MM 80 **Mathematics Mock Test IX Sep 2011** **Time 3 Hours**

Section A 1 Mark Each

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1. On factorizing $x^4 + y^4 + x^2y^2$, we get:
   (a) $(x^2 + y^2 + xy)^2$ (b) $(x^2 + y^2 + xy)(x^2 + y^2 - xy)$
   (c) $(1 + x^2 + y^2)(1 - x^2 - y^2)$ (d) $(x^2 - y^2 + xy)(x^2 - y^2 - xy)$

2. The coefficient of x in (x+9) (x-11) is:
   (a) - 19 (b) 2 (c) – 2 (d) 19

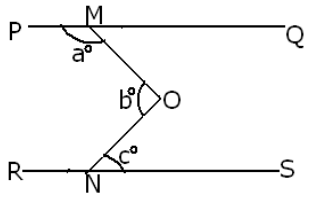
3. Degree of polynomial $0x^7 + 9x^6 + 11x^2 + 11$ is:
   (a) 7 (b) 6 (c)any real number (d)not defined

4. Each side of an equilateral triangle is 2x cm. Its area in cm^2 is:
   (a) $\sqrt{3}x^2$ (b) $2\sqrt{3x}$ (c) $\frac{\sqrt{3}}{4}x^2$ (d) $\sqrt{3}$

5. In ΔABC, $\angle B = 60^\circ$, $\angle A = 30^\circ$, $\angle C = 90^\circ$ then
   (a) AB = 2BC (b) AB = BC (c) AC = 2BC (d) AB = 2AC

6. If $x = 2 - \sqrt{3}$, then $x + \frac{1}{x}$ equals:
   (a) 4 (b) $2\sqrt{3}$ (c) 1 (d) - 4

7. In the figure, if PQ ll RS, then:
   (a) $a^\circ + b^\circ = c^\circ$ (b) $a^\circ + b^\circ + c^\circ = 180^\circ$ (c) $a^\circ + b^\circ - c^\circ = 180^\circ$ (d) $a^\circ + b^\circ = 90^\circ + c^\circ$



8. In Δ ABC, AB = 3cm and AC = 4cm, then BC is:
   (a) 7cm (b) less than 7cm (c) more than 7cm (d) 1 < BC < 7

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Section B 2 Marks Each

9. Factorise: $27x^3 + y^3 + z^3 - 9xyz$

10. Find real zeros of $x^2 + 1$. Justify your answer.

11. Can a triangle have two obtuse angles? Give reasons for your answer.

12. The perpendicular distance of a point from the x-axis is 8 and that from y-axis is 3. What may be the coordinates of the point?

13. Evaluate: $\dfrac{\sqrt{8}+\sqrt{12}}{\sqrt{2}+\sqrt{3}}$

14. A ray OC stands on a line AOB. Draw figure and find the angles, if $\angle AOC : \angle BOC = 4 : 5$.

Section C 3 Marks Each

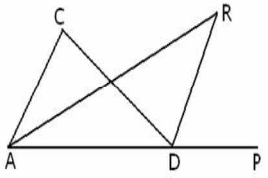
15. Represent $\sqrt{3}$ on the number line OR Simplify: $\dfrac{2+\sqrt{3}}{2-\sqrt{3}} + \dfrac{2-\sqrt{3}}{2+\sqrt{3}}$.

16. Simplify the following by rationalizing the denominator: $\dfrac{4}{3+\sqrt{2}+\sqrt{11}}$

17. The polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ leave the same remainder in each case when divided by $(x - 4)$. Find the value of a.

18. Simplify: $(a + b)^3 + (a - b)^3 + 6a(a^2 - b^2)$.

19. In the figure, the side AD of Δ CAD is produced to a point P. If the bisectors of $\angle$ CAD and $\angle$ CDP meet at point R, then prove that $2\angle ARD = \angle ACD$.



20. Prove that the sum of the angles of a triangles is 180°.

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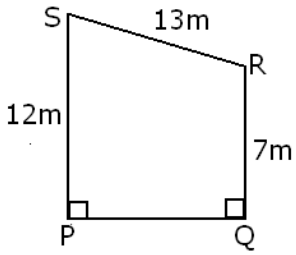
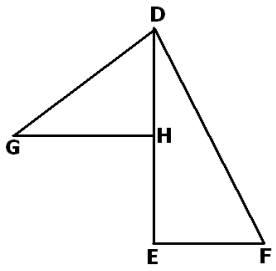
21. Δ ABC and Δ DBC are on the same base BC. If AB =AC and BD=CD, then prove that $\angle$ ABD= $\angle$ ACD.

22. In the figure, Find the area of the trapezium PQRS with height PQ.





23. In figure HE = GH. Prove that DE + EF > DG

24. A triangle ABC is right angled at A. L is a point on BC such that AL$\perp$BC. Prove that $\angle$ BAL= $\angle$ ACB.

Section D 4 Marks Each

25. If $x^2 + px + q = (x + a)(x + b)$, then factories $x^2 + pxy + qy^2$.

26. Prove that: $\frac{a^{-1}}{a^{-1}+b^{-1}} + \frac{a^{-1}}{a^{-1}-b^{-1}} = \frac{2b^2}{b^2-a^2}$

27. Factorise: $x^3 - \frac{1}{x^3} + 4$

28. If both a and b are rational numbers, Find the values of a and b in the following:
$\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} = a + b\sqrt{15}$

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29. Show using examples: (a) Product (b) Difference of two irrational numbers may be rational or irrational

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

31. PQ and RS are two mirrors placed parallel to each other. An incident ray AB Strikes the mirror PQ at B the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB ll CD.

32. Bisectors of the interior angles B and C of a triangle ABC intersect each other at the point O. Prove that $\angle BOC = 90^\circ + \frac{1}{2}\angle A$.

33. O is any point in the interior of ΔABC. Show that OB+OC < AB+AC.

34. Three vertices of a rectangle are (3, 2), (– 4, 2) and (– 4, 5). Plot these points and find the coordinates of the fourth vertex.