

SET - A

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

CBSE - X

Roll No.

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

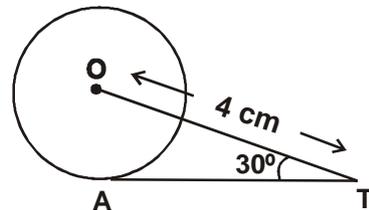
Question number 1 to 6 carry 1 mark each.

1. If 1 is a zero of the polynomial $ax^2 - 3(a - 1)x - 1$ then find the value of a .
2. A man goes 80 m due east and then 150 m due north. How far he is from the starting point?
3. Find the number of solutions for the following pair of linear equations:
 $x + 2y - 8 = 0$, $2x + 4y = 16$.
4. Check whether $x(x + 3) + 6 = (x + 2)(x - 2)$ is a quadratic equation or not.

OR

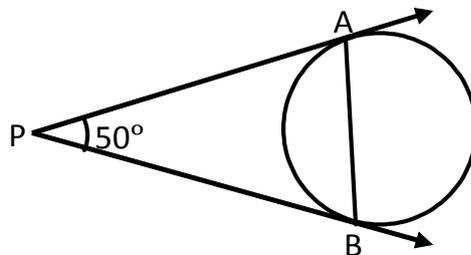
Find the value of k for which the quadratic equation $kx^2 - 6x - 2 = 0$ has equal roots.

5. Which term of the arithmetic progression 21, 18, 15, ... is zero?
6. In the given figure, AT is a tangent to the circle with centre O such that, $OT = 4$ cm and $\angle OTA = 30^\circ$. Find AT.



OR

In the given figure, PA and PB are tangents to the circle at A and B respectively such that $\angle APB = 50^\circ$. Find $\angle PAB$ and $\angle PBA$.



SECTION - B

Question number 7 to 12 carry 2 marks each.

7. Draw a pair of tangents to a circle of radius 3.5 cm from a point at a distance of 6.2 cm from its centre.
8. Solve the following quadratic equation by factorization method:
 $6x^2 + 11x + 3 = 0$.
9. Find the sum of first 24 terms of the arithmetic progression 5, 8, 11, 14....
10. If α and β are the zeroes of the polynomial $p(x) = 5x^2 - 7x + 1$ then find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$.

OR

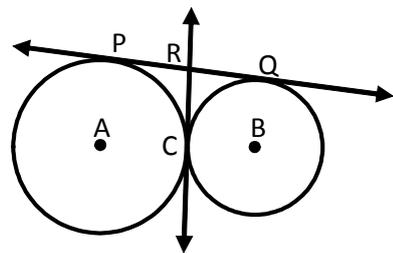
Find a quadratic polynomial whose zeroes are $3 + \sqrt{2}$, $3 - \sqrt{2}$.

11. The areas of ΔABC and ΔPQR are in the ratio 9:16. If $\Delta ABC \sim \Delta PQR$ and $BC = 4.5$ cm then find the length of QR .

OR

In ΔXYZ , A and B are points on the sides XY and XZ respectively such that $AB \parallel YZ$. If $AY = 2.2$ cm, $BX = 3.3$ cm and $XZ = 6.6$ cm then find AX .

12. In the given figure, two circles with centres A and B touch each other at the point C. Prove that the common tangent to the circles at C bisects the common tangent at P and Q at R.



SECTION - C

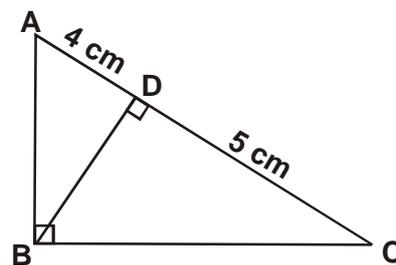
Question numbers 13 to 22 carry 3 marks each.

13. D and E are points on the sides CA and CB respectively of $\triangle ABC$ right angled at C. Prove that $AE^2 + BD^2 = AB^2 + DE^2$.
14. Construct a pair of tangents to a circle of radius 4 cm from a point P which lies on the concentric circle of radius 6 cm. Also, measure their lengths.
15. Prove that the polynomial $x^2 + 3x + 1$ is a factor of polynomial $3x^4 + 5x^3 - 7x^2 + 2x + 2$.
16. How many three digit natural numbers are divisible by 7?
17. If AD and PM bisects $\angle BAC$ and $\angle QPR$ of $\triangle ABC$ and $\triangle PQR$ respectively and $\triangle ABC \sim \triangle PQR$ then prove that $\frac{AB}{PQ} = \frac{AD}{PM}$.

OR

In the given figure, $\triangle ABC$ is right angled at B and $BD \perp AC$ at D.

If $AD = 4$ cm, $CD = 5$ cm then find the lengths of BD, AB and BC.



18. Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. Find their present ages.

OR

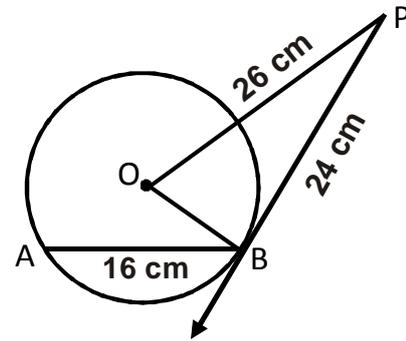
A part of monthly hostel charge is fixed and the remaining depends on the number of days one has taken food in the mess. When Swati takes food for 20 days, she has to pay ₹ 3000 as hostel charges whereas Mansi who takes food for 25 days, she has to pay ₹ 3500 as hostel charges. Find the fixed charges and the cost of food per day.

19. Divide a line segment AB of length 8.7 cm in the ratio 3:7.

... 5 ...

SET - A

20. In the given figure, AB is chord of a circle with centre O. At B, a tangent PB is drawn such that its length is 24 cm. The distance of P from the centre is 26 cm. If AB = 16 cm then find its distance from the centre.



OR

From a point T outside the circle with centre O, tangents TP and TQ are drawn to the circle at P and Q respectively. Prove that OT bisects $\angle PTQ$.

21. Subha Rao started working in the year 1995 at an annual salary of ₹ 5000 and received an increment of ₹ 200 each year. In which year, did his income reach ₹ 7000?
22. Find the roots of the equation $\frac{1}{x} + x = 3$, where $x \neq 0$.

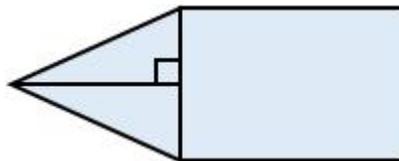
OR

A natural number, when increased by 12, equals 160 times its reciprocal. Find the number.

SECTION - D

Question numbers 23 to 30 carry 4 marks each.

23. In the given figure, a rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 m^2 more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of altitude 12 m. Find its length and breadth.



OR

The difference of the squares of the two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

24. Solve the pair of following linear equations:
 $152x - 378y = -74$; $-378x + 152y = -604$.
25. Obtain all other zeroes of the polynomial $4x^4 + x^3 - 72x^2 - 18x$, if two of its zeroes are $3\sqrt{2}$ and $-3\sqrt{2}$.
26. Prove that a rectangle circumscribing a circle is a square.
27. Prove that if a line is drawn parallel to one side of a triangle and intersects the other two sides in two distinct points then the other sides are divided in the same ratio by it.

OR

ABCD is a square. BCQ and ACP are equilateral triangles described on one side of the square and one of its diagonal respectively.

Prove that area of $\Delta BCQ = \frac{1}{2}$ area of ΔACP .

28. The sum of four consecutive terms in an arithmetic progression is 32 and the ratio of the product of the first and the last term to the product of two middle terms is 7:15. Find the numbers.

OR

Show that the list of numbers $7, 10\frac{1}{2}, 14, \dots, 84$ forms an arithmetic progression and then find their sum.

29. Construct a right angled triangle whose hypotenuse and one side are of lengths 10 cm and 8 cm respectively. Then construct another triangle whose sides are $\frac{4}{5}$ times the corresponding sides of this triangle.
30. Three lines $x + 3y = 6$, $2x - 3y = 12$ and Y axis are enclosing a beautiful triangular park. Find the points of intersection of the lines graphically and the area of the park, if all measurements are in km. What type of behavior should be expected of public in these type of parks?

All the Best 👍