

Karishma IX
Mount Carmel School

MATHEMATICS

109 / 2017-18

MM :80

Time: 3 hours

General Instructions:

1. All questions are compulsory.
2. The question paper consists of 30 questions divided into 4 sections.
3. 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. Section D comprises of 8 questions of 4 marks each.
4. Use of calculators is not permitted.

Section A

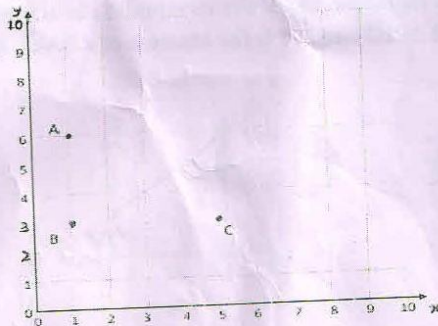
1X6=6

1. Factorize x^3+1
2. State whether $\sqrt{\sqrt{16}}$ is a rational number or an irrational number.
3. In $\triangle ABC$, if $AB > BC > AC$, then arrange its internal angles in descending order.
4. Find the perimeter of an equilateral triangle with area $100\sqrt{3} \text{ cm}^2$.
5. What is the distance of the point $(3a, 4b)$ from x-axis where $a=2$ and $b=1$?
6. If $(2,1)$ lies on the line $2kx - 4y = 0$, find the value of k .

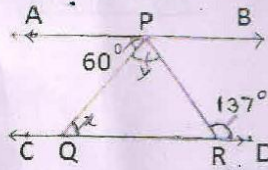
Section B

(2X 6 = 12)

7. A person goes to office by a car which is at a distance of $(81)^{1/4} - 8 \sqrt[3]{216} + 15 \sqrt[5]{32} + \sqrt{625}$ km. Find the distance to the office.
8. Show that $x^2 + 4x + 7$ has no zeros.
9. What are the coordinates of points A, B and C? Find the coordinates of point D so that the four points make a rectangle.



10. State Euclid's fifth postulate. Does it imply the existence of parallel lines? Justify.
 11. In Fig. if $AB \parallel CD$, $\angle APQ = 60^\circ$ and $\angle PRD = 137^\circ$, find x and y

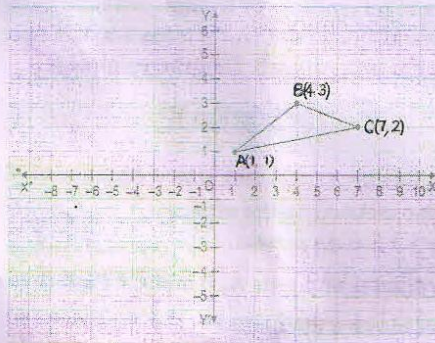


12. Prove that the medians of an equilateral triangle are congruent.

Section C

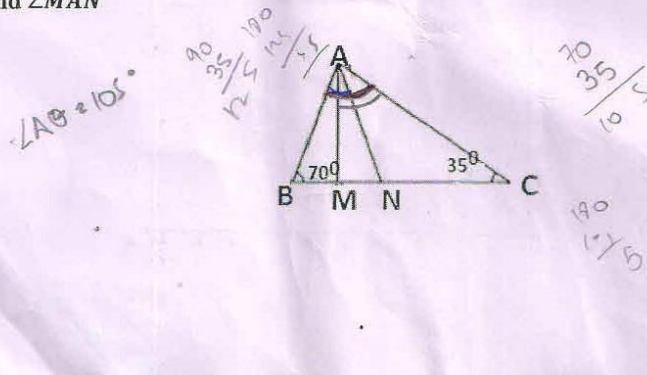
(3X10=30)

13. Express $1.3\bar{2} + 0.3\bar{5}$ in the form of $\frac{p}{q}$ where p and q are integers, $q \neq 0$
 14. Locate $\sqrt{5.5}$ on a number line.
 15. For what value of a is $p(x) = ax^3 + 20x^2 + 32x - 5$ exactly divisible by $g(x) = 7x - 1$?
 16. Simplify $(2x-5y)^3 - (2x+5y)^3$
 17. Draw the mirror image of $\triangle ABC$ in (i) x -axis (ii) y -axis



18. Give the geometric representation of $x = -3$ as an equation
 (i) In one variable
 (ii) In two variables. Also write its equation in standard form.

19. In the fig. $AM \perp BC$ and AN is the bisector of $\angle BAC$. If $\angle B = 70^\circ$ and $\angle C = 35^\circ$, find $\angle MAN$



20. In $\triangle ABC$, $\angle A + \angle B = 116^\circ$, and $\angle B + \angle C = 126^\circ$. Find the measure of each angle of the triangle.
21. ABC is an isosceles triangle in which altitudes BE and CF are drawn to equal sides AC and AB respectively. Show that these altitudes are equal.
22. A speed limit board indicating the speed limit in a colony is in the shape of an equilateral triangle with side 'a'. Using Heron's formula find the area of speed limit board, given that its perimeter is 144m.

Section D

(4X8=32)

23. The side BC of $\triangle ABC$ is extended to form exterior angle ACD. If bisectors of $\angle ABC$ and $\angle ACD$ meet at E, Prove $\angle BAC = 2 \angle BEC$.
24. In $\triangle ABC$, $AD \perp BC$, AE is the angle bisector of $\angle BAC$. If $\angle ABC = 60^\circ$ and $\angle ACB = 40^\circ$, find $\angle DAE$
25. The sides of the triangle are 35cm, 54cm and 61cm respectively. Find the length of one of its altitudes.
26. If $x = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and $y = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$, then find $x^2 + y^2$
27. Factorize using suitable identities:
- a) $216a^3 - \frac{1}{8}$ b) $9x^2 + 1 - 12xy + 6x + 4y^2 - 4y$
28. Plot graph of the equations $2x+3y=12$ and $x+y=5$ in the same graph and find their point of intersection.
29. Two sides AB, BC and median AM of $\triangle ABC$ are respectively equal to sides PQ, QR and median PN of $\triangle PQR$. Show that
- a) $\triangle ABM$ and $\triangle PQN$ are congruent
- b) $\triangle ABC$ and $\triangle PQR$ are congruent.
30. Show that $(x-1)$ is a factor of the polynomial $p(x) = x^3 + 2x^2 - x - 2$ and hence factorise $p(x)$

