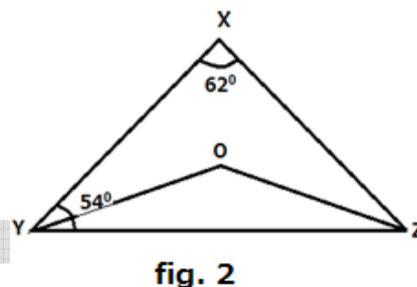
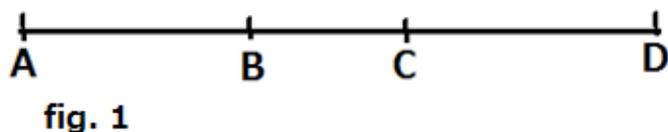


Army Public School, Dagshai
IX – MATHEMATICS Assignment

Note: Use thin notebook to solve the following question

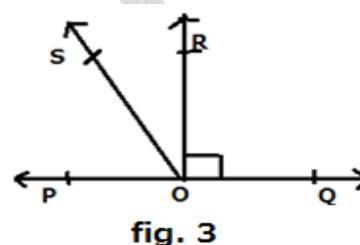
- 1) In the given fig.1, if $AC = BD$, then prove that $AB = CD$.



- 2) In the given fig. 2., $\angle X = 62^\circ$, $\angle XYZ = 54^\circ$. If YO and ZO are the bisectors of $\angle XYZ$ and $\angle XZY$ respectively of $\triangle XYZ$, find $\angle OZY$ and $\angle YOZ$.

- 3) In the given fig. 3., POQ is a line. Ray $OR \perp PQ$. OS is another ray lying between rays OP and OR. Prove that:-

$$\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$$



- 4) In the given fig. 4., $\angle B < \angle A$ and $\angle c < \angle D$. Show that $AD < BC$.

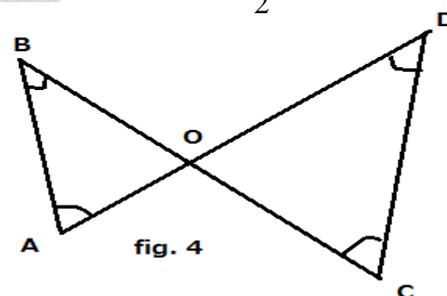
- 5) P and Q are any two points lying on the sides DC and AD respectively of a parallelogram ABCD. Show that $\text{ar}(\triangle APB) = \text{ar}(\triangle BQC)$.

- 6) Divide the polynomial $3x^4 - 4x^3 - 3x - 1$ by $x - 1$.

- 7) Factorize:- $27a^3 + 8b^3 + 54a^2b + 36ab^2$.

- 8) BE and CF are two equal altitudes of a triangle ABC. Using RHS congruence rule, prove that the triangle ABC is isosceles.

- 9) Prove that a cyclic parallelogram is a rectangle.

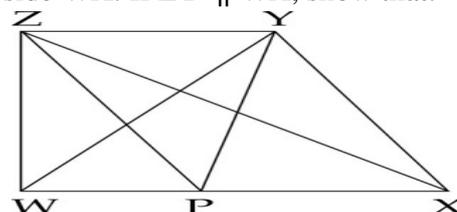


- 10) Prove that the line joining the mid-points of two sides of a triangle is parallel to the third side.

- 11) In a $\triangle ABC$, E is the mid-point of median AD. Show that $\text{ar}(\triangle BED) = \frac{1}{4}\text{ar}(\triangle ABC)$.

- 12) In the given figure, WXYZ is a quadrilateral with a point P on side WX. If $ZY \parallel WX$, show that:-

- (i) $\text{ar}(\triangle ZPY) = \text{ar}(\triangle ZXY)$
(ii) $\text{ar}(\triangle WZY) = \text{ar}(\triangle ZPY)$
(iii) $\text{ar}(\triangle ZWX) = \text{ar}(\triangle XWY)$



- 13) Construct a triangle ABC in which $BC = 7$ cm, $\angle B = 75^\circ$ and $AB + AC = 13$ cm.

- 14) A park, in the shape of a quadrilateral ABCD, has $\angle C = 90^\circ$, $AB = 9$ m, $BC = 12$ m, $CD = 5$ m and $AD = 8$ m. How much area does it occupy?

- 15) The volume of a right circular cone is 9856 cm^3 . If the radius and slant height of the cone is 14 cm and 50 cm respectively, find its height and curved surface area.

- 16) Find the total surface area of the hemisphere of radius 10 cm. (Use $\pi = 3.14$)

- 17) The capacity of a closed cylindrical vessel of height 1 m is 15.4 liters. How many square meters of metal sheet would be needed to make it?
- 18) Ashima has constructed a cubical water tank with lid for her house with each outer edge 300 cm long. She gets the inner four walls and the lid covered with square tiles of side 20 cm. Find the amount she spent for tiles, if it is given that the cost of 4 tiles is Rs 160.
- 19) The following observations have been arranged in ascending order. If the median of the data is 63, find the value of x. 29, 32, 48, 50, x, x + 2, 72, 78, 84,

20) Represent $\sqrt{19}$ on the number line.

21) Simplify:- $\frac{1}{2+\sqrt{2}} + \frac{1}{2-\sqrt{2}} + \frac{1}{7+4\sqrt{2}}$

22) Factorize:- $x^8 - y^8$

23) Expand the following:- a) $(3a - 7b - c)^2$ b) $(2a - 3b)^3$

24) Find the value of k, if $x - 1$ is a factor of $p(x)$ in each of the following cases:-

a) $p(x) = x^2 + x + k$ b) $p(x) = 2x^2 + kx + 2$

25) Yamini and Fatima, two students of class IX of a school, together contributed Rs 100 towards the Prime Minister's Relief Fund to help the earthquake victims. Write a linear equation which satisfies this data and also represent it on the graph.

Also write the moral value shown by these girls.

26) Locate the given points on the Cartesian Plane:- (1,2), (-2, 4), (3, -1), (-1, 0), (-3, -5), (5, -4)

27) If diagonals of a cyclic quadrilateral are diameters of the circle, prove that it is a rectangle.

28) In Science test, 15 students secured the following marks out of 100:-

41, 39, 48, 52, 46, 62, 54, 40, 88, 52, 86, 40, 42, 52, 60

Find the mean, median and mode of this data.

29) In a city, the weekly observations made in a study on the cost of living index are given in the following table:-

Cost of living index	140 – 150	150 – 160	160 – 170	170 – 180	180 – 190	190 – 200
No. of weeks	5	10	20	9	6	2

Draw a frequency polygon for the above data.

30) In the given fig.5, the sides AB and AC of $\triangle ABC$ are produced to points E and D respectively. If bisectors BO and CO of $\angle CBE$ and $\angle BCD$ respectively meet at a point O, then prove that

$$\angle BOC = 90^\circ - \frac{1}{2}\angle BAC.$$

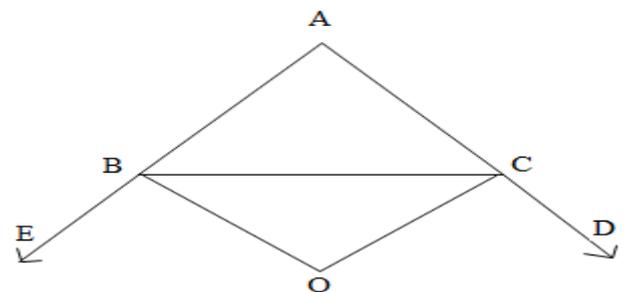


fig5

31) Write any two axioms of Euclid's Geometry.

32) In the adjoining figure6, if $x + y = w + z$, then prove that AOB is line.

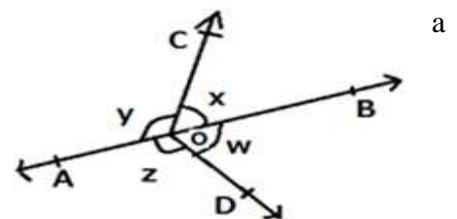


figure 6

33) If E, F, G and H are respectively the mid points of the sides of a parallelogram ABCD,
 Show that $\text{ar}(\text{EFGH}) = \frac{1}{2}\text{ar}(\text{ABCD})$.

34) In the adjoining figure7, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moved along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB is parallel to CD.

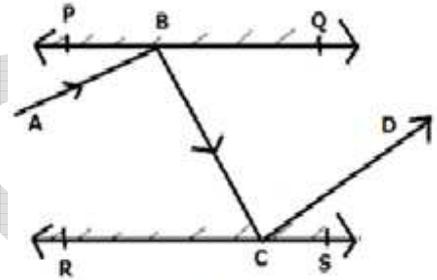


figure 7

35) ΔABC (figure8) is an isosceles triangle in which $AB = AC$. Side BA is produced to D such that $AD = AB$. Show that $\angle BCD = 90^\circ$.

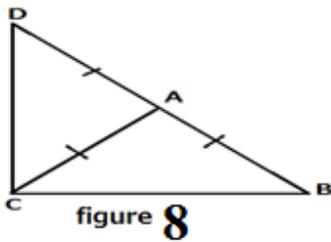


figure 8

36) Factorize:-a) $64m^3 - 343n^3$ b) $27a^3 + 8b^3 + 54a^2b + 36ab^2$.

37) AB and CD are respectively the smallest and longest sides of a quadrilateral ABCD (figure9). Show that $\angle A > \angle C$ and $\angle B > \angle D$.

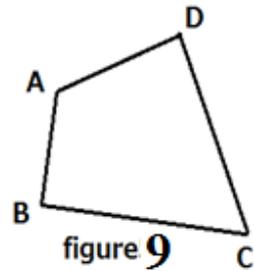


figure 9

38) ABC is a triangle right angled at C. A line through the mid point M of hypotenuse AB and parallel to BC intersects AC at D. Show that:-

- i) D is the mid-point of AC
- ii) $MD \perp AC$
- iii) $CM = MA = \frac{1}{2}AB$

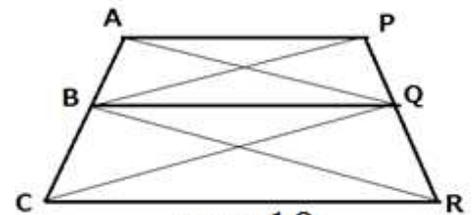


figure 10

39) In figure10, $AP \parallel BQ \parallel CR$. Prove that $\text{ar}(\text{AQC}) = \text{ar}(\text{PBR})$.

40) Construct a ΔXYZ in which $\angle Y = 30^\circ$, $\angle Z = 90^\circ$ and $XY + YZ + ZX = 11$ cm.

41) A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26 cm, 28 cm and 30 cm, and the parallelogram stands on the base 28 cm, find the height of the parallelogram.

42) A hemispherical tank is made up of an iron sheet 1 cm thick. If the inner radius is 1 m, then find the volume of the iron used to make the tank.

43) The table shows the marks obtained by a student in unit tests out of 50 :

Find the probability that the student get 70% or more in the next unit test. Also , the probability that student get less then 70%.

UNIT TEST	I	II	III	IV	V
MARKS (Out of 50)	34	35	36	34	37

44) A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm. Find the volume of the solid so formed.

45) Find the cost of digging a cuboidal pit 8 m long, 6 m broad and 3 m deep at the rate of Rs 30 per m³.

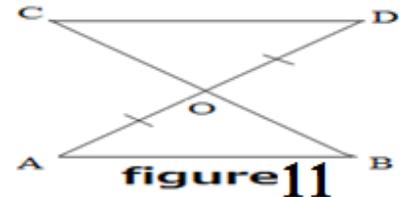
46) Find the mean salary of 60 workers of a factory from the following table:-

Salary(In Rs)	3000	4000	5000
No. of workers	25	20	15

47) In fig.11, line segment AB \parallel CD and O is the mid-point of AD.

Show that:-

- (i) $\triangle AOB \cong \triangle DOC$.
- (ii) O is also the mid-point of BC.



48) Represent $\sqrt{15}$ on the number line.

49) Express the following in the $\frac{p}{q}$ form:- a) 0.47777..... b) 0.001001001.....

50) Factorize:- $x^3 - 23x^2 + 142x - 120$

51) Verify that $x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z) [(x - y)^2 + (y - z)^2 + (z - x)^2]$

52) Factorize:- $27p^3 - \frac{1}{216} - \frac{9}{2}p^2 + \frac{1}{4}p$

53) The relation between temperature scale Fahrenheit(F^0) and Celsius(C^0) is given below, represent it on the graph paper by taking F^0 on y-axis and C^0 on x-axis .

54) Locate the following points in the Cartesian plane, join them in order and find the area of the figure so obtained:- A(5, 2), B (- 5 , 2), C(-5, -2), D(5, -2)

55) Rahim had a sandwich which was square in shape. Instead of eating his sandwich alone, he decided to divide it into four equal parts and share with his three best friends Ram, David and Manjeet.

- (i) Explain how can Rahim divide his square sandwich into four equal parts.
- (ii) What quality of Rahim is depicted in the above question ?