# SUMMATIVE ASSESSMENT – I, 2015

## MATHEMATICS Class – IX

Time Allowed: 3 hours Maximum Marks: 90

General Instructions:

1. All questions are compulsory.

2. The question paper consists of 31 questions divided into four sections A, B, C and D. Section-A comprises of 4 questions of 1 mark each; Section-B comprises of 6 questions of 2 marks each; Section-C comprises of 10 questions of 3 marks each and Section-D comprises of 11 questions of 4 marks each.

3. There is no overall choice in this question paper. 4. Use of calculator is not permitted.

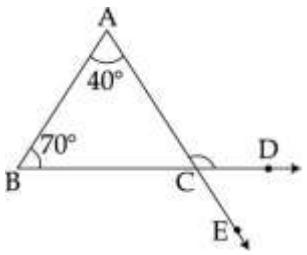
### Section – A

Question numbers 1 to 4 in Sections-A one mark questions

1. Find the rationalizing factor of $\sqrt{a}+\sqrt{b}$

2. If $x$ -1 is a factor of $ax3 + 2x2 – x + 3a - 7$, then find the value of a.

3. In the figure, if $< A = 40^0$ and $<B = 70^0$, then find < DCE.



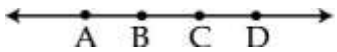

4. Point P is on $x$-axis and is at a distance of 4 units from $y$- axis to its left. Write the coordinates of the point P.

### Section-B comprises of 6 questions of 2 marks each

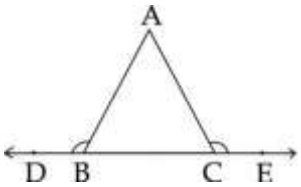
5. Simplify $\frac{2}{\sqrt{2}+\sqrt{3}+\sqrt{5}}$ by rationalise the denominator.

6. If $3x + 2y = 12$ and $xy = 6$, then find $27x^3 + 8y^3$.

7. In figure if AB = CD, prove that AC = BD. State Euclid axiom, which is applicable here.




8. In the figure, if < ABD = < ACE, then prove that AB= AC.




9. Find area of an isosceles triangle whose base is 16 cm and one of its equal sides is 10 cm.

10. Plot the points A(1, 0), B(4, 0) and C(4,4). Find the co-ordinates of the point D such that ABCD is a square.

Question numbers 11 to 20 in Sections - C are three marks questions

11. Simplify : $27^{\frac{1}{3}}\left(27^{\frac{1}{3}} - 27^{\frac{21}{3}}\right)$

12. Find the values of x if $\frac{2^{\frac{-1}{3}}}{32^x} = \frac{8^x}{2^3}$

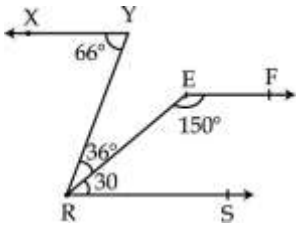
13. Show that x - 3 is a factor of the polynomial $2x^3 - x^2 - 19x - 9$. Hence factories the polynomial.

14. Find whether $(x - 2)$, $(x + 2)$ and $(2x - 3)$ are factors of $2x^3 - x^2 - 8x + 4$.

15. If the arms of an angle are respectively parallel to the arms of another angle, then show that the two angles are either equal or supplementary.

OR. If two parallel lines are intersected by a transversal, then show that the bisectors of a pair of alternate interior angles are parallel.

16. In the figure, In given figure, show that XY IIEF.




17. In an Isosceles triangle LMN the sides LM = LN. MP and NQ are two medians of the triangle. Show that MP = NQ.

18. LMN is a triangle in which altitudes MP and NQ to sides LN and LM respectively are equal. Show that $\Delta$ LMP $\cong \Delta$LNQ and LM = LN.

19. The sides of a quadrilateral taken in order are 9 m, 40 m, 15 m and 28 m. If the angle between first two sides is a right angle, find its area.

20. Plot the following ordered pairs (x, y) of numbers as points in the cartesian plane:

| | | | | | | |
|---|---|---|---|---|---|---|
| x | 0 | - 4.5 | - 1 | 2 | - 3 | 4 |
| y | 2.5 | 0 | 3 | 5 | - 2 | - 6 |

Question numbers 21 to 31 in Sections – D are four marks questions.

21. Simplify $\frac{1}{2+\sqrt{5}} + = \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{8}}$

22. if $a = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ $and$ $b = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ find the value of find the value of $a^2 + b^2 - 5ab$.

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23. Without actually calculating the cubes, find the value of: $(a - 2b)^3 + (2b - 3c)^3 + (3c - a)^3$

24. if $z^2 + \frac{1}{z^2} = 11$ find the value of $z^3 - \frac{1}{z^3}$ using only the positive value of $z - 1/z$

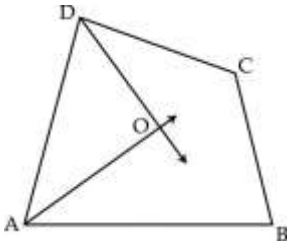
25. Factorise : $x^3 - 6x^2 + 11x - 6$

26. If a + b + c = 0, then prove that $\frac{(b+c)^2}{3bc} + \frac{(c+a)^2}{3ac} + \frac{(a+b)^2}{3ab}$

27. Show that of all line segments drawn from a given point not on it, the perpendicular line segment is the shortest.

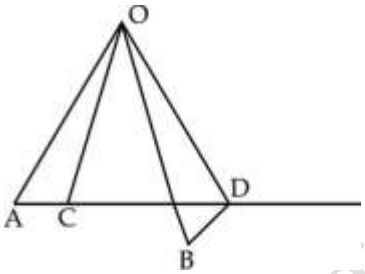
28. Diagonals PR and SQ of a quadrilateral PQRS meet at O. Prove that PQ + QR + RS +SP < 2(PR+ QS)

29. In figure, AO and DO are the bisectors of < A and < D respectively of the quadrilateral ABCD.
Prove that < AOD = 1/2 (< B + < C)




30. If ab + bc + ca= 0 find the value of $1/(a^2 - bc) + 1/(b^2 - ca) + 1/(c^2 - ab)$

31. In figure OA = OB, OC = OD and < AOB = < COD. Prove that AC = BD.




Extra score: Solve these Questions:

Q. if 1/ab + 1/bc + 1/ac = 1 and a + b + c = 1 find the value of $\frac{1}{1+a+ab} + \frac{1}{1+b+bc} + \frac{1}{1+c+ac}$

Q . if $x^2 - bc + c = (x+p)(x-q)$ , then factorize $x^2 - bxy + cy^2$

Q. If a + b + c = 0 : show that $( a^2 / bc ) + ( b^2 / ca ) + ( c^2 / ab ) = 3$

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