

**MT EDUCARE LTD.****QUEST - I (Semi Prelim I)  
(2018-19)**

**Portion :** Triangles, Circles, Constructions, Polynomials, Pair of Linear equations in Two Variables, Quadratic Equations, Arithmetic Progressions

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**CBSE - X**Roll No. 

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Code No. **30/1****Series RLH**

- Please check that this question paper contains 6 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 30 questions.
- Please write down the serial number of the question before attempting it.

**MATHEMATICS****Time allowed :** 3 hours**Maximum Marks :** 80**General Instructions:**

- i) **All questions are compulsory.**
- ii) The question paper consists of 30 questions divided in four sections: A, B, C and D.
- iii) Section **A** contains 6 questions of 1 mark each,  
Section **B** contains 6 questions of 2 marks each,  
Section **C** contains 10 questions of 3 marks each,  
Section **D** contains 8 questions of 4 marks each.
- iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- v) Use of **calculator** is not permitted.

## SECTION - A

Question number 1 to 6 carry 1 mark each.

1. Find a quadratic polynomial if the sum and product of its zeroes are 4 and 1 respectively.

2.  $\triangle ABC \sim \triangle PQR$ . If  $\frac{AB}{BC} = \frac{1}{3}$  then find  $\frac{PQ}{QR}$ .

3. Find the nature of the roots of quadratic equation  $2x^2 - 4x + 3 = 0$ .

**OR**

Find the value of  $k$  for which one of the root of quadratic equation  $kx^2 - 14x + 8 = 0$  is 2.

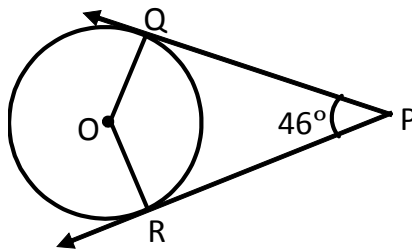
4. Find the 30<sup>th</sup> term of the arithmetic progression 10, 7, 4....

5. Find the value of  $a$  so that the point whose coordinates are  $(3, a)$  lies on the line represented by the equation  $2x - 3y = 5$ .

**OR**

If  $x = a, y = b$  is the solution of the pair of linear equations  $x - y = 2$  and  $x + y = 4$  then find the values of  $a$  and  $b$ .

6. In the given figure, PQ and PR are tangents to a circle with centre O at Q and R respectively. If  $\angle QPR = 46^\circ$  then find  $\angle QOR$ .



**SECTION - B****Question number 7 to 12 carry 2 marks each.**

7. D is a point on side BC of  $\triangle ABC$  such that  $\angle ADC = \angle BAC$ .  
Show that  $CA^2 = CB \cdot CD$ .

**OR**

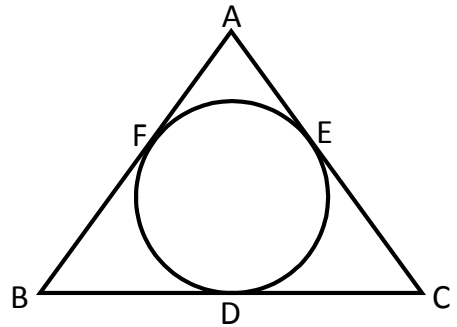
In  $\triangle ABC$ , P and Q are midpoints of sides AB and AC respectively.  
Prove that  $PQ \parallel BC$ .

8. Find the sum of first 12 terms of the arithmetic progression  $-37, -33, -29, \dots$ .
9. Solve the quadratic equation  $3x^2 + 5x - 2 = 0$  by method of completing the square.
10. Solve the following pair of linear equations by cross multiplication method:  
 $2x + 3y - 46 = 0$ ;  $3x + 5y - 74 = 0$
11. If  $\alpha$  and  $\beta$  are zeroes of the polynomial  $3x^2 - 10x + 7$  then find the value of  $\alpha^2 + \beta^2$ .

**OR**

Divide the polynomial  $2x^2 + 3x + 1$  by the polynomial  $x + 2$ .  
State the quotient and the remainder.

12. In the given figure,  $\triangle ABC$  circumscribes the circle at F, D and E. If  $AB = AC$  then prove that  $BD = CD$ .

**SECTION - C****Question numbers 13 to 22 carry 3 marks each.**

13. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of  $60^\circ$ .
14. Find the sum of the first 40 positive integers divisible by 6.

15. Solve for  $x$  :  $\frac{16}{x} - 1 = \frac{15}{x+1}$ ;  $x \neq 0, -1$ .

**OR**

Find two consecutive odd positive integers sum of whose squares is 290.

16. A guy wire attached to a vertical pole of height 18 m is 24 m long and has a stake attached to the other end. How far from the base of the pole should the stake be driven so that the wire will be taut?

17. Prove that the length of tangents drawn from an external point to a circle are equal.

18. Solve the following pair of equations:  $\frac{2}{x} + \frac{3}{y} = 13$ ;  $\frac{5}{x} - \frac{4}{y} = -2$ .

**OR**

Solve the following pair of linear equations graphically:  $3x + y = 5$ ;  
 $2x - y = 5$ .

19. Draw a circle of radius 4 cm. Take two points P and Q on one of its extended diameter at a distance of 6 cm from its centre. Draw tangents to the circle from these two points.

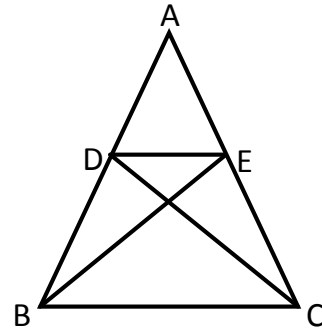
20. The first and the last term of an arithmetic progression are 5 and 45 respectively. If the sum of all its terms is 400, find its common difference.

**OR**

In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be same as the class, in which they are studying, e.g., a section of class I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class. Find the number of trees that will be planted.

21. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

22. In the given figure,  $\triangle ABE \cong \triangle ACD$ .  
Show that  $\triangle ADE \sim \triangle ABC$ .

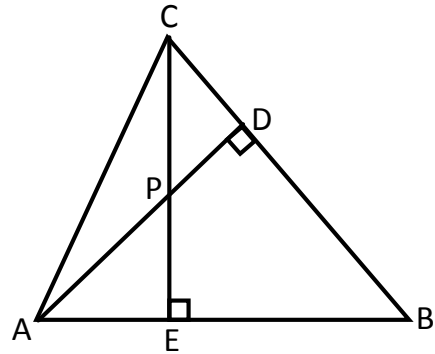


**OR**

In the given figure, altitudes AD and CE of  $\triangle ABC$  intersect each other at point P.

Show that:

- a)  $\triangle AEP \sim \triangle CDP$
- b)  $\triangle ABD \sim \triangle CBE$
- c)  $\triangle AEP \sim \triangle ADB$



**SECTION - D**

**Question numbers 23 to 30 carry 4 marks each.**

23.  $\triangle ABC$  is an equilateral triangle. Point P is on base BC such that  $PC = \frac{1}{3}BC$ . If  $AB = 6$  cm, find AP.

**OR**

Prove that in a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

24. Solve the pair of following equations :  $\frac{10}{x+y} + \frac{2}{x-y} = 4$ ;  $\frac{15}{x+y} - \frac{5}{x-y} = -2$ .

**OR**

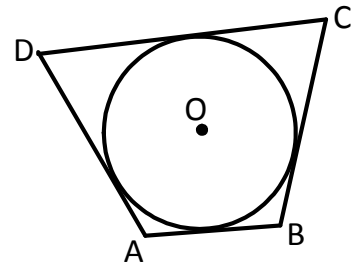
The angles of cyclic quadrilateral ABCD are  $\angle A = (6x + 10)^\circ$ ,  $\angle B = (5x)^\circ$ ,  $\angle C = (x + y)^\circ$ ,  $\angle D = (3y - 10)^\circ$ . Find the values of  $x$  and  $y$  and hence the measures of four angles.

25. Find the roots of the equation  $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$ ,  $x \neq -4, 7$ .

**OR**

- A train travels 300 km at a uniform speed. If the speed had been 5 km per hour more, it would have taken 2 hours less for the same journey. Find the actual speed of the train.
26. Find the zeroes  $\alpha$  and  $\beta$  of the polynomial  $3x^2 - x - 4$  and hence verify the relationship between the zeroes and the coefficients. Also, find  $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ .
27. The sum of the 4<sup>th</sup> and 8<sup>th</sup> term of an arithmetic progression is 24 and the sum of the 6<sup>th</sup> and 10<sup>th</sup> term is 44. Find the sum of first 10 terms of the arithmetic progression.

28. Quadrilateral ABCD circumscribes the circle with centre O. Prove that:  
 a)  $\angle AOB + \angle COD = 180^\circ$   
 b)  $\angle AOD + \angle BOC = 180^\circ$



29. Construct a triangle with sides of length 4 cm, 6 cm and 9 cm. Construct a triangle similar to it with scale factor  $\frac{3}{2}$ .
30. In a class test, the sum of Shrishti's marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of her marks would have been 210. Find her marks in two subjects.  
 By using unfair means in a test/exam which values does one violates?

*All the Best* 👍