SNP

HALF YEARLY EXAMINATION — 2013-14

Mathematics

Set-B

Time Allowed : 3 Hrs. **Class – IX** **M.M. : 90**

General Instructions :

(i) ***All questions are compulsory.***

(ii) ***The question paper consists of 34 questions divided into four sections A, B, C and D. Section-A comprises of 8 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 10 questions of 4 marks each.***

(iii) ***Question numbers 1 to 8 in Section-A are multiple choice questions where you are required to select one correct option out of the given four.***

(iv) ***Use of calculator is not permitted.***

Section-A

Question numbers 1 to 8 carry 1 mark each. For each question four alternatives have been provided of which only 1 is correct. You have to select the correct choice.

1. Among the following, the rational number is :

(a) $\sqrt{\frac{64}{8}}$ (b) $\sqrt{98}$

(c) $\frac{\sqrt{98}}{\sqrt{2}}$ (d) $\sqrt{14}$

2. If $p(x) = 5x^2 - 3x - 18$ then value of $p\left(\frac{-1}{2}\right)$ is :

(a) -17 (b) $\frac{4}{16}$

(c) $\frac{61}{4}$ (d) $\frac{-61}{4}$

3. Maximum number of zeroes in a cubic polynomial are :

(a) 0 (b) 1

(c) 2 (d) 3

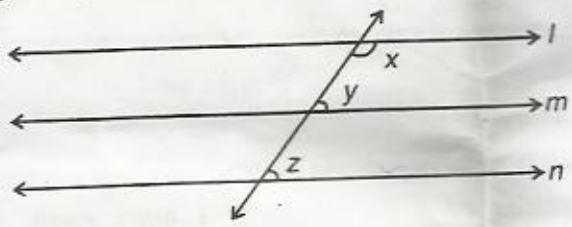
[P.T.O.]

4. If $a+b+c=0$, then $a^3+b^3+c^3$ is equal to :

(a) abc (b) $-3abc$

(c) 0 (d) $3abc$

5. In the given figure $l \parallel m$ and $m \parallel n$. If $x : y = 3 : 2$ then the value of z is :



(a) 120° (b) 126°

(c) 108° (d) 72°

6. In ΔABC, $BC = AB$. If $\angle B = 70°$ then $\angle A$ is :

(a) 55° (b) 70°

(c) 110° (d) 45°

7. The perpendicular distance of a point $P(5, 3)$ from y-axis is :

(a) 3 units (b) 8 units

(c) 5 units (d) 2 units

8. A point both of whose co-ordinates are negative lies in the :

(a) I Quadrant (b) II Quadrant

(c) III Quadrant (d) IV Quadrant

Section-B

Question numbers 9 to 14 carry 2 marks each.

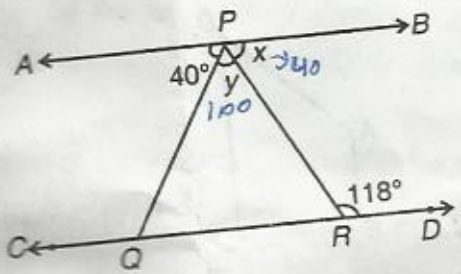
9. Represent $0.\overline{237}$ in the form $\frac{p}{q}$ where p and q are integers, $q \neq 0$.

10. Expand $\left(3x - \frac{1}{2}y + 2z\right)^2$.

11. Give possible expression for the length and breadth of a rectangle whose area is given by $25a^2 - 35a + 12$.

12. If A, B, C are three points on a line and B lies between A and C, then prove that $AB + BC = AC$. State the Euclid's Axiom/Postulate used to prove this.

13. In the given figure $AB \parallel CD$, $\angle APQ = 40°$, $\angle PRD = 118°$. Find x and y.



14. Find the area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm.

Section-C

Question numbers 15-24 carry 3 marks each.

15. If $x = 5$ and $y = 2$, find the value of :

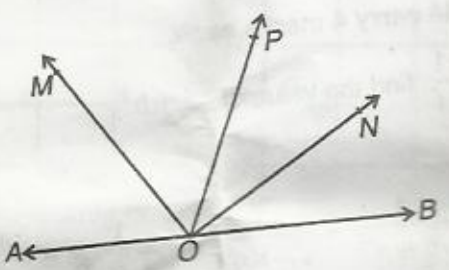
(i) $(x^y + y^x)^{-1}$ (ii) $(x^x + y^y)^{-1}$

16. Represent $\sqrt{4.5}$ geometrically.

17. Factorize $125x^3 - 27y^3 + 8 + 90xy$.

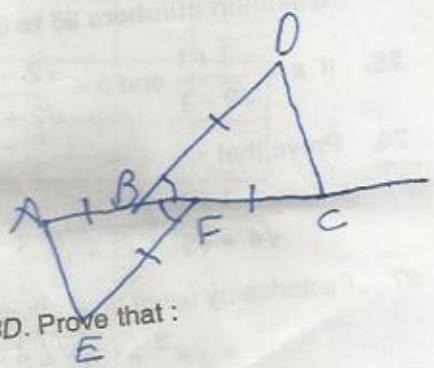
18. If $2x + y = -5$, prove $8x^3 + y^3 - 30xy + 125 = 0$.

19. In the given figure, AOB is a line. OM bisects $\angle AOP$ and ON bisects $\angle BOP$. Prove that $\angle MON = 90°$.



20. In the given figure $AB = CF$, $EF = BD$, $\angle AFE = \angle CBD$. Prove that :

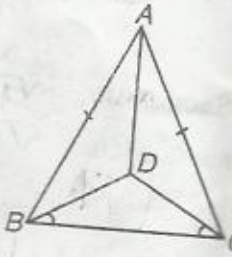
(i) $\Delta AFE \cong \Delta CBD$ (ii) $\angle D = \angle E$



[P.T.O.]

21. AB and CD are respectively the smallest and the longest sides of a quadrilateral ABC Show that $\angle A > \angle C$ and $\angle B > \angle D$.

22. In the given figure, $AB = AC$. D is the point in the interior of ΔABC such tha $\angle DBC = \angle DCB$. Prove that AD bisects $\angle BAC$ of ΔABC.



23. ABC is a triangle in which altitudes BE and CF are equal. Then show that :

(i) $\Delta ABE \cong \Delta ACF$ (ii) $AB = AC$

24. Trees are being planted in a park, in the shape of a quadrilateral $ABCD$ having $\angle C = 90°$, $AB = 9$ m, $BC = 12$ m, $CD = 5$ m and $AD = 8$ m. How much area does it occupy ? What value is depicted here ?

Section-D

Question numbers 25 to 34 carry 4 marks each.

25. If $a = \dfrac{\sqrt{2}+1}{\sqrt{2}-1}$ and $b = \dfrac{\sqrt{2}-1}{\sqrt{2}+1}$, find the value of $a^2 + b^2$.

26. Prove that :

$$\frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{8}} + \frac{1}{\sqrt{8}+\sqrt{9}} = 1$$

27. Factorise by using factor theorem :

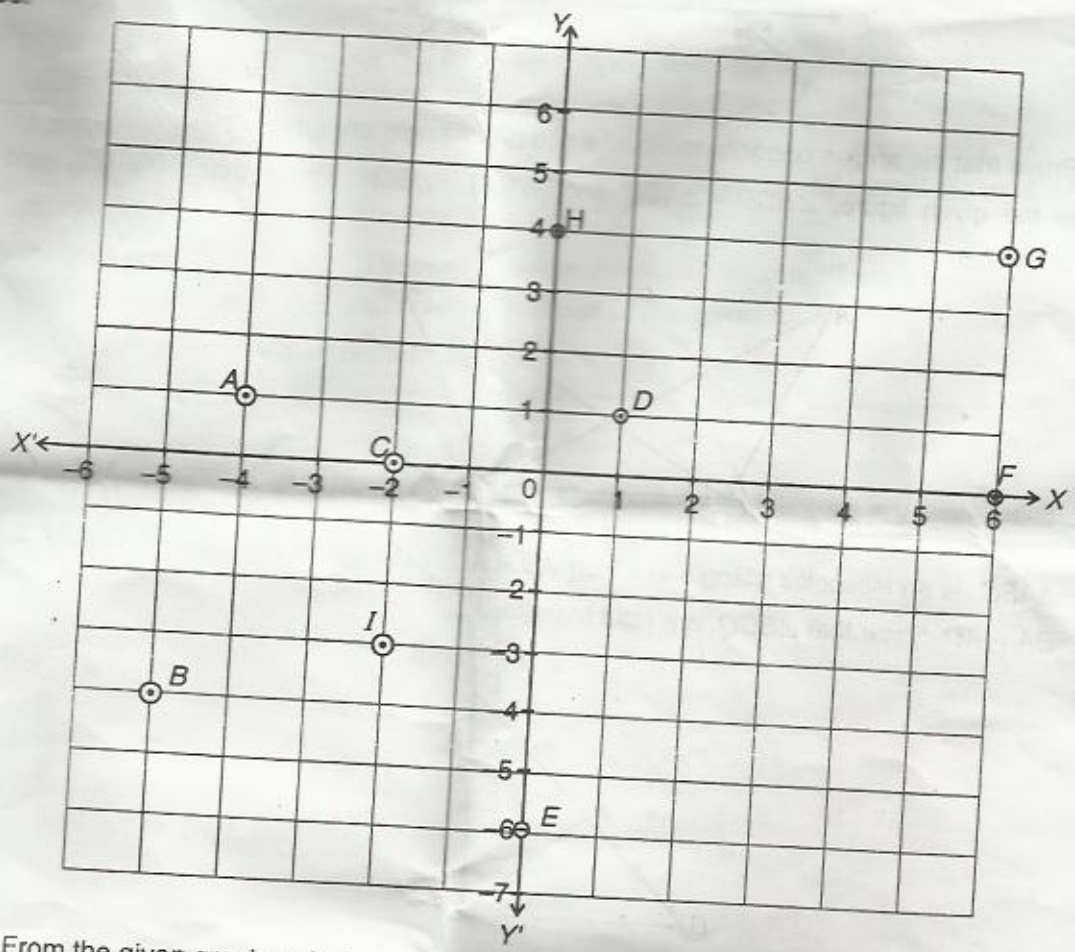
$$x^3 + 13x^2 + 32x + 20.$$

28. Let R_1 and R_2 be the remainders when the polynomials $x^3 + 2x^2 - 5ax - 7$ and $x^3 + ax^2 - 12x + 6$ are divided by $(x + 1)$ and $(x - 2)$ respectively. If $2R_1 + R_2 = 6$, find the value of a.

29. (a) Find the value of a if $(x - 1)$ is a factor of $2x^2 + ax + \sqrt{2}$.

(b) Factorize $64a^3 - 27b^3$.

30.



From the given graph, write :

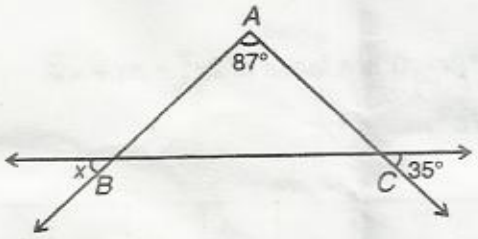
(i) The co-ordinates of the point B and F.

(ii) The abscissa of the points D and H.

(iii) The ordinate of the points A and C.

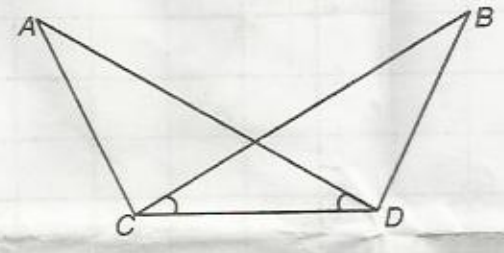
(iv) The perpendicular distance of the point G from the x-axis.

31. If two lines intersect each other, then vertically opposite angles so formed are equal. Prove it. Using above, find the value of x in the given figure :



32. Prove that the angles opposite to equal sides of a triangle are equal.

33. In the given figure, $\angle BCD = \angle ADC$ and $\angle ACB = \angle BDA$. Prove that $AD = BC$ and $\angle A = \angle B$.



34. ΔABC is an isosceles triangle in which $AB = AC$. Side BA is produced to D such that $BA = AD$. Show that $\angle BCD$ is a right triangle.