V & C Patel English School
Half Yearly Exam

Std: IX
Subject: Mathematics

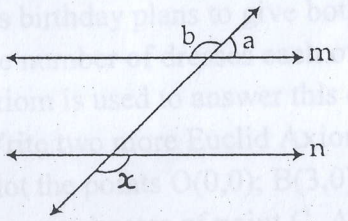
Max.Marks: 80
Date: 11-09-2017
Time: 3 hrs.

General Instructions:

1. All questions are **compulsory.**
2. The question paper consists of 30 questions divided into **four sections A, B, C and D. Section-A** comprises of **6** 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 **8** questions of **4 marks** each.
3. There is no overall choice in this question paper.
4. Use of calculator is not permitted.

Section-A

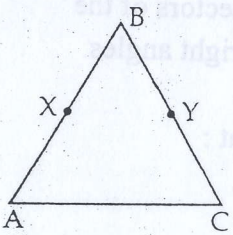
1. Write the coefficient of x^2 in $(4 + 4x^2)(3x^2 - 5)$.
2. If $x^{49} + 49$ is divided by $(x+1)$ then what is the remainder?
3. In the given figure, if m||n and a : b = 2 : 3 then find the value of x.



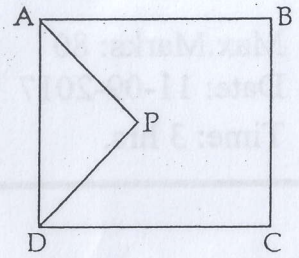
4. Find the area of the triangle formed by joining the points (4,0), (0,0) and (0,4).
5. Write the mirror image of (1,-2) with respect to y-axis.
6. If $P(x) = x^2 - 2\sqrt{2}x + 1$ then find the value of $P(2\sqrt{2})$.

Section-B

7. Simplify : $\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32}$
8. If $x = \frac{1}{2-\sqrt{3}}$, find the value of $x^2 - 4x + 1$
9. Factorise : $8 - 27a^3 - 36a + 54a^2$
10. In the given figure, we have AB = BC, BX = BY. Show that AX = CY. State the axiom used.



11. In the given figure, AP and DP are bisectors of $\angle A$ and $\angle D$. Prove that $2\angle APD = \angle B + \angle C$



12. Using Heron's formula find the area of an equilateral triangle whose perimeter is 24 cm. (Take $\sqrt{3} = 1.732$)

Section-C

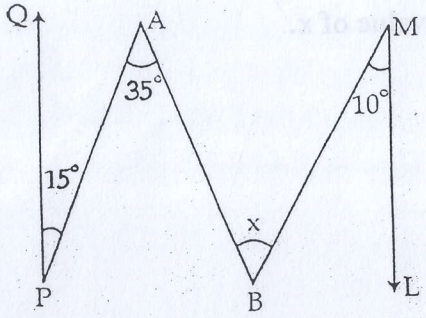
13. Rationalise the denominator of $\frac{4\sqrt{3}+5\sqrt{2}}{\sqrt{48}+\sqrt{18}}$

14. If $x = 2 + \sqrt{3}$ then find the value of $x^3 + \frac{1}{x^3}$

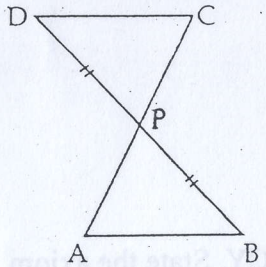
15. Find the value of $(x-a)^3 + (x-b)^3 + (x-c)^3 - 3(x-a)(x-b)(x-c)$ if $a + b + c = 3x$.

16. If $(x - 3)$ and $(x - \frac{1}{3})$ are both factors of $ax^2 + 5x + b$ show that $a = b$.

17. In the given figure, if QP||ML then find the value of x.



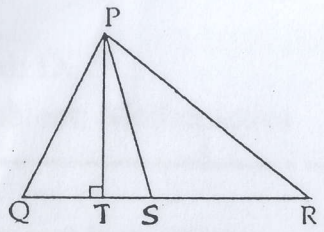
18. In the given figure, AB||DC and P is the mid point of BD. Prove that P is also the mid point of AC.



19. If two parallel lines are intersected by a transversal, prove that the bisectors of the interior angles on the same side of transversal intersect each other at right angles.

20. In the given figure, PS is the bisector of $\angle QPR$ and $PT \perp QR$. Show that :

$\angle TPS = \frac{1}{2}[\angle Q - \angle R]$



21. Represent $\sqrt{5.6}$ on the number line. Mention the steps also.
22. The perimeter of a triangle is 450 m and its sides are in the ratio 13 : 12 : 5. Find the area of the triangle.

Section-D

23. If $\frac{5+3\sqrt{2}}{5-3\sqrt{2}} = a + b\sqrt{2}$, find the value of a and b.
24. Factorise : $x^3 + 13x^2 + 32x + 20$
25. The polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + 3a - 7$ when divided by $(x + 1)$ leaves the remainder 19. Find the value of 'a'. Also find the remainder when p(x) is divided by (x +2).
26. Evaluate : $\frac{(x^2 - y^2)^3 + (y^2 - z^2)^3 + (z^2 - x^2)^3}{(x - y)^3 + (y - z)^3 + (z - x)^3}$
27. Roshan's maid has two children. Both of them have equal number of dresses. Roshan on his birthday plans to give both of them same number of dresses. What you can say about the number of dresses each of them will have after Roshan's birthday? Which Euclid axiom is used to answer this question? What value is Roshan depicting by doing so? Write two more Euclid Axioms.
28. Plot the points O(0,0); B(3,0) and D(0,3) on graph. Complete the square OBCD. Find the coordinates of point C. Also find the area of the square OBCD.
29. The angles of a triangle are $(x - 40)°$, $(x - 20)°$ and $(\frac{x}{2} - 10)°$. Find the value of x and then the angles of the triangle.
30. ΔABC and ΔDBC are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC. If AD is extended to intersect BC at P, show that :
    (i) $\Delta ABD \cong \Delta ACD$
    (ii) $\Delta ABP \cong \Delta ACP$
    (iii) AP bisects $\angle A$ as well as $\angle D$

BEST OF LUCK