ST. XAVIER'S SENIOR SECONDARY SCHOOL, DELHI – 110 054

Class 9 Time : 3 hrs.

17-9-2014 Summative Assessment I in **MATHEMATICS** M. Marks : 90

General Instructions:

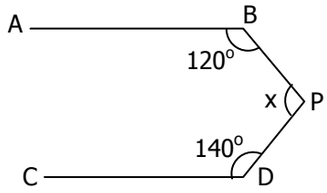
i) Attempt all the questions.

ii) This question paper consists of 31 questions divided into four sections A, B, C and D. Section A comprises of 4 sections 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.

SECTION – A (1 x 4 = 4 marks)

1. Find the distance of point (– 4, – 3) from x-axis.

2. In the given figure AB||CD. Find the value of x.



3. Write 4 rational numbers between $\frac{-2}{5}$ and $\frac{-3}{5}$.

4. Using remainder theorem, find the remainder when $3x^3 - 2x^2 + x + 1$ is divided by $x + 1$.

SECTION – B (2 x 6 = 12 marks)

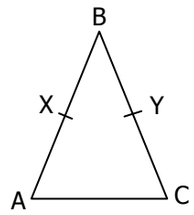
5. If a point C lies between two points A and B such that AC = BC then prove that AC = $\frac{1}{2}$ AB.

Explain by drawing the figure.

6. Factorize $2x^2 + 3y^2 + 8z^2 + 2\sqrt{6}xy + 4\sqrt{6}yz + 8zx$.

7. Write in which quadrant or on axis do the following points lie:
a) (–5, 2) b) (0, –9) c) (3, –4) d) (–6, –9)

8. In the given figure, if AB = BC and BX = BY, then show that AX = CY.



9. Find the area of a triangle whose sides are of length 20 cm, 12 cm and 16 cm, using Heron's formula.

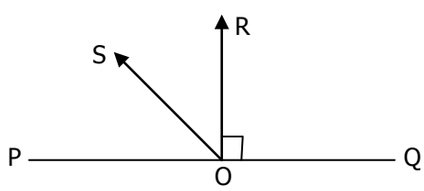
10. Compare the two exponents $(625)^{\frac{1}{4}}$ and $(16)^{\frac{3}{4}}$.

SECTION – C (3 x 10 = 30 marks)

11. Express $0.4\overline{56}$ in the form of $\frac{p}{q}$, where p and q are integers and q≠o.

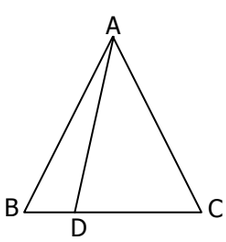
12. Plot the points A (0,3) , B (5,3) , C (5,0) and D (1,0) on the graph. Name the figure so obtained. Find whether the point (2, 2) lies inside the figure or not.

13. In the given figure, POQ is a line.
Ray OR is perpendicular to line PQ.
OS is another ray lying between rays of OP and OR.
Prove that $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$.



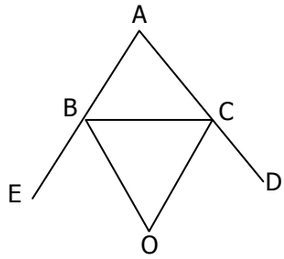
14. Factorize $2x^3 + 7x^2 - 3x - 18$.

15. D is a point on side BC of ΔABC such that AD = AC. Show that AB > AC.



16. The measures of the adjacent sides of a field which is in the shape of a parallelogram are 12.5 m and 8.5 m. If one of the diagonals is of length 6 m, find area of the parallelogram. Hence find the length of altitude on the base 12.5 cm.

17. The sides AB and AC of Δ ABC are produced to point E and D respectively. If the bisectors BO and CO of ∠CBE and ∠BCD respectively meet at point O, then prove that ∠BOC = $90° - \frac{1}{2}$ ∠BAC.



18. Simplify: $\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{5}}$

19. Factorize: $27a^3 - 216b^3 - c^3 - 54abc$.

20. It is given that ∠XYZ = 84° and XY is produced to a point P. Draw a figure from the given information. If ray YQ bisects ∠ZYP, then find ∠XYQ and reflex ∠QYP.

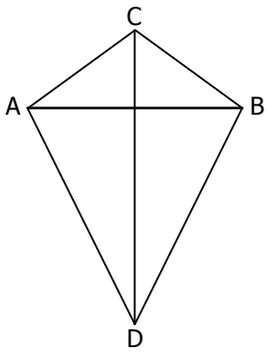
SECTION – D (4 x 11 = 44 marks)

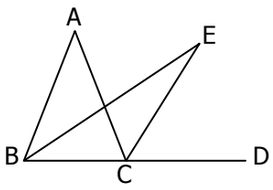
21. Divide the polynomial $3x^4 - 4x^3 - 3x - 1$ by x – 1, find its quotient and remainder and hence verify the division algorithm.

22. Prove that the angles opposite to the equal sides of an isosceles triangle are equal.

23. If $x = 3 - 2\sqrt{2}$, check whether $x - \frac{1}{x}$ is rational or irrational. Check the same for $(x + \frac{1}{x})^2$.

24. AB is a line segment. C and D are the points on opposite sides of AB such that each of them is equidistant from the points A and B. Show that the line CD is the perpendicular bisector of AB.
A father distributed his land between his two children as ΔACD and ΔBCD.
What value/s he is depicting for his children?



25. 

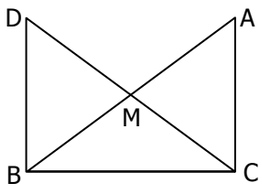
In the given figure, BE is the bisector of ∠B and CE is the bisector of exterior ∠ACD, which intersect at E.
Prove that 2∠BEC = ∠BAC.

26. Show that (2x – 3) is a factor of $2x^3 - 9x^2 + x + 12$. Also find the remaining factors.

27. Simplify $(2a + 3b)^3 - (2a - 3b)^3$.

28. Represent $\sqrt{8.4}$ on the number line.

29. In the right triangle ABC, right angle at C, M is the mid point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B. Show that
i) Δ AMC ≅ Δ BMD
ii) ∠DBC is a right triangle
iii) Δ DBC ≅ Δ ACB
iv) CM = $\frac{1}{2}$ AB



30. Verify that
i) $x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$
ii) $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

31. Two sides AB and BC and median AM of one triangle ABC are respectively equal to side PQ and QR and median PN of Δ PQR.
Show that:
i) Δ ABM ≅ Δ PQN
ii) Δ ABC ≅ Δ PQR