

SUMMATIVE ASSESSMENT – I, 2014-2015

MATHEMATICS CLASS – IX

Time allowed : 3.15 hours

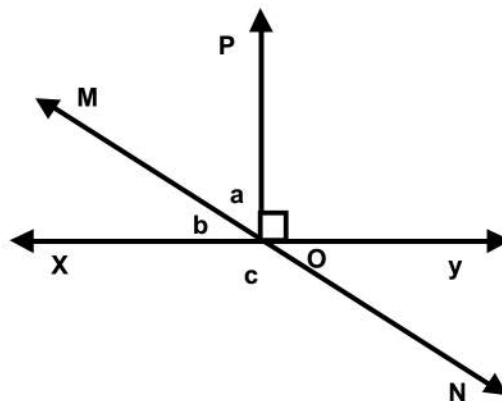
Maximum Marks : 90

General Instruction:

- (i) All questions are compulsory.
- (ii) The question paper consists of 31 questions divided into four sections A, B, C and D.
- (iii) Section A contains 4 multiple-choice 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 11 questions of 4 marks each.
- (iv) Use of calculator is not permitted.

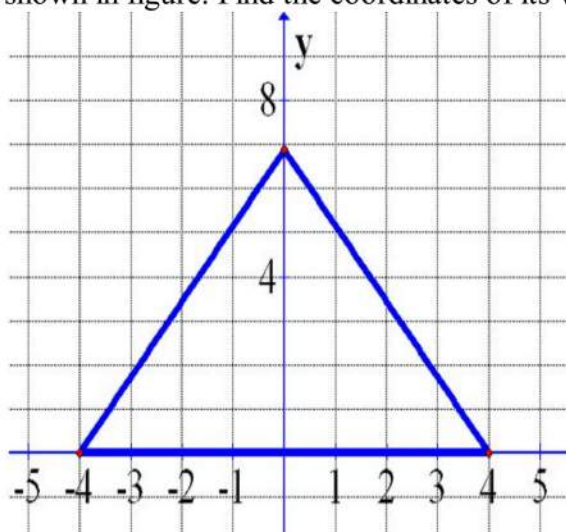
SECTION – A

1. If $x - 2$ is a factor of $x^3 - 3x + 5a$ then the value of a is:
 (a) 1 (b) -1 (c) $\frac{2}{5}$ (d) $-\frac{2}{5}$
2. If $x = \frac{1}{2 - \sqrt{3}}$, find the value of $x^2 - 4x + 1$
 (a) 3 (b) 1 (c) 0 (d) -1
3. In fig., lines XY and MN intersect each other at point O. If $\angle POY = 90^\circ$ and $a : b = 2 : 3$ then the value of $\angle C$ is
 (a) 140° (b) 120° (c) 80° (d) 95°
4. Area of equilateral triangle of side a unit is
 (a) $\frac{\sqrt{3}}{2} a^2$ (b) $\frac{\sqrt{3}}{4} a^2$ (c) $\frac{\sqrt{3}}{2} a$ (d) none of these



SECTION – B

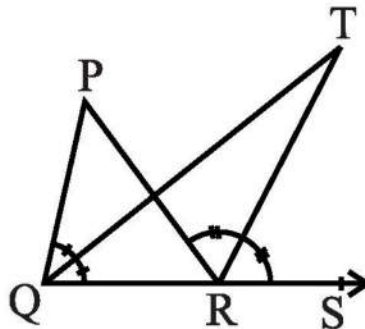
5. ABC is an equilateral as shown in figure. Find the coordinates of its vertices.



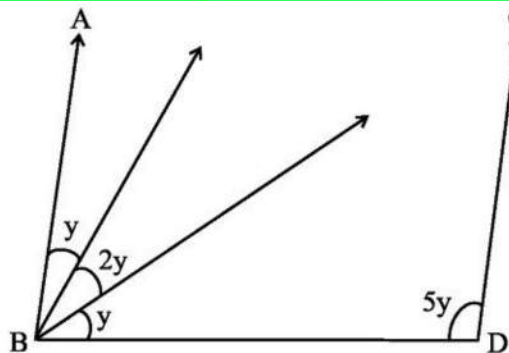
6. If $x = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$, find $x^2 + \frac{1}{x^2}$
7. Factorise : $8x^3 + 27y^3 + 36x^2y + 54xy^2$
8. If $x - 2$ is a factor of $x^3 - 2ax^2 + ax - 1$ then find the value of a .
9. If both $x - 2$ and $x - \frac{1}{2}$ are factors of $px^2 + 5x + r$, show that $p = r$.
10. If a point C lies between two points A and B such that $AC = BC$, then prove by using Euclid's axiom that $AC = \frac{1}{2} AB$. Explain by drawing the figure.

SECTION – C

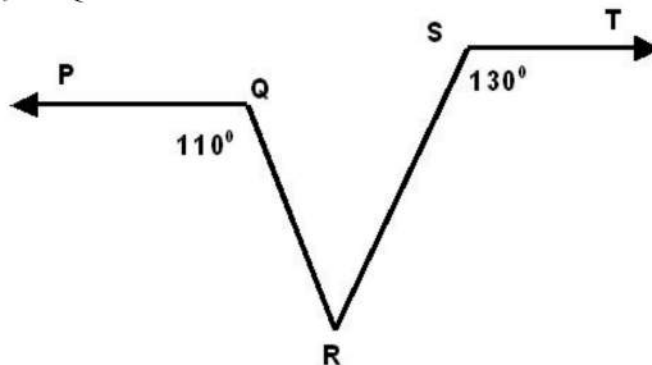
11. Show that $1.27272727\dots$ can be expressed in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
12. Find the value of a and b in $\frac{3 + \sqrt{7}}{3 - \sqrt{7}} = a + b\sqrt{7}$
13. Factorise: $x^3 - 2x^2 - x + 2$
14. Find the value of $x^3 + y^3 + 15xy - 125$ if $x + y = 5$.
15. In the figure, the side QR of $\triangle PQR$ is produced to a point S . If the bisectors of $\angle PQR$ and $\angle PRS$ meet at point T , then prove that $\angle QTR = \frac{1}{2} \angle QPR$.



16. ABC is triangle in which $\angle B = 2\angle C$. D is a point on BC such that AD bisects $\angle BAC$ and $AB = CD$. Prove that $\angle BAC = 72^\circ$.
17. If two sides of a triangle are unequal, prove that the longer side has the greater angle opposite to it.
18. In the figure, if $AB \parallel CD$ then what is the value of y .



19. In the fig, if $PQ \parallel ST$, $\angle PQR = 110^\circ$ and $\angle RST = 130^\circ$ then find the value of $\angle QRS$.

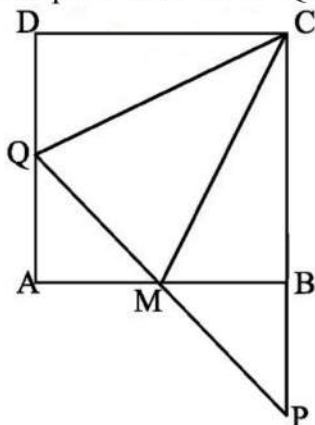


20. In a right angle triangle, one acute angle is double the other. Prove that hypotenuse is double the smallest side.

SECTION – D

21. If $x = \frac{1}{3 - \sqrt{8}}$, find the value of $x^3 - 2x^2 - 7x + 5$.

22. In fig. ABCD is a square. M is the midpoint of AB and $PQ \perp CM$. Prove that $CP = CQ$.

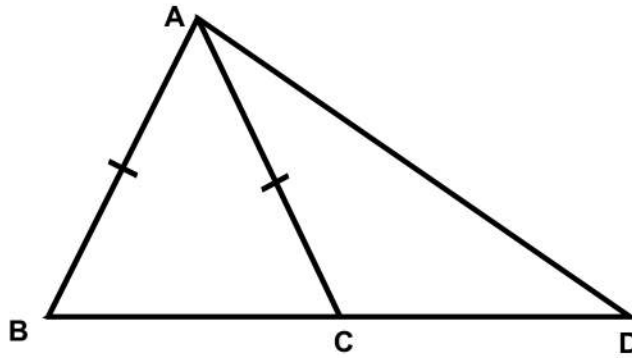


23. Find the value of a and b so that the polynomial $(x^4 + ax^3 - 7x^2 + 8x + b)$ is exactly divisible by $(x + 2)$ as well as $(x + 3)$.

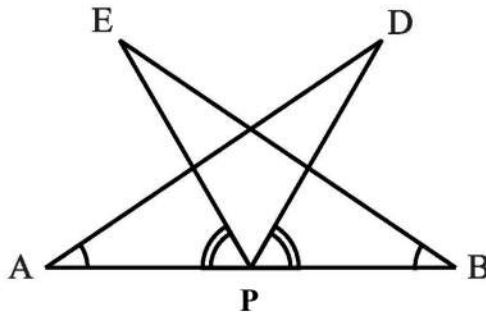
24. Factorise: $(\sqrt{5}x - 3\sqrt{2}y)^3 + \left(3\sqrt{2}y - \frac{4}{3}z\right)^3 + \left(\frac{4}{3}z - \sqrt{5}x\right)^3$

25. Prove that “If three sides of one triangle are equal to three sides of the other triangle, then the two triangles are congruent”.

26. In given figure, ABC is a triangle in which $AB = AC$. If D be a point on BC produced, prove that $AD > AC$.



27. AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that $\angle BAD = \angle ABE$ and $\angle EPA = \angle DPB$ (see the below figure). Show that (i) $\triangle DAP \cong \triangle EBP$ (ii) $AD = BE$



28. Without actually calculating the cubes, find the value of $(28)^3 + (-15)^3 + (-13)^3$
29. The polynomial $f(x) = x^4 - 2x^3 + 3x^2 - ax + b$ when divided by $(x - 1)$ and $(x + 1)$ leaves the remainders 5 and 9 respectively. Find the values of a and b.
30. Plot the points A (4, 4) and (-4, 4) on a graph sheet. Join the lines OA, OB and BA. What figure do you obtain?
31. Students of a school staged a rally for cleanliness campaign. They walked through the lanes in two groups. One group walked through the lanes AB, BC and CA; while the other through AC, CD and DA. Then they cleaned the area enclosed within their lanes. If $AB = 9$ m, $BC = 40$ m, $CD = 15$ m, $DA = 28$ m and $\angle B = 90^\circ$, which group cleaned more area and by how much? Find the total area cleaned by the students (neglecting the width of the lanes). What values you are depicting? Write any two values.

