MT 1201

SECOND TERMINAL EVALUATION - 2017
MATHEMATICS

Time: 2½ Hours **Std: X** **Total Score: 80**

Instructions

- Read the instruction carefully before answering each question
- Necessary steps should be written against each answer
- Simplification using aproximate values of $\pi, \sqrt{2}, \sqrt{3}$ need to be done only if specifically asked
- First 15 minutes is cool off time.

Answer any three from questions 1 to 4. Each carries 2 scores (3 × 2=6)

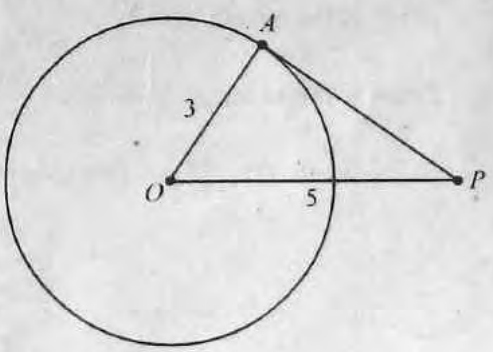
1. A (5,3) is a point on a line parallel to the x axis

   (a) Write the coordinates of any other point on the same line.

   (b) What is the distance of that (you have written) point from A?

2. In the figure OA is a radius and PA is the tangent to the circle at A.

   If OP= 5cm, OA = 3 cm, then



   (a) What is the measure of ∠OAP?

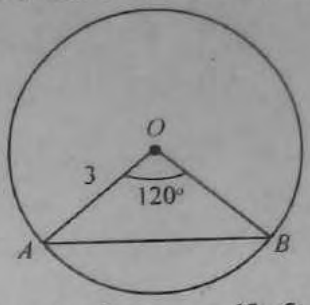
   (b) Calculate the length of the tangent PA

3. Consider the Arithmetic Sequence $\frac{1}{11}$ $\frac{4}{11}$ $\frac{7}{11}$ .....

   (a) What is the next term of the sequence?

   (b) Which is the first integer term in the sequence?

4. In the figure O is the centre and AB is a chord of the circle. If OA = 3 cm, and $\angle AOB = 120^0$, then



find the length of AB.

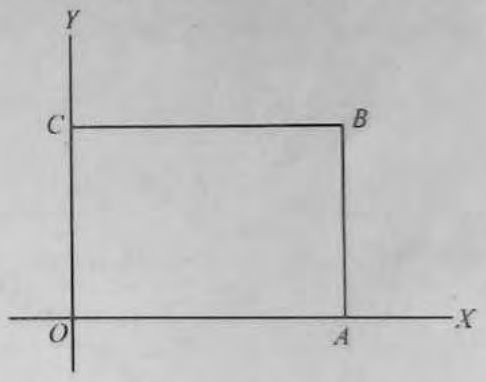
Answer any five from questions 5 to 11. Each carries 3 scores (5x3=15)

5. A sector with central angle 120^0 is cut and removed from a circular disc and a cone is made out of it.

   (a) What is the slant height of the cone?

   (b) Calculate radius of the cone.

6. In the figure OABC is a rectangle. A(12,0), C(0,5) are two of its vertices.

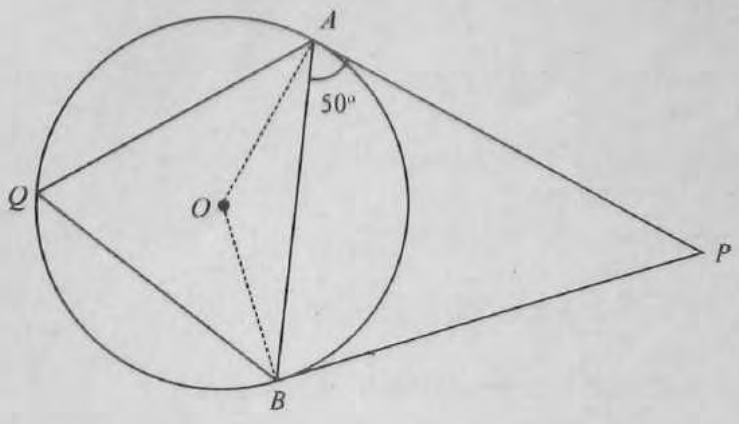


   (a) Write the coordinates of O & B

   (b) Find the length of OB

7. Draw a line of length $2\sqrt{6}$ cm

8. In the figure PA, PB are two tangents to the circle with centre O. If $\angle PAB = 50^0$,

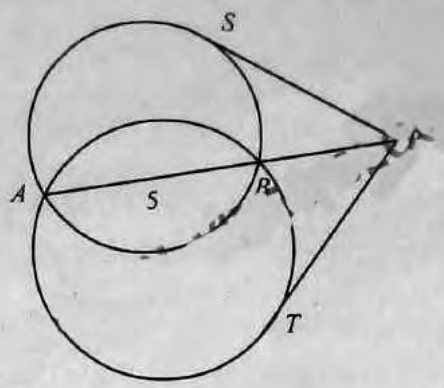


write the measures of $\angle AQB$, $\angle AOB$, $\angle APB$

9. A polygon with n sides has $\frac{n(n-3)}{2}$ diagonals. How many sides are there for a polygon with 104 diagonals?

10. A ladder leans against a wall. Its foot is 3 metres away from the wall and making an angle 35° with ground. .How high is the other end of the ladder from the ground? (sin 35° = 0.57, cos 35° = 0.82, tan 35° = 0.70)

11. In the figure PT, PS are tangents to the large circle and small circle respectively. The circles cut each other at points A and B. If PB = 4 cm, AB = 5 cm



(a) Find the length of PA

(b) Calculate the lengths of PS and PT

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

12. Coordinates of the end points of a diameter of a circle are (1,3) and (11,3)

(a) Calculate the length of the diameter

(b) Write the coordinates of the centre

(c) Write the coordinates of any other point on the same circle

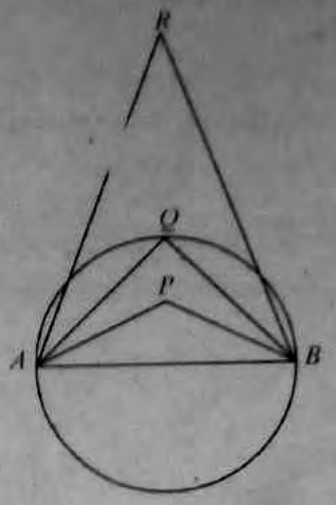
13. The lengths of sides of a triangle are 9 cm, 10 cm, 17cm

(a). Find the perimeter of the tiangle

(b) Calculate its area

(c) If the sides of the triangle are 4.5 cm, 5 cm, 8.5 cm , what would be its area?

14. In the figure, AB is a diameter of the circle. Measures of $\angle P$, $\angle Q$, $\angle R$ are in arithmetic sequence. One of these angles is 55^0.



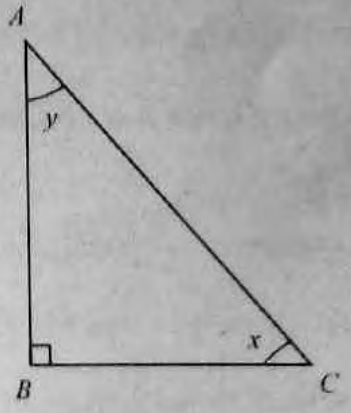
(a) What are the measures of $\angle P$, $\angle Q$, $\angle R$?

(b) Justify your answer

15. Draw a circle of radius 3 cm. Mark a point 7 cms away from its centre. Draw tangents from that point to the circle and measure lengths of the tangents.

16. A boy sees the top of a tower with an angle of elevation 60^0. Stepping 20metres back he sees the same top with an angle of elevation 30^0. Draw a rough figure and calculate the height of the tower

17. In the figure $\angle B = 90^0$, $\angle C = x$, $\angle A = y^0$



(a) What is $x + y$?

(b) Prove that $\sin x = \cos y$

(c) If $\sin x = \cos x$, then find the value of x

18. Consider the arithmetic sequence 4,10,16,...

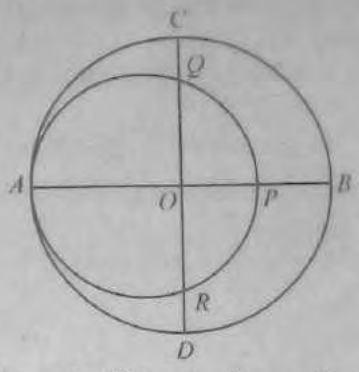
(a) What is its common difference?

(b) Write is its 11^{th} term

(c) Calculate the sum of first 21 terms

(d) Find the sum of first 20 terms of the arithmetic sequence 10, 16, 22 ....

19. In the figure AB. CD are two mutually perpendicular diameters of the large circle.AP is a diameter of the small circle. PB = 9 cm. QC = 5 cm



(a) If OP = x. find the lengths of OB and OQ.

(b) Find the radius of the larger circle

20. All the 8 edges of a square pyramid are of equal length. If length of one edge is 10 cm

(a) What is the total length of all edges?

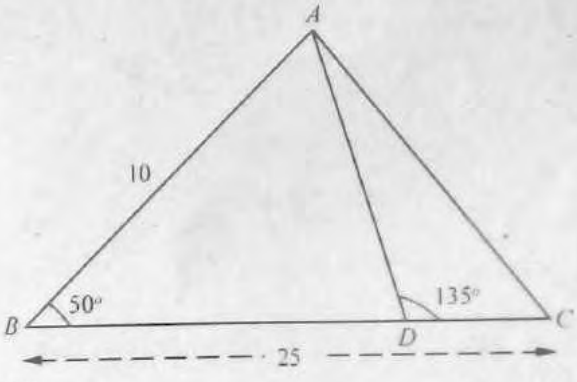
(b) What is the total surface area of the pyramid?

21. (a) Which is the number obtained when 60 times of 2 is added to the square of 2 ?

(b) 2016 is obtained when square of a number is added to 60 times of it. Find the number

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

22. In the given figure $\angle B = 50^{\circ}$, $\angle ADC = 135^{\circ}$. AB = 10 cm. BC = 25 cm



(a) What is the area of triangle ABC?

(b) Find the length of DC?

($\sin 50^{\circ} = 0.77$, $\cos 50^{\circ} = 0.64$, $\tan 50^{\circ} = 1.19$)

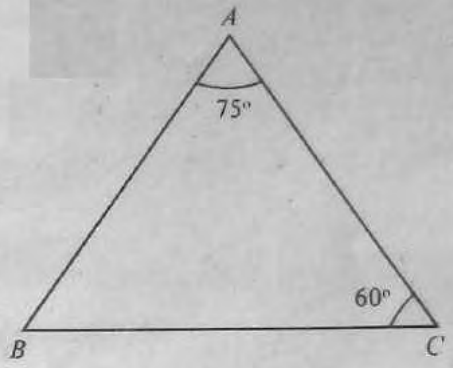
23. (a) Draw the x, y axes and mark the points A(-3, 0), B (3,0)

(b) Construct an equilateral triangle ABC with AB as one of its sides

(c) Write the co ordinates of the third vertex of the equilateral triangle.

24. In triangle ABC, AB = 6 cm, $\angle A = 60^{\circ}$, $\angle B = 65^{\circ}$. Draw triangle ABC and construct its incircle and measure the inradius.

25. In triangle ABC, $\angle A = 75^{\circ}$, $\angle C = 60^{\circ}$

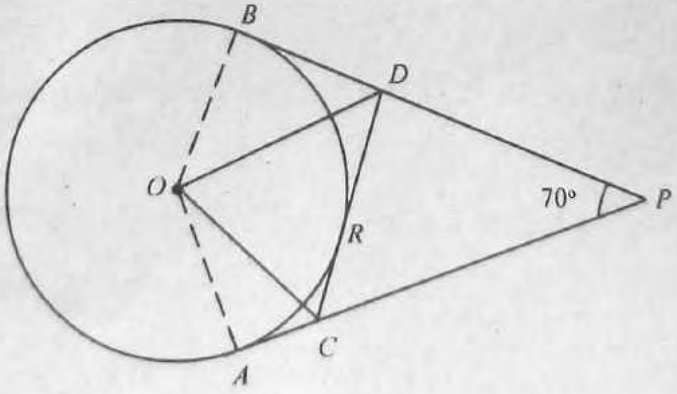


(a) What is the measure of $\angle B$?

(b) If AB = $5\sqrt{2}$ what is the length of AC ?

(c) Find the ratio AB:BC:AC

26. In the figure PA, PB, CD are tangents to the circle with centre O. $\angle P = 70^{\circ}$



(a) $\angle PCD + \angle PDC =$ .....

(b) $\angle ODC + \angle OCD =$.....

(c) If $\angle AOC = 25^{\circ}$, then what is $\angle BOD$?

27. The slant height of a square pyramid is 13 cm. and the length of base edge is 10 cm.

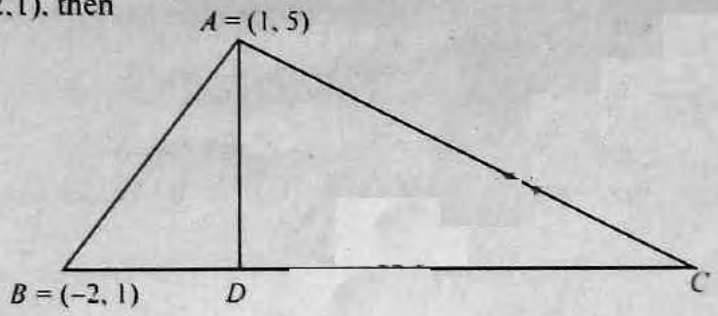
(a) What is the height of the square pyramid?

(b) Calculate the length of the lateral edge

(c) Write the squares of height , slant height , lateral edge respectively and establish the relationship between them

(d) If the height of a square pyramid is $\sqrt{7}$ cm. , lateral edge is $\sqrt{11}$ cm, then what is its slant height ?

28. In the given figure , BC is parallel to the x axis. If the coordinates of A is (1,5), and B is (-2,1), then



(a) What is the length of AB?

(b) Write the coordinates of C if AC = $\sqrt{41}$

(c) If AD is perpendicular to BC, then find the coordinates of D.

29. Read the following, understand the mathematical concept in it and answer the questions that follows. Each question carries 1 score. ***(6×1=6)***

1= 1

1+2=3

1+2+3=6

1+2+3+4 =10

.....

The terms of the sequence 1, 3, 6, 10..... are the sum of first few natural numbers. These numbers are known as ***Triangular Numbers***.

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

1, 4, 9, 16..... are known as ***square numbers.***

Sum of the two consecutive triangular number is a square number.

(a) What is the next term of the sequence 1,3,6,10,.....?

(b) Which is the fifth square number ?

(c) Find the algebraic expression of the sequence of triangular numbers

(d) What is the algebraic expression of the sequence of square numbers ?

(e) If the 20th and 21st triangular numbers are x and y respectively. then what is y-x?

(f) The sum $\frac{50 \times 51}{2} + \frac{51 \times 52}{2}$ is a square number. Which is the next square number?