

T.H.S.L.C. EXAMINATION, MARCH-2013

MATHEMATICS

Time : 2½ Hours

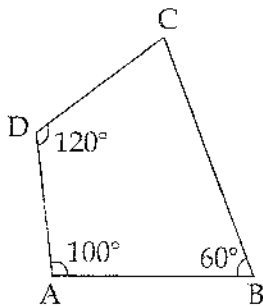
Total Score : 80

Instructions :

- Read the questions carefully, understand each question and then answer the questions.
- Give explanations wherever necessary.
- If there is an 'OR' between any two questions, you may answer only one among them.

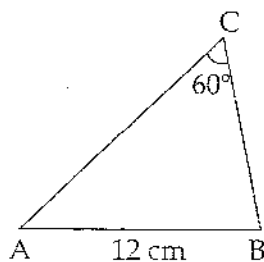
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|--|-------|
| 1. 9, 15, 21, ... is an arithmetic sequence. Can the difference between any two terms be 150? Justify your answer. | 2 |

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| 2. | 2 |
|----|---|



In quadrilateral ABCD, $\angle A = 100^\circ$, $\angle B = 60^\circ$, $\angle D = 120^\circ$ with respect to a circle with BD as diameter, locate the positions of A and C.

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|---|---|
| 3. Sides of the rectangle ABCD are parallel to x - axis and y - axis. A and C are the points A (1, 2) ; C(7, 7). Write the co-ordinates of B and D. | 2 |
| 4. Can the sum of a number and its reciprocal be $\frac{3}{4}$? Justify your answer. | 3 |
| 5. In $\triangle ABC$, $AB = 12$ cm, $\angle C = 60^\circ$ | 3 |

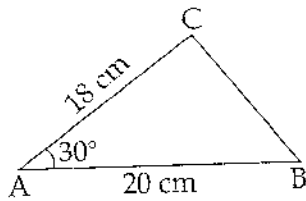


What is the circum diameter of the circle ?

OR

P.T.O.

In $\triangle ABC$, $AB = 20$ cm, $AC = 18$ cm, $\angle A = 30^\circ$



- (a) What is the altitude from C to AB. ?
 (b) What is the area of the triangle ?

3

6. $P(x) = 2x^3 + kx^2 + 17x - 2$.

When $P(x)$ is divided by $x - 2$, the remainder obtained is 4.

- (a) What is the value of k ?
 (b) What is the remainder when $p(x)$ is divided by $x - 1$?

7. Write the sequence of the integers in the arithmetic sequence $\frac{19}{15}, \frac{23}{15}, \frac{9}{5}, \dots$

3

8. Circum diameter of a triangle is 4 cm and two angles are 100° and 30° . Construct the triangle and measure the longest side of the triangle.

3

9. $A(-3, 2)$; $B(5, 2)$ and $C(1, 5)$ are the vertices of a triangle ABC.

- (a) Prove that $\triangle ABC$ is isosceles
 (b) What is the altitude from C to AB ?

3

OR

$A(1, -5)$; $B(3, 1)$ and $C(5, 7)$ are three points.

Gopu says A, B and C are the vertices of an isosceles triangle. But Indu argues that they are the points on a line. Do you agree with Gopu or Indu. Justify your answer.

3

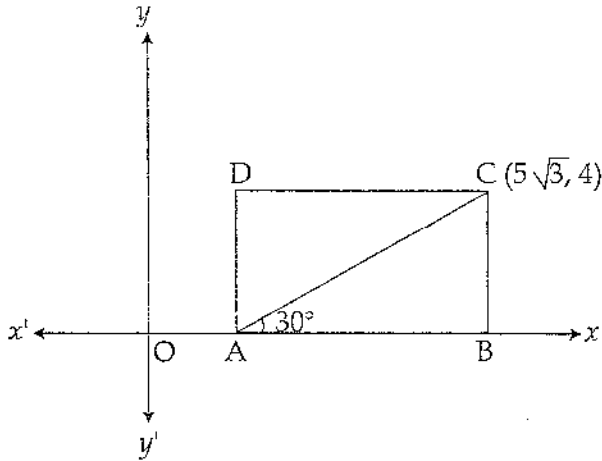
10. Daily wages of employees in various sectors of a company are given in a table as shown

3

Daily wages	Number of employees
150-200	2
200-250	8
250-300	15
300-350	18
350-400	5
400-450	2

Find arithmetic mean of wages.

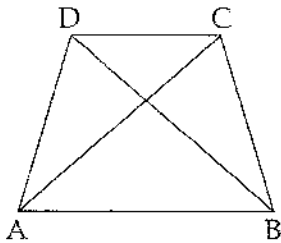
11.



ABCD is a rectangle. $\angle BAC = 30^\circ$ and Co-ordinates of C is $(5\sqrt{3}, 4)$

Write the co-ordinates of the points A, B and D.

12. Write the polynomial $6x^2 - x - 2$ as the product of two first degree polynomials. 3
13. Sum of first 20 terms of an arithmetic sequence is 860. 8th term of the sequence is 33 4
 (a) Find the sum of 10th term and 11th term ?
 (b) What is the 13th term of the sequence ?
 c Write the sequence.
14. In quadrilateral ABCD, AB is parallel to CD. If the quadrilateral is cyclic, prove that $AC = BD$ 4



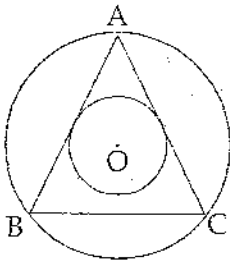
15. Base perimeter of a square pyramid is 72 cm and total surface area is 864 sq.cm. 4
 (a) Find slant height of the pyramid.
 (b) What is the volume of the pyramid ?

OR

- A sector of central angle 288° and radius 25 cm is rolled up to form a cone of maximum size. 4
 (a) What is the radius of the cone ?
 (b) What is the volume of the cone ?

16. 20 paper slips numbered 1 to 20 are put in two boxes. From the boxes one paper slip each is drawn with out looking in it. 4
 (a) What is the probability of getting two same numbers ?
 (b) What is the probability of getting two odd numbers ?
 (c) What is the probability of getting one prime number and the other a perfect square ?

17.



In the figure, two concentric circles with centre at O are drawn. The chords AB and AC of outer circle are the tangents of inner circle. Prove that $\triangle ABC$ is an isosceles triangle.

18. Surface area of a solid sphere is 576π sq.cm. The sphere is melted and circular cones of height 16 cm and radius equal to half the radius of sphere are formed. How many such spheres can form ?

4

19. Weights of students in a class are given in a table as shown :

4

Weights (kg)	No. of students
35-40	3
40-45	7
45-50	12
50-55	8
55-60	6
60-65	4
Total	40

Calculate the median of weights.

20. In $\triangle ABC$, $AB = 6$ cm; $\angle A = 70^\circ$; $AC = 8$ cm.

4

Construct the triangle and draw its incircle. Measure the inradius of the triangle.

21. Height of the light house mounted vertically on seashore is 150 meters. From the top of the light house a child sees a boat in the sea at an angle of depression 35° . The boat is moving towards the land and after some time the child sees the boat at an angle of depression 50° . How far the boat is travelled during this time ?

5

$$\left[\begin{array}{l} \sin 35^\circ = 0.57 ; \cos 35^\circ = 0.82 ; \tan 35^\circ = 0.7 \\ \sin 50^\circ = 0.77 ; \cos 50^\circ = 0.64 ; \tan 50^\circ = 1.2 \end{array} \right]$$

Score

22. How many terms of the arithmetic sequence 7, 11, 15, . . . should be added to get the sum 525 ? 5

OR

Perimeter of a rectangle is 46 cm. Length of the diagonal is 1 cm more than two times of its breadth. 5

- (a) If x is the breadth of the rectangle, what is its length and the diagonal ?
(b) Find the value of x and hence find the area of the rectangle.

23. Find the equation of a line passing through $(-3, 0)$ and slope $\frac{2}{3}$. Find the co-ordinates of the point of intersection of the line with y -axis. Prove that the line is parallel to the line $2x - 3y = 6$. 5

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