Octahedral classes, kharadi

2nd floor, yashwant plaza, near bank of India,

Class 09 - Mathematics

Maths Exam 1 to 9

Maximum Marks: 80 **Time Allowed: 3 hours**

Section A

1. Represent $\sqrt{9.3}$ on the number line. **1**
2. Rationalize the denominators of the: **1**

   $\frac{1}{\sqrt{5}+\sqrt{2}}$
3. Rationalize the denominators of the: **1**

   $\frac{1}{\sqrt{7}-2}$
4. If $a = \frac{3+\sqrt{5}}{2}$, then find the value of $a^2 + \frac{1}{a^2}$. **3**
5. If $a = \frac{1}{7-4\sqrt{3}}$ and $b = \frac{1}{7+4\sqrt{3}}$, then find the value of: **3**

   i. $a^2 + b^2$

   ii. $a^3 + b^3$
6. Factorize: **2**

   $8a^3 + b^3 + 12a^2b + 6ab^2$
7. Factorize: $6x^2 + 5x - 6$ **2**
8. Factorise: $x^3 - 6x^2 + 11x - 6$ **2**
9. Find the values of m and n if the polynomial **2**

   $2x^3 + mx^2 + nx - 14\, has\, x - 1$ and x + 2 as its factors.
10. Take a triangle ABC with A (3, 0), B (-2, 1), C (2, 1). Find its mirror image. **2**
11. Draw the graphs of y = x and y = -x in the same graph. Also find the co-ordinates of the point where the two lines intersect. **2**
12. The following table gives measures (in degrees) of two acute angles of a right triangle **2**

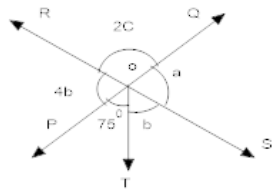
X	10	20	30	40	50	60	70	80
Y	80	70	60	50	40	30	20	10

   Plot the point and join them.
13. Plot the following points and check whether they are collinear or not: (1, 1), (2, -3), (-1, -2) **2**

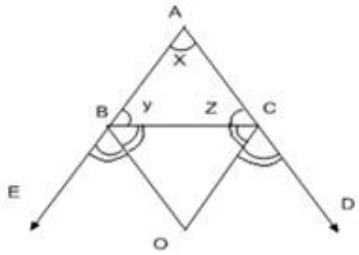
14. Draw the graph of the following linear equation: 2y + 5 = 0 **2**
15. If the work done by a body on application of a constant force is directly proportional to the distance traveled by the body, express this in the form of an equation in two variables and draw the graph of the same by taking the constant force as 5 units. Also read from the graph the work done when the distance traveled by the body is 2 units. **2**
16. Draw the graph of the linear equation 3x + 4y= 6. At what points, the graph cuts the x-axis and the y-axis. **3**
17. The auto-rickshaw fare in a city is charged as Rs.10 for the first kilometre and Rs. 4 per kilometre for subsequent distance covered. Write the linear equation to express the above statement. Draw the graph of linear equation. **3**

Section B

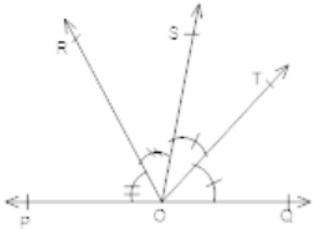
18. In fig two straight lines PQ and RS intersect each other at O, if ∠POT = 75° Find the values of a, b and c **3**



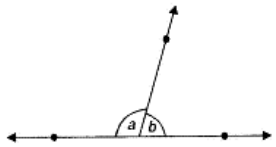
19. In fig the side AB and AC of △ ABC are produced to point E And D respectively. If bisector BO and CO of ∠CBE And ∠BCD respectively meet at point O, then prove that ∠ BOC =$90^\circ - \frac{1}{2}\angle$ BAC **3**



20. In figure ray OS stands on a line POQ, ray OR and ray OT are angle bisector of ∠POS an d ∠SOQ respectively. If ∠POS = x, find ∠ROT. **3**



21. In figure, a is greater than b by one third of a right angle. Find the values of a and b. **3**



22. In 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. **3**

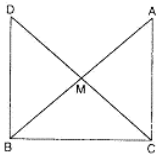
    Show that:

    i. $\triangle AMC \cong \triangle BMD$

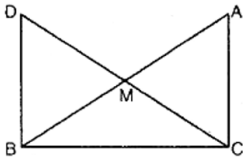
    ii. $\angle DBC$ is a right angle

    iii. $\triangle DBC \cong \triangle ACB$

    iv. CM = $\frac{1}{2}$AB



23. In 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. (See figure) **3**



    Show that:

    i. $\triangle AMC \cong \triangle BMD$

    ii. $\angle DBC$ is a right angle.

    iii. $\triangle DBC \cong \triangle ACB$

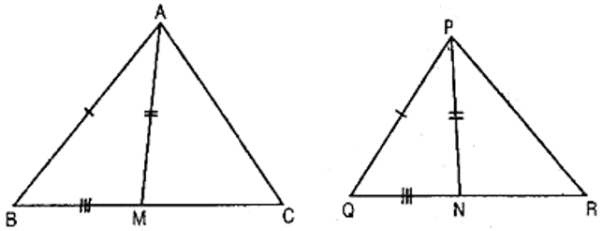
    iv. CM = $\frac{1}{2}$ AB

24. Prove that the sum of three altitudes of a triangle is less than the sum of the three sides of the triangle. **3**

25. Two sides AB and BC and median AM of the triangle ABC are respectively equal to side PQ and QR and median PN of PQR (See figure). Show that: **3**

    i. $\triangle ABM \cong \triangle PQN$

    ii. $\triangle ABC \cong \triangle PQR$



26. ABCD is a trapezium in which AB||CD and AD = BC. Show that: **3**

i. $\angle A = \angle B$

ii. $\angle C = \angle D$

iii. $\triangle ABC \cong \therefore BAD$

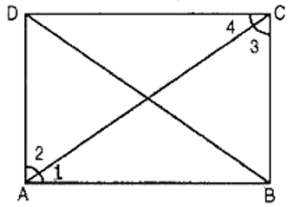
iv. Diagonal AC = Diagonal BD

27. Prove that the line joining the mid-points of the diagonals of a trapezium is parallel to each of the parallel sides and is equal to half of the difference of these sides. **3**

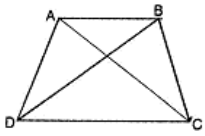
28. ABCD is a rectangle in which diagonal BD bisects $\angle B$ as well as $\angle D$. Show that: **3**

i. ABCD is a square.

ii. Diagonal BD bisects both $\angle B$ as well as $\angle D$.



29. ABCD is a trapezium in which AB || CD and AD = BC. **3**



Show that :

i. $\angle A = \angle B$

ii. $\angle C = \angle D$

iii. $\triangle ABC \cong \angle BAD$

iv. diagonal AC = diagonal BD.

30. If E, F, G and H are respectively the mid-points of the sides of a parallelogram ABCD, show that ar(EFGH) = $\frac{1}{2}$ ar(ABCD) **3**

31. ABCD is a quadrilateral as shown in Figure. A line through D, parallel to AC meets BC produced in P. Prove ar ($\triangle ABP$) = ar (quad. ABCD). **3**

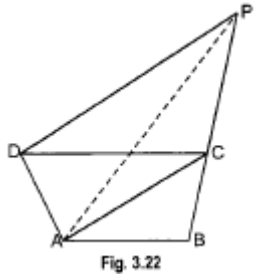


Fig. 3.22

32. Prove that: **3**

i. ar(△BDE)= $\frac{1}{4}$ ar(△ABC)

ii. ar(△BDE)= $\frac{1}{2}$ ar(△BAE)

If △ABC and △DBE are two equilateral triangles such that D is the mid-point of BC and AE intersect BC at F.