INDIAN SCHOOL MUSCAT
MID-TERM EXAMINATION
MATHEMATICS
Sub. Code: 041

CLASS: IX

17.09.2017

Time : 3 Hrs

Max. Marks : 80

General Instructions:
1. All questions are compulsory.
2. The question paper consists of 30 questions divided into four sections A, B, C and D.
3. Section A contains 6 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 8 questions of 4 marks each.
4. All questions in section A are to be answered in one word, one sentence or as per the exact requirement of the question.
5. Use of calculators is not permitted.

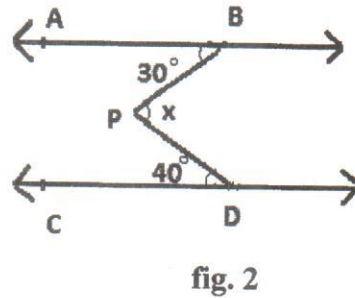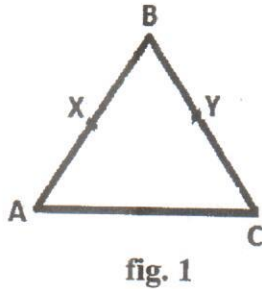## SECTION A
(Question numbers 1 to 6 carry 1 mark each)

1. Find the value of $\sqrt[4]{625^{-2}}$

2. For what value of k, (x +1) is a factor of the polynomial $kx^2 - x - 4$?

3. Find the sum of the abscissa and the ordinate of the point in the fourth quadrant which is 2 units away from x axis and 3 units away from y axis.

4. The perimeter of an equilateral triangle is 60 cm. Find the area of the triangle.

5. Give the Euclidean definition of a line.

6. In $\triangle ABC$, if the longest side is BC = 7 cm, then which angle will be the greatest?

SECTION B
(Question numbers 7 to 12 carry 2 marks each)

7. Express -0.00875 in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

8. If $x + y + 4 = 0$, then find the value of $x^3 + y^3 - 12xy + 64$.

9. Factorize: $64x^3 + \sqrt{125}y^3$

10. Without plotting the points, state in which quadrant or axis the following points lie: (-5, 6), (2, 0), (-6, -2) and (0, 3.5).

11. In fig.1, AB = BC and BX = BY. Show that AX = CY. State the Euclid's axiom used.

12. In the fig.2, AB ∥ CD, $\angle ABP = 30°$ and $\angle CDP = 40°$, find x.

fig. 1   fig. 2

SECTION C
(Question numbers 13 to 22 carry 3 marks each)

13. Find the values of a and b when $\dfrac{5+\sqrt{6}}{5-\sqrt{6}} = a + b\sqrt{6}$.

14. Locate $\sqrt{7.2}$ on a number line.

15. If $f(x) = x^4 - 4x^3 + 3x^2 - 2x + 1$, then check whether $f(0) \times f(-1) = f(2)$.

16. (a) Give the equation of a line parallel to x-axis.
    (b) If the point (3, 4) lies on the graph of the equation 3y = ax + 7, find the value of a.
    (c) Give the equation of a line passing through the point (3, 5).

17. The auto fare in a city is charged ₹ 10 for first kilometer and @ ₹ 4 per kilometer for subsequent distance covered. Write a linear equation to express the above statement taking the total fare as y and distance covered as x.
    Without drawing the graph of this equation, find where would it meet the x and y axes.

18. Rehman and Prakash contributed equal amount towards Prime Minister's Relief Fund. Prakash and Rahul contributed equal amount towards the same Fund. If Rahul contributed ₹ 500, how much did Rehman contribute?
    What value they all are exhibiting by this deed?
    State the Euclid's axiom which you used to derive the correct answer.

19. Plot three points P (1, 5), Q (1, 1) and R (5, 1) on the graph paper. Now plot the point S so that PQRS is a square. Give the coordinates of the point of intersection of its diagonals.

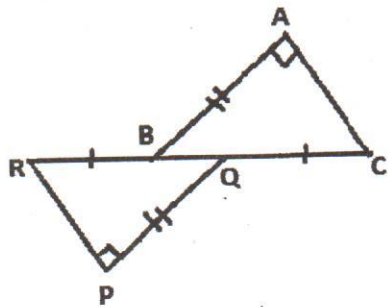20. In fig. 3, $BA \perp CA$, $RP \perp QP$, $AB = PQ$ and $BR = CQ$. Prove that $AC = PR$.

21. In fig.4, OA ⊥ OD, OC ⊥ OB, OD = OA and OC = OB. Prove that AB = CD.
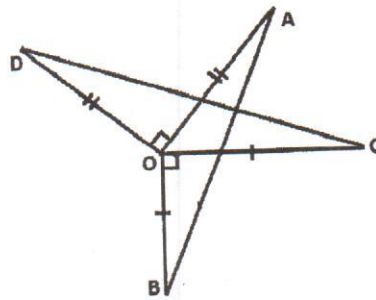

fig. 3

fig. 4

22. Prove that angles opposite to equal sides of an isosceles triangle are equal.

SECTION D
(Question numbers 23 to 30 carry 4 marks each)

23. Two classmates Omar and Taiyab simplified two different expressions during the revision hour and explained to each other their simplifications. Omar explains the simplification of
$\dfrac{\sqrt{2}}{\sqrt{5}+\sqrt{3}}$ and Taiyab explains the simplification of $\sqrt{28}+\sqrt{98}+\sqrt{147}$. Write both the simplifications. What value does this act of students depict?

24. Give an example of two irrational numbers, whose
    (i) sum is rational
    (ii) difference is irrational
    (iii) product is irrational
    (iv) quotient is rational

25. (a) Evaluate using an appropriate identity: $(98)^3$
    (b) If $x + y + z = 10$ and $x^2 + y^2 + z^2 = 40$, find xy + yz + zx.

26. The polynomials $ax^3 - 3x^2 + 4$ and $2x^3 - 5x + a$ when divided by (x -2) leave remainders p and q respectively. If p – 2q = 4, find the value of a.

27. Draw the graph of the linear equation 2x + y = 8 on the Cartesian plane. Using the graph, check whether (-1, 10) is a solution of the equation.

28. The sides of a triangular park are 5 m, 7 m and 8 m respectively. Find the cost of leveling the park at the rate of ₹ 10 per m². (Use $\sqrt{3} = 1.73$)

29. Students in a school are preparing flags as shown in fig. 5 for a rally to make people aware of saving water. In the fig., $\triangle ABC$ is shown with AC extended through point D.

  (i) If $\angle BCD = 6x + 2$, $\angle BAC = 3x + 15$ and $\angle ABC = 2x - 1$, what is the value of x?

  (ii) State the property used to solve this problem.
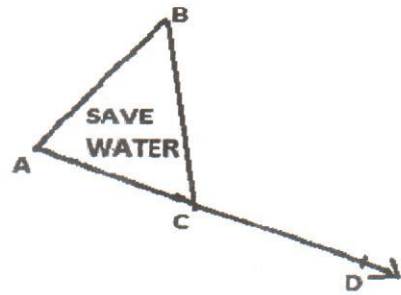
  (iii) What value are they exhibiting by doing so?

fig. 5

30. Sides AB, BC and median AD of $\triangle ABC$ are respectively equal to sides PQ, QR and median PM of $\triangle PQR$. Prove that $\triangle ABC$ is congruent to $\triangle PQR$.

End of the Question Paper