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SET A

INDIAN SCHOOL MUSCAT
FIRST MID TERM EXAMINATION
MATHEMATICS

CLASS: IX | Sub. Code: 041 | Time Allotted: 3 Hrs

24.09.2018 | 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**. **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

Question numbers **1** to **6** carry one mark each.

1. Is $(7 + \sqrt{2}) - (4 + \sqrt{2})$ a rational or an irrational number.

2. Find the degree of the polynomial $4x^4 + 0x^3 + 10x^5 + 5x + 7$

3. In figure 1, if AOB is a line then find y.

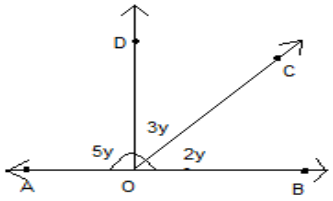

fig 1

4. In which quadrants the abscissa of a point is negative.

5. In Δ ABC, $\angle$ A = $\angle$ C and BC = 3cm. what is the length of the side AB? Give reason for your answer.

6. Find the area of an equilateral triangle with side $3\sqrt{2}$ cm.

SECTION-B

Question numbers **7** to **12** carry two marks each.

7. Evaluate $\left(\frac{32}{243}\right)^{\frac{4}{5}}$

8. Express $0.4\overline{7}$ in the $\frac{p}{q}$ form, where p and q are integers and $q \neq 0$.

9. Using suitable identity, evaluate 101 x 99

10. If -1 is a zero of a polynomial p(x) = a$x^3 - x^2 + x + 4$. Find the value of 'a'

11. In figure 2, point C lies between two points A and B such that AC = BC, then prove that AC = $\frac{1}{2}$ AB

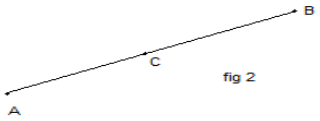

fig 2

12. Two sides of a triangle are 17 cm and 15 cm and its semi- perimeter is 20 cm. Find the area of this triangle.

SECTION-C

Question numbers **13** to **22** carry three marks each.

13. If a = 9 - 4$\sqrt{5}$, find the value of $\left(a - \frac{1}{a}\right)^2$

14. (a) Represent $\sqrt{5}$ on a number line.
OR
(b) Locate $\sqrt{9.3}$ on the number line.

15. (a) Using suitable identity, evaluate $(-32)^3 + (18)^3 + (14)^3$
OR
(b) Find the value of $x^3 - 8y^3 - 36xy - 216$ when $x = 2y + 6$.

16. The polynomials $p(x) = 4x^3 - kx^2 + 5$ and $q(x) = x^2 + kx - 3$ leave the same remainder when divided by $(x - 1)$. Find the value of k.

17. In figure 3, the side QR of Δ PQR is produced to a point S. If the bisectors of ∠ PQR and ∠ PRS meet at point T, then prove that ∠ QTR = $\frac{1}{2}$∠ QPR

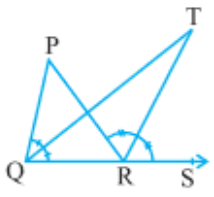

fig 3

18. In figure 4, we have ∠ABC = ∠ACB and ∠3 = ∠4. Show that ∠1 =∠2. State the Euclid's axiom used here.

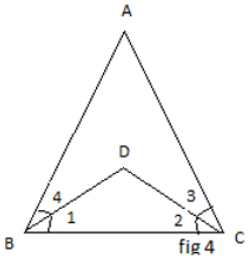

fig 4

19. (a) In figure 5, if PQ || RS, ∠ MXQ = 135° and ∠ MYR = 40°, find ∠ XMY.

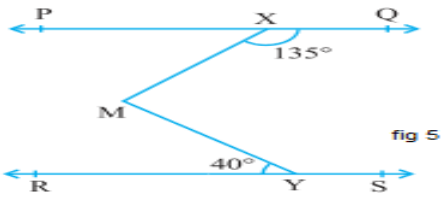

fig 5

OR

(b) If a transversal intersects two lines such that the bisectors of a pair of corresponding angles are parallel, then prove that the two lines are parallel.

20. Answer the following questions (see fig 6):

(i) write the coordinates of A, B C and F
(ii) the ordinate of the point D
(iii) the abscissa of the point E

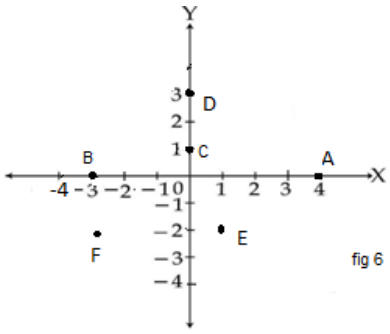

fig 6

21. (a) In figure 7, right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M and produced to a point D such that DM = CM. Point D is joined to point B. Show that:

(i) Δ AMC ≅ Δ BMD
(ii) ∠ DBC is a right angle

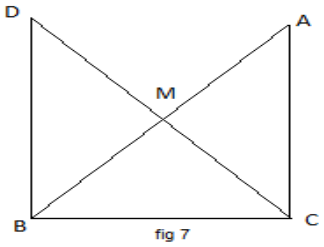

fig 7

OR

(b) In figure 8, an isosceles Δ ABC with AB = AC, D and E are points on BC such that BE = CD Show that AD = AE.

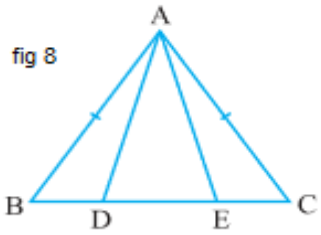

fig 8

22. In ΔPQR, PR > PQ and PS bisects ∠QPR. Prove that ∠PSR > ∠PSQ.

SECTION-D

Question numbers **23** to **30** carry four marks each.

23. Find the value of a and b if $\frac{7+3\sqrt{5}}{7-3\sqrt{5}} = a - b\sqrt{5}$

24. (a) Factorize : $x^3 - 6x^2 + 3x + 10$

OR

(b) Simplify: $(2x - 5y)^3 - (2x + 5y)^3$

25. If $a + b + c = 9$ and $a^2 + b^2 + c^2 = 1$, then find the value of $a^3 + b^3 + c^3 - 3abc$.

26. (a) Prove that sum of three angles of a triangle is 180^0. Using this result, find the value of x and all the three angles of a triangle, if it is given that three angles of the triangle are $(2x - 7)^0$, $(x + 25)^0$ and $(3x + 12)^0$ respectively.

OR

(b) The sides AB and AC of ΔABC are produced to points E and D respectively as shown in fig 9. If bisectors BO and CO of ∠ CBE and ∠ BCD respectively meet at point O, then prove that $\angle BOC = 90^0 - \frac{1}{2}\angle BAC$.

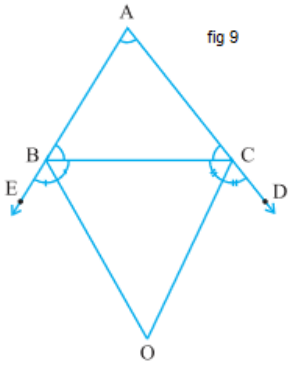

fig 9

27. Plot the following points in the coordinate plane A (-4, 4), B (-6, 0), C (-4, -4) and D (-2, 0). Name the figure obtained by joining the points A, B, C and D. Also find its area.

28. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of Δ PQR as shown in figure 10.Prove that:
    (i) ΔABM ≅ ΔPQN
    (ii) ΔABC ≅ ΔPQR

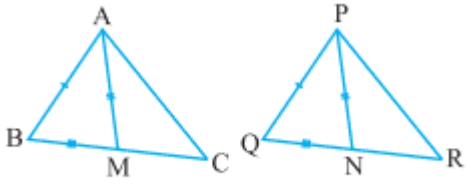

fig 10

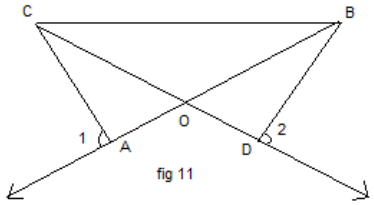

fig 11

29. (a) In figure 11, OA= OD and ∠1= ∠2. Prove that ΔOCB is an isosceles triangle.

OR

(b) AD is an altitude to side BC of an isosceles ΔABC in which AB = AC. Show that
(i) AD bisects BC
(ii) AD bisects ∠ A.

30. Two parallel sides of a trapezium are 120 cm and 154 cm and the other non- parallel sides are 50 cm and 52 cm. find the area of the trapezium.

End of the Question Paper