

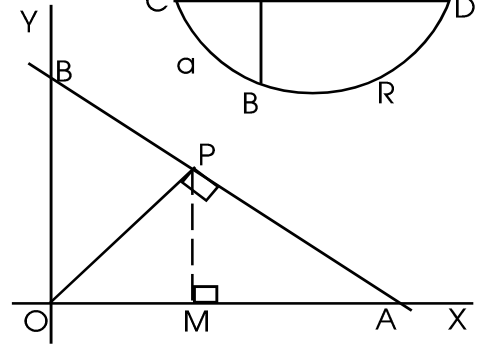


18. In the figure lines AB and CD are perpendicular to each other .
and $\angle CAM = 40^\circ$.

- a) What is the central angle of arc CQB?
- b) What is the central angle of the arc ASD?
- c) When the arc APC is joined to arc BRD at one end , prove that the resulting arc is a semi circle.



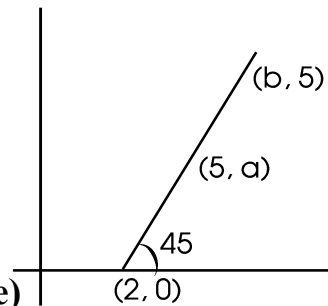
19. In the figure P is the point (36,48).
- a) Write the coordinates of the point M.
 - b) Write the coordinates of the points A and B.
 - c) Find perimeter of triangle OAB.



20. a) What is the volume of a sphere of radius 6cm?
b) What is the volume of a cylinder of radius 6cm and height 25cm?
c) A metallic solid cylinder of radius 6cm and height 25cm is melted and recast in to a solid sphere and a cone of same radius 6cm. What is the volume of the cone? Also find its height.

21. In the figure the line is making an angle 45° with the x axis. $(2,0)$, $(5,a)$ and $(b,5)$ are on this line.

- a) What is the slope of this line?
- b) What are the numbers a and b?
- c) Write the equation of the line
- d) Write the coordinates of any other point on this line.



Answer to any 5 of the questions from 22 to 28 (5x5=25 score)

22. 5
9 13
17 21 25

.....

.....

This number pattern is prepared by using the terms of the arithmetic sequence 5,9,13,....

- (a) Write next two lines of this sequence.
- (b) What is the algebraic form of the arithmetic sequence?
- (c) What is the sum of first 20 natural numbers?
- (d) What is the last term of 20th line of this sequence?
- (e) Find the sum of all terms in the 20th line.

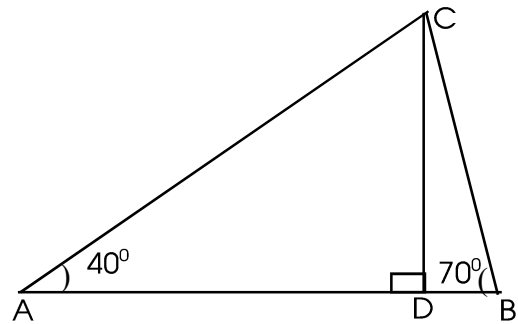
23. (a) Draw $\triangle ABC$ with $AB=6\text{cm}$, $BC=7\text{cm}$, $AC=5\text{cm}$ and then construct its incircle.
 (b) Find the length of the tangent drawn from A to the circle.

24. $P(x) = (x^2-3x+2)(x-3)+5$

- (a) What is the remainder on dividing the polynomial $P(x)$ by $(x-3)$
 (b) If $(x^2-3x+2) = (x+a)(x+b)$ then, find $a+b$ and ab .
 (c) write x^2-3x+2 as two first degree polynomials.
 (d) Which number should be added to $P(x)$ for which $(x-2)$ as a factor?

25. Two men standing either sides of a tree sees the top at an angles of elevations 40° and 70° . (a rough figure is given)

- (a) Find the measure of $\angle A$.
 (b) What is the height of the tree?
 (c) What is the distance from A and B to C?
 (Sin $40 = 0.64$, Cos $40 = 0.80$, tan $40 = 0.84$)



26. $2x+3y-21=0$, and $7x-3y-6=0$ are the equations of two lines

- (a) Find the point of intersection of these two lines.
 (b) Write the equation of a circle with centre this point and radius 6 unit.

27. Daily wages and number of some workers in a factory is given.

Daily wages	number of workers
300 - 400	9
400 - 500	10
500 - 600	10
600 - 700	8
700 - 800	5
800 - 900	3

- (a) If the workers are arranged according to their wages, the wage of the worker at what position is taken as the median?
 (b) Which is the median class?
 (c) Find the median wage.

28. Diameter of a solid cylinder is 24cm and its height is 30cm. This cylinder is melted and recast into solid spheres.

- (a) What is the volume of such spheres?
- (b) What is the number of spheres?
- (c) What is the volume of the cylinder?
- (d) What is the total surface area of a sphere?

Read the following, understand the mathematical concept in it and answer the questions that follow (1+1+1+1+1+2)

29. We know $1+2+3+\dots+n = \frac{n(n+1)}{2}$

1^3	=	1	=	1	=	1^2
1^3+2^3	=	1+8	=	9	=	$(1+2)^2$
$1^3+2^3+3^3$	=	1+8+27	=	36	=	$(1+2+3)^2$
$1^3+2^3+3^3+4^3$	=	1+8+27+64	=	100	=	$(1+2+3+4)^2$
.....	

Sum of cubes of consecutive natural numbers is the square of sum of that natural numbers.

- a) What is the sum of first 6 natural numbers?
- b) Find $1^3+2^3+3^3+4^3+5^3+6^3$
- c) Square of which number is equal to $1^3+2^3+3^3+\dots+10^3$
- d) Write $(1+2+3+4+5)^2$ as the sum of cubes of consecutive natural numbers
- e) Find $(1^3+2^3+3^3+4^3) - (1+2+3+4)^2$
- f) What is $1^3+2^3+3^3+4^3+\dots+n^3$

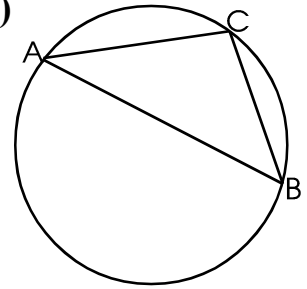
MATHEMATICS SAMPLE QUESTION PAPER - SET II

Answer to any 3 of the questions from 1 to 4 (3x2=6 score)

1. Prove that x^2-1 is a factor of $x^8+x^4+x^2-3$.
2. What is the probability of 5 Saturdays in a leap year?
3. For an arithmetic sequence, common difference 4 and 8th term is 25. What is the 15th term?
4. Quadrilateral ABCD is cyclic, $\angle A:\angle B=3:2$ and $\angle B=70^\circ$
 - (a) Find $\angle D$
 - (b) Find $\angle A$ and $\angle C$.

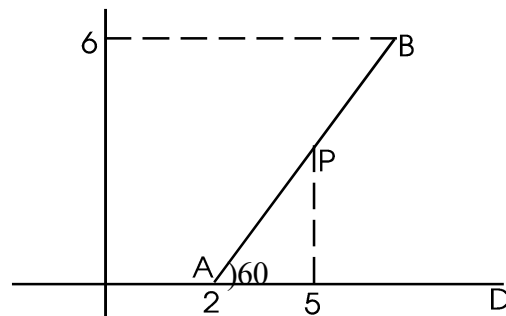
Answer to any 7 of the questions from 5 to 13 (7x3=21 score)

5. Side BC of $\triangle ABC$ is equal to its circum radius.
 - (a) How much part of the perimeter of this circle is the arc length BC
 - (b) Find $\angle BAC$



6. Are the points A(1,-4), B(3,2), and C(4,5) on a line?. If x coordinate of a point on the line AB is 2, what is its y coordinate?
7. Side of an equilateral triangle is 'a'. Prove that the area of the portion in between the incircle and circumcircle of this triangle $\frac{\pi a^2}{4}$.
8. How much terms of the arithmetic sequence 5,9,13,... should be added to get the sum 434?
9. Height of a square pyramid with all sides are equal is $6\sqrt{2}$ cm. Find the sum of lengths of all sides of this pyramid. What is its slant height?
10. In the figure, coordinates of A is (2,0). x coordinate of 'P' is 5 and y coordinate of 'B' is 6.

- (a) Write the coordinates of P and B.
- (b) Find the length of AB.



11. The table below shows the number of children and their weights
Find the mean and median of the weights.

Weights	Number of children
42	3
45	5
50	9
54	12
58	10
60	6

12. (a) Find the sum of the natural numbers from 1 to 25.
(b) n^{th} term of an arithmetic sequence is $6n+4$. Find the sum of first 25 terms of this sequence.
13. Draw a rectangle with one side 7cm and area is equal to the area of a square with side 6cm.

Answer to any 5 of the questions from 14 to 20 (5x4=20 score)

14. A bowl containing six black, 8 red and 10 white beads. Another bowl containing 9 black, 6 red and 5 white beads. A bead is drawn from each box without looking
- (a) The probability of getting a red bead from which box is more?
(b) What is the probability of getting both beads of the same colour?
(c) What is the probability of getting at least one black?
15. One side of a rhombus is 8cm and one of its angles is 80°
- (a) Find the lengths of the diagonals of the rhombus.
(b) Find the area of the rhombus.
[$\sin 40^\circ = 0.64$ $\cos 40^\circ = 0.76$ $\tan 40^\circ = 0.80$
 $\sin 50^\circ = 0.76$ $\cos 50^\circ = 0.64$ $\tan 50^\circ = 1.2$]
16. Sides of a triangle are 7cm, 6cm and 6.5cm. Draw this triangle and construct its incircle, measure its inradius.
17. Find the volume of a cone with base perimeter 18π cm and curved surface area 135π cm².
18. $P(x) = 2x^3 + Kx^2 - 8x - 1$. $P(x) = (x-2)q(x) + 3$
- a) What is the remainder on dividing $P(x)$ by $x-2$?
b) Find the number K ?
c) Check whether $x+2$ is a factor of $q(x)$ after finding $P(-2)$.
d) Check whether $2x+1$ is a factor of $q(x)$.

19. The table below shows the number childrens and their scores in an examination conducted out of 100 marks

Scores	Number childrens
0 - 20	12
20 - 40	8
40 - 60	5
60 - 80	13
80 - 100	7
Total	45

Find the median of the scores.

20. Draw a circle of radius 5cm and centre 'O'. Draw a chord AB of length 5cm in this circle. Draw tangents through A, B and meet them in P. Find the perimeter of $\triangle PAB$.

Answer to any 5 of the questions from 21 to 28 (5x5=25 score)

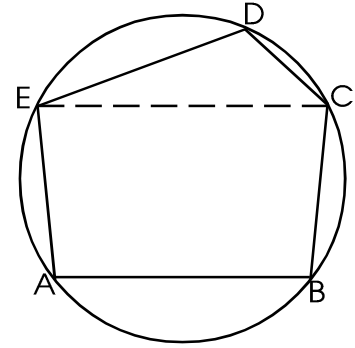
21. Achu and kichu wrote arithmetic sequences with common differences 6. Sum of first 25 terms of the arithmetic sequence Achu wrote is 300 more than that of Kichu.
- What is the difference between the first terms these sequences?
 - What is the difference between the sum of first 30 terms of these sequences?
 - If the sequences are wrote without changing the first terms and common difference 7 instead of 6, then what is the difference between the sum of first 25 terms.
 - If the difference of first 25 terms of the above sequences is 200, what will be the difference of their first terms?
22. A right triangle is made by bending a thread of 40m. One of the perpendicular side is 1 more than two times of the other.
- If the length of the small side is 'x', What will be the length of the large side?
 - Find the sides of the triangle after forming a second degree equation.
23. In $\triangle ABC$, $AB=8\text{cm}$, $\angle A=80^\circ$ and $\angle B=55^\circ$
- Find the perpendicular distance C to AB.
 - Find the area of the triangle.
[$\tan 70=2.8$, $\tan 55= 1.4$]
24. A (-3,1), B (14, -5) and C (5, 7) are the vertices of $\triangle ABC$
- Find the length of the sides AC and BC
 - Bisector AB of $\angle ACB$ passes through D, find AD:BD.
 - Find the coordinates of D .

25. Vertices of the regular pentagon ABCDE are the point of a circle and $\angle CED=55^\circ$.

(a) Find $\angle A + \angle BCE$

b) Write another pair of angles with sum 180°

c) Find $\angle A - \angle B + \angle C - \angle E + \angle D$.



26. An hemisphere is attached to the flat surface of a cone. Curved surface area of this cone is equal to the curved surface area of this hemisphere. Height of the cone is 15cm.

(a) What is the ratio between the slant height and base diameter of the cone?

(b) Find the radius of the hemisphere.

(c) Find the volume of this solid.

27. (a) Write the equation of circle with centre $(2, 3)$ and radius 5 unit.

(b) Write the coordinates of the points of the circle cuts the x axis.

(c) Check whether the point $(-1, -1)$ is on this circle ?

(d) Find the equation of the diameter of a circle passing through the point $(-1, -1)$.

Read the following, understand the mathematical concept in it and answer the questions that follows (1+1+1+1+1+2)

28. Look at the number pattern given.

$$1+2=3$$

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

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

(a) Write next two lines of this pattern.

(b) Find the first and last term of the 10th line of this pattern.

(c) Prepare a number pattern like this using even numbers instead of natural numbers.

(d) Prepare a number sequence using the terms of arithmetic sequence with common difference 3.

(e) Sum of first 13 terms is equal to the next 12 terms in 25 consecutive terms of an arithmetic sequence with common difference 4, What is its first term?

MATHEMATICS SAMPLE QUESTION PAPER - SET III

Answer to any 3 of the questions from 1 to 4 (3x2=6 score)

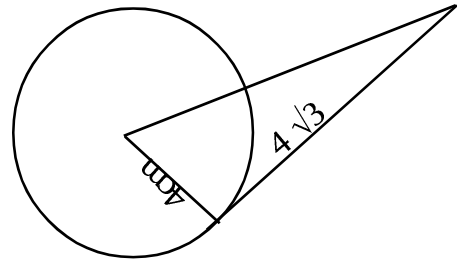
1. Write an arithmetic sequence with common difference 8. Which term is obtained when 96 is added to the first term.
2. Write the coordinates other two points on a line joining (3,4), (0,8)
3. Square of '1 less than a number' is 9. What will be the number?
4. Total surface area of a solid sphere is 360cm^2 . What is the total surface area of the hemispheres formed by cutting this sphere?

Answer to any 5 of the questions from 5 to 11 (5x3=15 score)

5. Draw a tangent of length $4\sqrt{3}\text{cm}$ to a circle of radius 4cm

OR

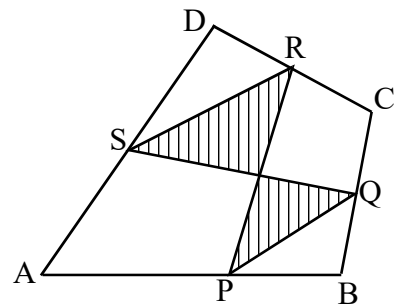
Draw a figure using the dimensions given in the figure



6. Write the polynomial $P(x)=x^2(x+5)-(x+5)$ as the product of first degree polynomials.
7. (a) Find the slope of the line $2y=x$.
(b) Write the coordinates of two points on this line.
8. Imagine two numbers,
(a) What are the numbers of two digit numbers?
(b) What is the probability of the imagined two digit number is a perfect square?
9. Sum of two numbers is 6 and their product is 1.
(a) If one number is $x+3$, what will be the second number.
(b) Find the numbers.
10. Midpoints of sides of the quadrilateral are P,Q,R and S, the diagonal AC passing through the point O.

A point is marked in this figure,

- (a) What is the probability of that point is inside the shaded portion?
- (b) What is the probability of that point is outside the shaded portion?



11. which number should be added to the polynomial $2x^2+5x$ for which this polynomial become the product of $x-2$.

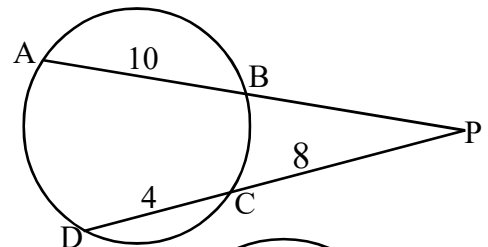
Answer to any 7 of the questions from 12 to 20 (7x4=28 score)

12. (a) Find the sum of first 23 terms of the arithmetic sequence 6,10,14,....
 (b) Find the median of first 23 terms of this sequence.
 (c) Find the median of first 23 terms of this sequence.
13. 34 households in a locality are sorted according to their electricity usage in the table below. Find the median.

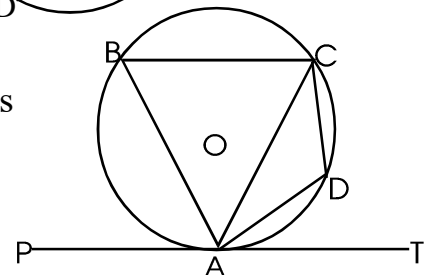
Use of electricity	Number of households
30 - 50	2
50 - 70	4
70 - 90	8
90 - 110	10
110 - 130	7
130 - 50	3

14. A cone is made by bending a sector of central angle 216° is cut out from a circle of radius 20cm.
 (a) What is the volume of this cone?
 (b) Find the curved surface area of this cone.?
 (c) What is the curved surface area of the cone made by using the remaining sector?
15. Draw a triangle with two angles 55° , 75° and circum radius 3.5cm.
16. A triangle with one angle 135° and circum radius 10cm. What is the length of the side opposite to the angle 135°
17. (a) In a parallelogram ABCD, If A(1,2), B(6,4),C(8,9) then find the coordinates of D.
 (b) Prove that this parallelogram is a rhombus.
 (c) Find the coordinates of its incentre.

18. In the figure, AB=10cm, CD=4cm and PC=8cm.
 (a) Find the length of PB.
 (b) What is the length of side of a square of area equal to the area of the rectangle of sides PA and PB



19. In the figure, TA is a tangent, A,B,C and D are the points on the circle. If $\angle DAT=40^\circ$, and $\angle D=110^\circ$ then, find $\angle ABD$, $\angle ACD$, $\angle ABC$ and $\angle BAP$.



20. Product of 5 less than four times a number and 2 less than the first is one. What are the numbers?

21. From the top of a tower, sees the foot and top of a flag post of height 11m at angles of depression 30° and 70° .

(a) what is the height of the tower?

(b) What is the distance between the foot of the tower and flag post?

[$\sin 70=0.94$, $\cos 70=0.34$, $\tan 70=2.75$, $\sqrt{3} \approx 1.73$]

22. Draw of rectangle of sides 7cm and 4cm. Draw another rectangle with one side 5cm and Area equal to the area of the first rectangle. Draw a square of equal area.

23. (a) Find the coordinates of point of intersection of the line $x-2y=4$ with the axes.

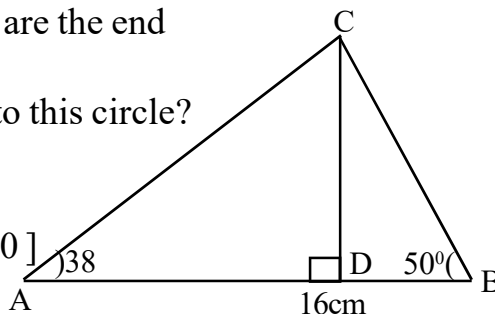
(b) Find the equation of the circle with these points are the end points of the diameter.

(c) Where is the position of the origin with respect to this circle?

24. In the figure, $AB=16\text{cm}$, $\angle A=38^\circ$ and $\angle B=50^\circ$.

Find the length of AC and CD.

[$\sin 38=0.61$, $\cos 38=0.80$, $\tan 38=0.80$, $\tan 50=0.90$]



25. A square pyramid is made by using 4 isosceles triangle with base edge 16cm and height 17cm.

(a) What is lateral surface area of this pyramid?

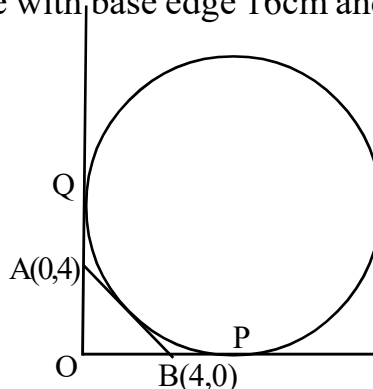
(b) What is the height?. What is the lateral edge?

(c) What is the area of one triangle?

26. Ex-circle of a triangle formed by joining the points $B(4,0)$, $A(0,4)$ and the origin is given.

(a) Find the length of the tangents OP and OQ.

(b) Find the coordinates of the points P and Q.



Read the following, understand the mathematical concept in it and answer the questions that follows (1+1+1+1+1+2)

27. Consider the arithmetic sequence: 15,33,51,.....

(a) What is the common difference of this sequence?

(b) What is the algebraic form of this sequence?

(c) Fill the blanks

$15+1=16$

$15+33+1=.....$

$15+33+51+1=$

$15+33+51+.....+1= 169$

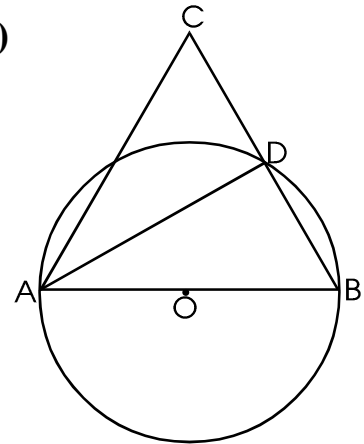
(d) What is the sum of first n terms.

(f) Prove that 1 added to sum first consecutive terms is form a perfect square.

MATHEMATICS SAMPLE QUESTION PAPER - SET IV

Answer to any 3 of the questions from 1 to 4 (3x2=6 score)

1. In the arithmetic sequence: 25,38,31,.....
 - (a) Write next two terms.
 - (b) Is 2019 a term of this sequence? Why?
2. In the figure, AB is the diameter of the circle, AC=BC and $\angle B=70^\circ$. Find all angles of $\triangle ADC$

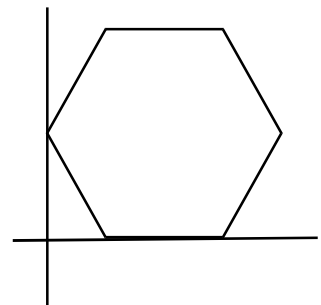


3. A bowl contain paper slips numbered 1 to 20. A paper slip is drawn from the bowl without looking. What is the probability getting this number is a prime number?
4. Check whether x^2-1 is a factor of $x^{100}+1$.

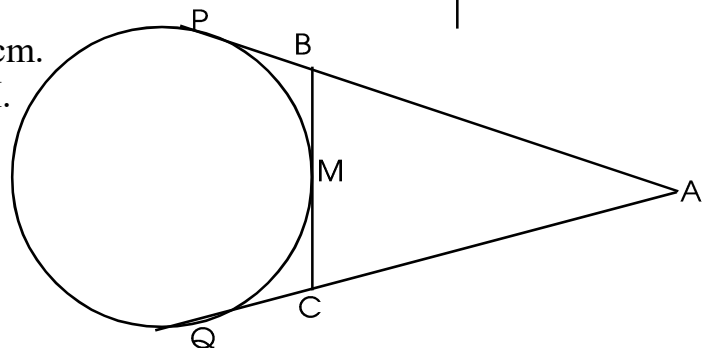
Answer to any 7 of the questions from 5 to 13 (7x3=21 score)

5. (a) What is the sum of first 'n' odd numbers?
(b) If the sum of first 'n' even numbers is 702. Find 'n'.
6. What is the perimeter of a largest regular pentagon that can be drawn in a circle of radius 6cm.
($\sin 36^\circ = 0.5878$, $\cos 36^\circ = 0.81$, $\tan 36^\circ = 0.727$)

7. Two points of a regular hexagon is on the x axis. Another point is (0,6). Write the coordinates of all vertices of this hexagon.



8. In the figure, perimeter $\triangle ABC$ is 24cm. The side BC touches the circle at M.
 - (a) What is the length of PA?
 - (b) If $AB=AC$ then, prove that M is the midpoint of BC.

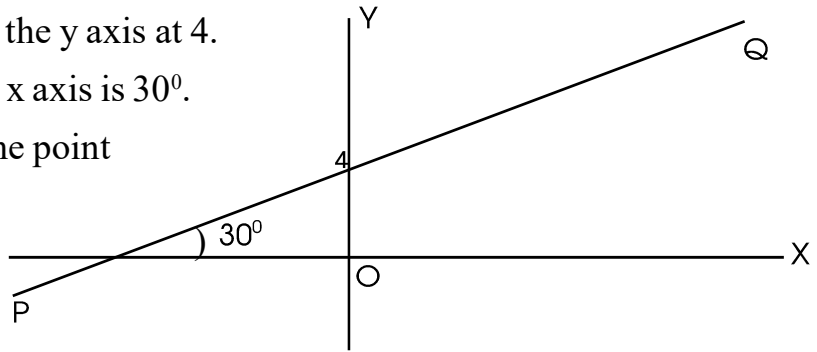


9. Slant height of a square pyramid is 15cm and height 12cm. Find the lateral surface area of the pyramid.

10. In the figure, the line PQ cuts the y axis at 4.
This line makes an angle with x axis is 30° .

(a) Write the coordinates of the point of this line cuts the x axis.

(b) Find the slope of this line.



11. The table below shows the ages and number of some people in a group.
Find the mean and median of the ages.

Ages	Number of some people
25	3
30	4
33	5
37	6
40	4
42	3

12. Sum of 2nd term to 15th term of an arithmetic sequence is 518. Find the sum of first 16 terms of this sequence.
13. Draw a triangle with two angles $32\frac{1}{2}^\circ$, $42\frac{1}{2}^\circ$ and circum radius 5cm. Calculate the approximate value of the largest side.

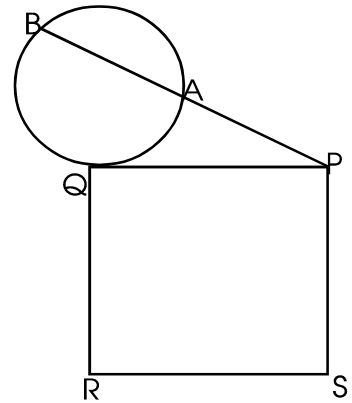
Answer to any 5 of the questions from 14 to 20 (5x4=20 score)

14. Two bowls containing paper slip numbered 1 to 100. One paper slips is drwan from each box without looking.
- (a) What is the probability of both numbers are the same?
- (b) What is the probability of both numbers are perfect squares?
- (c) What is the probability of the sum of the numbers is 101?
15. In $\triangle ABC$, $AB=10\text{cm}$, $\angle A=35^\circ$, $\angle B=65^\circ$.
- (a) What is the perpendicular distance from C to AB?
- (b) What is the perimeter of $\triangle ABC$?
- [$\sin 35=0.57$, $\cos 35=0.81$, $\tan 35=0.7$, $\sin 65=0.9$, $\cos 65=0.42$, $\tan 65=2.14$]

16. In the figure, area of the square PQRS is 84cm^2 .

(a) If $AB=8\text{cm}$, find the length of PA.

(b) Find the length of PB, if $PA=AB$.



17. A wooden solid cone has 24cm height and 9cm radius. A solid cylinder of maximum size with height 8cm is carved out from this cone.

(a) What is the volume of the cylinder?

(b) What is the volume of the remaining wood?

18. x^2-4 is a factor of $P(x) = x^3 - x^2 + ax + b$

(a) Write two first degree factors of $P(x)$

(b) Calculate a and b

(c) write $P(x)$ as the product of three first degree polynomials.

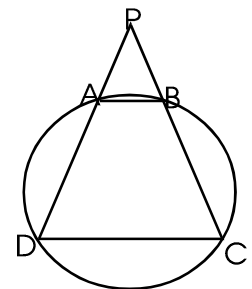
19. Number of workers and their daily wages in a factory is given below. Find the median.

Daily wages	Number of workers
200 - 300	3
300- 400	6
400 - 500	8
500 - 600	10
600 - 700	12
700 - 800	6

20. In the figure, $PA=PB$ and A,B,C,D are the points on the circle.

(a) Prove that ABCD is an isosceles trapezium.

(b) If $CD=12\text{cm}$, $AB=9\text{cm}$ and $AD=4\text{cm}$ then find PD?



Answer to any 5 of the questions from 21 to 27 (5x5=25 score)

21. Anu and Binu wrote arithmetic sequences with common difference 6. Sum of 15 terms of the arithmetic sequence of Binu wrote is 300 more than that of Anu wrote.

(a) What is the difference of first terms of these sequences?

(b) Does the second sequence contains any number in first sequence?

(c) What is the difference between the sum of first 20 terms these sequences.

22. Achu and Suchu ran through mutually perpendicular path AB and BC. Achu ran from A to B, Bichu ran from B to C. Achu's speed is 3 m/s is less than that of Bichu. Difference of distance at first is 40m and after 4s distance become 40m. Find the speed of Achu and Bichu.
23. A boy standing on the side of a river sees the top of a tree on the other side at angle of elevation 70° . After stepping back 10m , he sees the top at an angle 55° . Height of the boy is 1.5m.
- Draw a rough figure and mark the dimensions.
 - Find the height of the tree.
 - Find the width of the river.
- [$\tan 70=2.75$, $\tan 55= 1.43$]
24. A (5, 7), B (-1, -1), C (5, -1) are the verices of $\triangle ABC$
- What is the coordinates of the circumcentre?
 - If D (7,0) then prove that ABCD is cyclic.
25. AB=6cm, BC=5cm and AC=7cm. Draw $\triangle ABC$ and construct its incircle. Measure its inradius. Calclate the approximate area of this triangle.
26. Base diameter of a solid cone is 14cm, total surface area 224cm^2 .
- Find the slant height of the cone.
 - Find the height of the cone.
 - Find the volume of the cone.
27. (a) Find the coordinates of the centre of the circle $x^2 + y^2 - 4x - 2y - 20 = 0$
- Prove that the point (5,5) is a point on this circle.
 - If AB is a diameter of this circle, then find the coordinates of B.

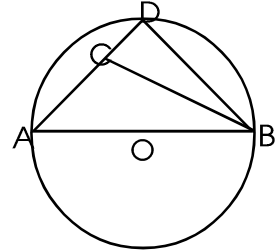
Read the following, understand the mathematical concept in it and answer the questions that follows (1+1+1+1+1+2)

28. (a) Write an arithmetic sequence with common difference 6.
- Write the sum of first cosecutive terms of this sequence. Is this sequence an arithmetic sequence?
 - Form a sequence by dividing the terms of the second sequence with their positions.
 - What is the relation between this sequence and first sequence.
 - Is this relation true for all arithmetic sequences ? Why?

MATHEMATICS SAMPLE QUESTION PAPER - SET: V

Answer to any 3 of the questions from 1 to 4 (3x2=6 score)

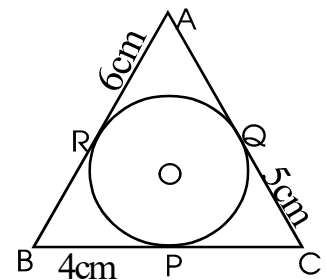
1. consider the arithmetic sequence: 15,24,33,.....
 - (a) Write the algebraic form of this sequence.
 - (b) Find the 20th term of this sequence.



2. 'O' is the centre of the circle with AB as diameter. D is a point on the circle, AC=BC and $\angle A=40^\circ$. Find all angles of $\triangle BCD$.
3. Two dice numbered 1 to 6 are rolled together. What is the probability of getting the sum of the numbers on the top is 8?
4. Which of the following are the factors of $x^{100} + x^{99} + x^{98} + x^{97} + \dots + x + 1$
 - (a) $x - 1$
 - (b) $x + 1$

Answer to any 7 of the questions from 5 to 13 (7x3=21 score)

5. (a) Find the sum of first 'n' even numbers.
(b) How much even numbers starting from 2 should add to get the sum 240?
6. A polygon of 12 sides of maximum size is drawn in a circle. What is the perimeter of this polygon?
($\sin 75^\circ = 0.916$, $\cos 75^\circ = 0.26$ $\tan 75^\circ = 3.93$)
7. Two sides of a rectangle is on x,y axes. The diagonals of this rectangle meets at the point (4,3). Find coordinates of four verices of the rectangle.
8. Volume and base area of a cone is numerically equal. Base diameter is 8cm. Find its curved surface area.
9. In the figure, incircle touches the sides of the triangle at the points P,Q,and R.
 - (a) Find the area of the triangle.
 - (b) Find the inradius.
10. A (0, -2), B (1, 1), C (3, 7), D (4,10) are four points
 - (a) Find the slope of the line AB.
 - (b) Find the slope of the line CD.
 - (c) Check whether the points A,B,C and D are on the circle.



11. The table below shows the number of children and scores in an examination. Find the mean and median of scores.

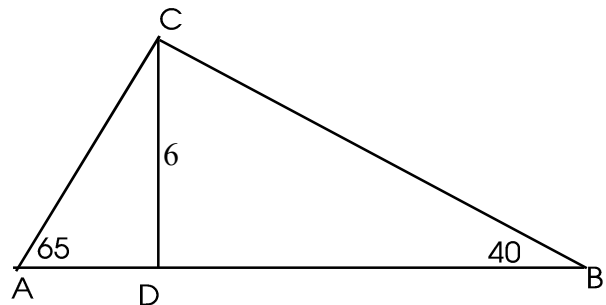
Mark	Number of children
12	3
15	7
18	11
20	15
22	5
25	4

12. Sum of first 15 terms of an arithmetic sequence is 525. 12th term is 51.
- Find the 8th term.
 - Find the first term.
13. An equilateral triangle of maximum size is cutout from a thick circular paper sheet of radius 8cm.
- What is the length of side of the triangle?
 - What is the area of the remaining paper sheet?

Answer to any 5 of the questions from 14 to 20 (5x4=20 score)

14. A bowl containing 8 black and 12 white beads. Another bowl containing 9 black and 13 white beads.
- The probability of getting black beads from which bowl is more?
 - The probability of getting white beads from which bowl is more?
 - What is the probability of both beads are of the same colour?

15. In the figure, $\angle A=65^\circ$, $\angle B=40^\circ$ and AB is perpendicular to CD. CD=16cm.

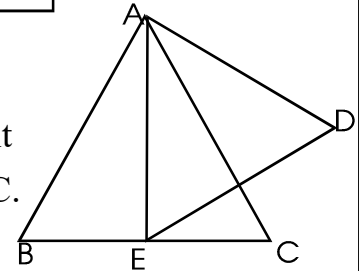


- What is the perimeter of $\triangle ABC$?
 - What is the area of $\triangle ABC$?
- ($\sin 65^\circ = 0.91$, $\sin 40^\circ = 0.64$,
 $\cos 65^\circ = 0.42$, $\cos 40^\circ = 0.77$)
16. Draw a square ABCD with AB=5cm. Draw a circle through A with AB as a tangent and then construct a rectangle of area equal to the area of the square and one side 4cm.
17. All the sides of a square pyramid are equal. What is the ratio of length of base edge, height and slant height. Base edge of such square pyramid is 6cm, What is its volume?

18. (a) Write the polynomial $x^2 - 6x + 8$ as the product of two first degree polynomials.
 (b) Prove that $x^2 - 6x + 8$ is the factor of $2x^3 - 11x^2 + 10x + 8$.
19. The table below shows that number and ages of the members in a group. Find the median age?

Age	Number
5 - 15	6
15 - 25	10
25 - 35	4
35 - 45	8
45 - 55	5
55 - 65	4
Total	37

20. In the $\triangle ABC$, $\triangle AED$ are equilateral triangles. E is the mid point of BC. Prove that the circumcircle of $\triangle AED$ passes through C.



Answer to any 5 of the questions from 21 to 27 (5x5=25 score)

21. Angles of a polygon with 16 sides are natural numbers and also they are in arithmetic sequence.
- What is the smallest and largest angle?
 - What is the common difference of this arithmetic sequence?
22. In two polygons, number of sides of one is 3 more than that of the second. Difference of their outer angles is 4.
- Find the outer angles of the polygons.
 - Find the number of sides of the polygons.
23. A flag post of height 5m is fixed on the top of a building. A boy standing some distant away from the foot of the building sees the top of the building at an angle of 40° and top of the flag post at angle 55° .
- Draw a rough figure and mark the measures.
 - Find the height of the building.
 - What is the distance between the foot of the building and the boy.
- ($\sin 40^\circ = 0.64$, $\sin 55^\circ = 0.82$, $\cos 40^\circ = 0.76$, $\cos 55^\circ = 0.57$, $\tan 40^\circ = 0.83$, $\tan 55^\circ = 1.43$)

24. A (2, 2), B (6, -2), C (4, 6) are the vertices of $\triangle ABC$. P, Q, R are the midpoints of the sides AB, BC and AC.
- (a) Find the coordinates of the points P, Q and R.
 - (b) Write the equation of the lines AQ and BR.
 - (c) Find the coordinates of intersection of the lines AQ and BR.
25. Draw a triangle with angles 50° , 60° and inradius 3cm. Find the length of longest side of the triangle.
26. Height of a solid wooden cone is 18cm and radius 12cm. A cylinder of maximum size with 4cm radius is carved out.
- (a) What is the volume of the cylinder carved out?
 - (b) What is the volume of the remaining wood?
27. (a) Find the coordinates of the centre of the circle $x^2 + y^2 - 7x - 8y + 12 = 0$
- (b) Find the coordinates of points of the circle cuts x,y axes.

Read the following, understand the mathematical concept in it and answer the questions that follows (6x1=6)

28. Terms of the arithmetic sequence with first term 1 and common difference 1 are natural numbers. Sequence of sum of these terms are 1,3,6,... are called triangular numbers. Sequence of sum of the terms of the arithmetic sequence with first term 1 and common difference 2 is called square numbers.
- (a) Write first 7 terms of the triangular number sequence.
 - (b) Write the algebraic form of this sequence.
 - (c) Write sequence of square numbers.
 - (d) Write the algebraic form of the square number sequence.
 - (e) Write pentagonal number sequence.
 - (f) Write the algebra of pentagonal sequence.