SUBJECT : MATHEMATICS

TOPIC : NUMBER SYSTEM

1. Simplify the expression $\dfrac{3}{\sqrt{48} - \sqrt{75}}$.

2. If $x = (7 + 4\sqrt{3})$, then what is the value of the expression $x + \dfrac{1}{x}$?

3. If $\sqrt{2} = 1.414$, then what is the value of $\sqrt{\dfrac{\sqrt{2} - 1}{\sqrt{2} + 1}}$?

4. Express $2.0\overline{15}$ in the fraction form.

5. Simplify the expression $\left[\left(\dfrac{5}{6}\right)^{1/5}\right]^{-1/6}$.

6. Add $\left(\dfrac{2}{3}\sqrt{7} - \dfrac{1}{2}\sqrt{2} + 6\sqrt{11}\right)$ and $\left(\dfrac{1}{3}\sqrt{7} + \dfrac{3}{2}\sqrt{2} - \sqrt{11}\right)$.

7. Simplify $\sqrt{m^2 n^2} \times \sqrt[6]{m^2 n^2} \times \sqrt[3]{m^2 n^2}$.

8. Simplify $\dfrac{16 \times 2^{n+1} - 4 \times 2^n}{16 \times 2^{n+2} - 2 \times 2^{n+2}}$.

9. Show that $\dfrac{x^{a(b-c)}}{x^{b(a-c)}} \div \left(\dfrac{x^b}{x^a}\right)^c = 1$.

10. Simplify $3\sqrt{45} - \sqrt{125} + \sqrt{200} - \sqrt{50}$.

11. Find the value of $\dfrac{4}{(216)^{(-2/3)}} - \dfrac{4}{(256)^{(-3/4)}}$.

12. Find the values of a and b, if
$$\dfrac{3 + \sqrt{2}}{3 - \sqrt{2}} = a + b\sqrt{2}.$$

13. Simplify $\dfrac{\sqrt{6}}{\sqrt{2} + \sqrt{3}} + \dfrac{3\sqrt{2}}{\sqrt{6} + \sqrt{3}} - \dfrac{4\sqrt{3}}{\sqrt{6} + \sqrt{2}}$.

14. If $a = 6 + 2\sqrt{3}$, find the value of $a - \dfrac{1}{a}$.

15. Simplify $\dfrac{\sqrt{25}}{\sqrt[3]{64}} + \left(\dfrac{256}{625}\right)^{-1/4} + \dfrac{1}{\left(\dfrac{64}{125}\right)^{2/3}}$.

16. Simplify $3\sqrt{45} - \sqrt{125} + \sqrt{200} - \sqrt{50}$.

17. Find the value of x, if
$$2^{7x} \div 2^{2x} = \sqrt[5]{2^{15}}.$$

18. Simplify $\dfrac{4 - \sqrt{5}}{4 + \sqrt{5}} + \dfrac{4 + \sqrt{5}}{4 - \sqrt{5}}$.

19. Find the value of $\dfrac{4}{(216)^{-2/3}} - \dfrac{1}{(256)^{-3/4}}$.

20. Simplify $3\sqrt{48} - \dfrac{5}{2}\sqrt{\dfrac{1}{3}} + 4\sqrt{3}$.

21. If $x = 3 + \sqrt{8}$, find the value of $\left(x^2 + \dfrac{1}{x^2}\right)$.

22. Prove that $\dfrac{2^{30} + 2^{29} + 2^{28}}{2^{31} + 2^{30} - 2^{29}} = \dfrac{7}{10}$.

23. If a and b are rational numbers $\dfrac{2 + \sqrt{3}}{2 - \sqrt{3}} = a + b\sqrt{3}$, find the values of a and b.

24. If $x = 1 + \sqrt{2}$, find the value of $\left(x - \dfrac{1}{x}\right)^3$.

25. Rationalise $\dfrac{4\sqrt{3} + 5\sqrt{2}}{\sqrt{48} + \sqrt{18}}$.

26. If $x = (5 + 2\sqrt{6})$, show that $\sqrt{x} + \dfrac{1}{\sqrt{x}} = \pm 2\sqrt{3}$.

27. If $x = \dfrac{1}{2 - \sqrt{3}}$, show that the value of $(x^3 - 2x^2 - 7x + 5)$ is 3.

28. Simplify $\dfrac{1}{2 + \sqrt{5}} + \dfrac{1}{\sqrt{5} + \sqrt{6}} + \dfrac{1}{\sqrt{6} + \sqrt{7}} + \dfrac{1}{\sqrt{7} + \sqrt{8}}$.

29. Find the value of
$$\dfrac{4}{(216)^{-2/3}} + \dfrac{1}{(256)^{-3/4}} + \dfrac{2}{(243)^{-1/5}}.$$

30. If $x = \dfrac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$ and $y = \dfrac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$, find $x^2 + y^2$.

31. If $a = 2$, $b = 3$, then find the values of the following.
   (a) $(a^b + b^a)^{-1}$
   (b) $(a^a + b^b)^{-1}$

32. Evaluate $[5(8^{1/3} + 27^{1/3})^3]^{1/4}$.

SUBJECT : MATHEMATICS   CLASS – IX

TOPIC : POLYNOMIAL

1. What are the zeroes of the polynomial $p(x) = X^2 + X - 6$?.
2. If $X^{11} + 101$ is divided by $X + 1$. Then find the remainder.
3. If $X + 2$ and $X - 1$ are the factors of $X^3 + 10X^2 + mx + n$, then find the values of m & n.
4. If the volume of a cuboid is $2X^2 - 16$, then find its possible dimensions.
5. Find the factors of $(25X^2 - 1) + (1+5X)^2$.
6. Factorise $5 (3X+Y)^2 + 6 (3X+Y) - 8$.
7. Find the product $(a - 1/a) (a+ 1/a) (a^2+ 1/a^2) (a^4 + 1/a^4)$ by using a suitable identity.
8. If $a^2 + 9/a^2 = 31$, then what is the value of $a - 3/a$.
9. If the polynomials $2x^3 + ax^2 + 3x - 5$ and $x^3 + x^2 - 2x + a$ leave the same remainder when divided by x- 2, then find the value of a.
10. If $f(x) = x^2 - 5x + 1$ evaluate $f(2) - f(-1) + f(1/3)$
11. Find $y^2 + 1/y^2$ and $y^4 + 1/y^4$ if $y - 1/y = 9$.
12. If $x + y + 4 = 0$, then find the value of $x^3 + y^3 - 12 xy + 64$.
13. If $x^3 + ax^2 + bx + 6$ has $(x-2)$ as a factor and leaves a remainder 3 when divided by $(x-3)$, then find the value of a & b.
14. Find the zeroes of polynomial $6x^3 - 7x^2 - 11x + 12$, if x-1 is a factor of the polynomial.
15. If $x+y+z = 1$, $xy + yz + zx = -1$ and $xyz = -1$, then find the value of $x^3 + y^3 + z^3$.
16. If A and B are the remainders when the polynomials $x^3 + 2x^2 - 5ax - 7$ and $x^3 + ax^2 - 12x + 6$ are divided by $(x+1)$ and $(x-2)$ respectively. If $2A + B = 6$, then find the value of a.
17. If $x - y = 5$ and $xy = 84$ then find the value of $x^3 - y^3$.
18. Show that 2 and -1/3 are the zeroes of of the polynomial $3x^3 - 2x^2 - 7x - 2$ also find the third zero of polynomial.
19. Without actual division prove that $x^4 - 5x^3 + 8x^2 - 10x + 12$ is divisible by $x^2 - 5x + 6$.
20. Find whether $g(x) = x/3 - 1/4$ is a factor of polynomial $p(x) = 8x^3 - 6x^2 - 4x + 3$ or not.

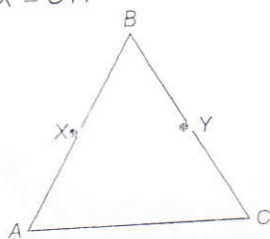**SUBJECT : MATHEMATICS**   CLASS – IX

TOPIC : *Introduction to Euclid's Geometry*
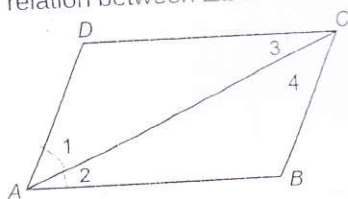
1. In the adjoining figure, name
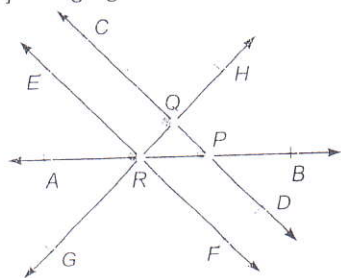
(a) two pairs of intersecting lines and their corresponding points of intersection

(b) three concurrent lines and their points of intersection
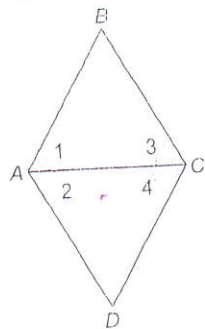
(c) three rays

(d) two line segments

2. In the given figure, we have $AB = BC$ and $BX = BY$, show that $AX = CY$.

3. In the figure, if $\angle 1 = \angle 3$, $\angle 2 = \angle 4$ and $\angle 3 = \angle 4$, write the relation between $\angle 1$ and $\angle 2$.

4. In the figure, we have $\angle 1 = \angle 2$ and $\angle 2 = \angle 3$, show that $\angle 1 = \angle 3$.

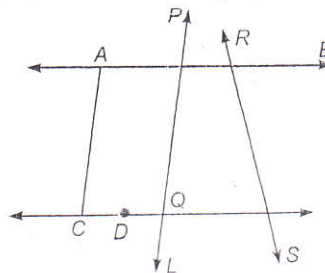**5.** Solve the equation $u - 5 = 15$ and state the axiom that you use here.

6. If Q is mid-point of line segment AB and P is mid-point of AQ, then show that $PQ = \dfrac{1}{4} AB$.

7. Give four collinear points A, B, C and D. List all the line segments determined by these.   [HOTS]

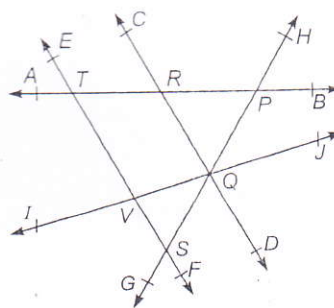**8.** In the figure, we have $AC = DC$ and $CB = CE$, show that $AB = DE$.
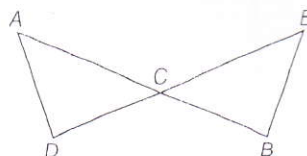
9. In figure, name the following

(a) five line segments

(b) five rays

(c) four collinear points

(d) two pairs of non-intersecting line segment.

10. In the adjoining figure, name

(a) twelve points

(b) six line segments

(c) six rays

(d) five collinear points

(e) three pairs of intersecting lines and corresponding points of intersection

(f) three concurrent lines and their point of intersection.

11. If S is a point lies in the interior of $\angle PQR$. Given that, $\angle PQR = 80°$ and $\angle PQS = 35°$, determine the measure of $\angle RQS$.

12. PQ is a line segment 12 cm long and R is a point in its interior such that $PR = 8$ cm. Then, find QR, $PQ^2 - PR^2$ and $PR^2 + QR^2 + 2PR \cdot QR$.
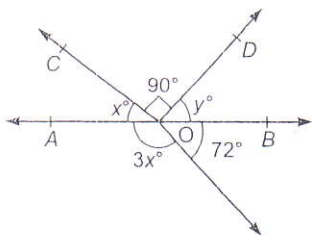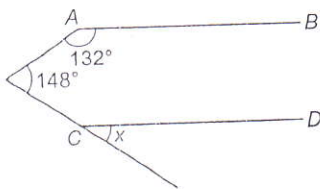
SUBJECT : MATHEMATICS

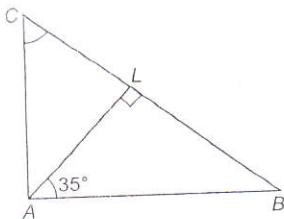TOPIC : LINES & ANGLES
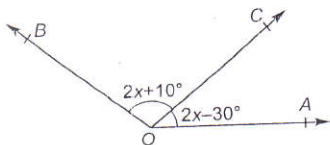
CLASS – IX

1. In the figure, find the value of y.

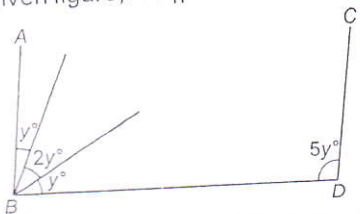2. In the figure, if $AB \parallel CD$, then find the value of x.

3. $\triangle ABC$ is a right triangle in which $\angle A$ is a right angle. AL is drawn perpendicular to BC. If $\angle BAL = 35°$, then find $\angle ACB$.

4. In figure, what value of x will make AOB a straight line?

5. In the given figure, $AB \parallel CD$, what is the value of y?
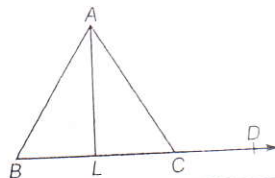

6. Find the measure of an angle, if six times its complement is 12° less than twice its supplement.

7. In a $\triangle ABC$, $\angle A + \angle B = 65°$ and $\angle B + \angle C = 140°$, find the measure of each angle of a triangle.
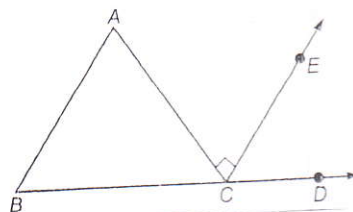
8. In a $\triangle ABC$, if $2 \angle A = 3 \angle B = 6 \angle C$, calculate the measures of $\angle A$, $\angle B$ and $\angle C$.

9. The side BC of $\triangle ABC$ is produced to D. The bisector of $\angle A$ meets BC in L. Prove that
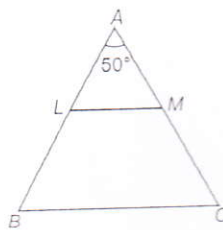$$\angle ABC + \angle ACD = 2\angle ALC.$$

10. In figure, $AC \perp CE$ and $\angle A : \angle B : \angle C = 5 : 3 : 2$. Find the value of $\angle ECD$.
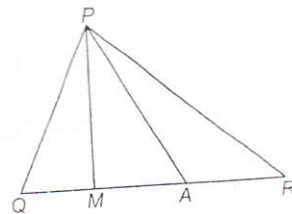

11. In figure, $\triangle ABC$ is isosceles in which $\angle B = \angle C$ and $\angle M \parallel BC$. If $A = 50°$, find $\angle LMC$.

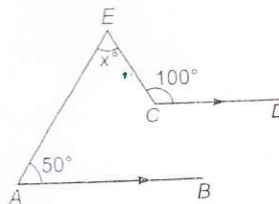12. In figure, $\angle Q > \angle R$, PA is the bisector of $\angle QPR$ and $PM \perp QR$. Prove that
$$\angle APM = \frac{1}{2} [\angle Q - \angle R].$$

13. If the bisectors of $\angle B$ and $\angle C$ of a $\triangle ABC$ meet at a point O, then prove that
$$\angle BOC = 90° + \frac{1}{2} \angle A.$$

14. In the given figure, $AB \parallel CD$, find the value of x.

15. If two parallel lines are intersected by a transversal, prove that the bisectors of the two pairs of interior angles enclose a rectangle.

1. ABC is a triangle in which $AB = AC$. D is any point on AB. Through D, a line parallel to AC intersects BC at E. If $DB = 1.5$ cm, then find the length of DE. [HOTS]
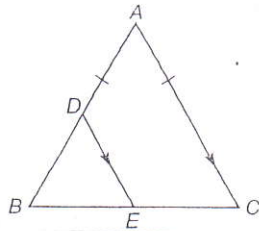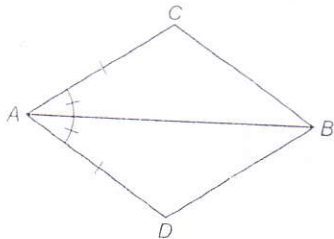
2. In the given figure, $AC = AE$, $AB = AD$ and $\angle BAD = \angle EAC$. If $\angle ACB = 40°$, then find the measure of $\angle AED$.
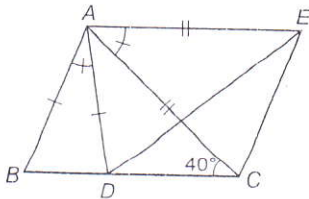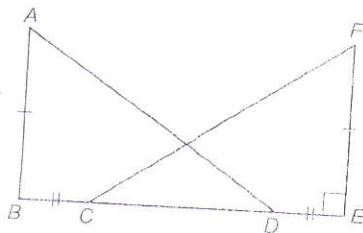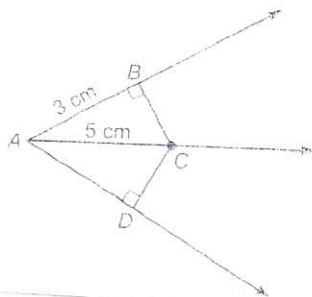
3. In the given figure, if $BC = 2.6$ cm, then find
$$2BD + \frac{BC}{2}.$$

4. In figure, $AB \perp BE$ and $FE \perp BE$. If $BC = DE$ and $AB = EF$, then prove that $\triangle ABD$ is congruent to $\triangle FEC$.

5. In given figure, if AC is bisector of $\angle BAD$ such that $AB = 3$ cm and $AC = 5$ cm, then find the length CD.

6. AD is a median and BL, CM are perpendiculars drawn from B and C respectively on AD and AD produced. Prove that $BL = CM$.

7. E and F are mid-points of the sides AB and AC of $\triangle ABC$. CE and BF are produced to X and Y, respectively. So that, $EX = CE$ and $FY = BF$. AX and AY are joined. Find in figure, a triangle congruent to $\triangle AEX$ and demonstrate the congruency. Prove that XAY is a straight line.
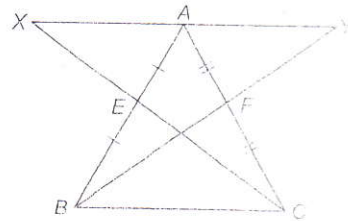
8. P is any point in the square $ABCD$, $DPQR$ is another square. Prove that $AP = CR$.
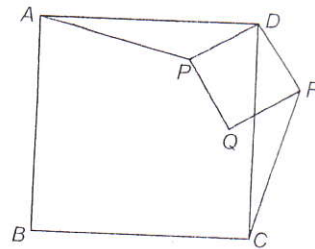
9. $ABCD$ is a square. M is the mid-point of AB and $PQ \perp CM$ meets AD at P and CB produced at Q. Prove that
   (i) $PA = BQ$ (ii) $CP = AB + PA$.
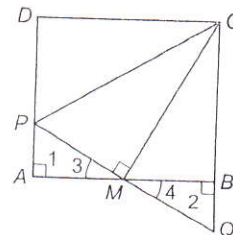
10. A $\triangle ABC$ is right angled at A. AL is drawn perpendicular to BC. Prove that
$$\angle BAL = \angle ACB.$$
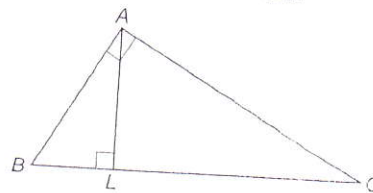
11. In a $\triangle ABC$, the sides AB, AC are equal and the base BC is produced to any point D. From D, DE is drawn perpendicular to BA produced and DF perpendicular to AC produced. Prove that BD bisects $\angle EDF$.

12. Line segment joining the mid-points M and N of parallel sides AB and DC, respectively of a trapezium $ABCD$ is perpendicular to both the sides AB and DC. Prove that $AD = BC$.

SUBJECT : MATHEMATICS CLASS – IX

TOPIC : COORDINATE GEOMETRY

1. The coordinates of two points are A (3,4) & B (-2, 5), then find (abscissa of A) – (abscissa of B).

2. Find the coordinates of four points lying on the coordinate axis at a distance of 5 units from the origin.

3. Writes the coordinates of vertices of a rectangle whose length & breadth are 7 & 4 units respectively, one vertex at the origin the longer side lies on the x axis and one of the vertices lies in the third quadrant.

4. Draw the quadrilateral with vertices (-4, 4) (-6, 0) (-4, -4) (-2, 0), name the type of quadrilateral and find its area.

5. Find some ordered pairs (x, y) such that x+2y = 5 and plot them. How many such ordered pairs can be found and plotted.

6. Plot the points (a) (-6, -2) (b) (-4, 0) and (c) (-5/2, 1/2) in a rectangular coordinate system and write the quadrant of each point.

7. Find the coordinates of the point :-
   (a) Which lies on x & y axes both
   (b) Whose ordinate is -4 and which lies on y axis.
   (c) Whose abscissa is 5 and which lies on x axis.

8. Plot the following points and check whether they are collinear or not
   (a) (2,3) (3,2) (1,-5)
   (b) (-1,1) (-3,3) (-5,5)

9. Plot the following points (1,1) (2,-2) and (-1,-2) and check whether they are collinear or not also determine the area.

10. Two points with coordinates (4, 3) & (4, -2) lie on a line parallel to which axis ?.

11. ABC is an equilateral triangle the coordinates of vertices B & C are (3, 0) and (-3, 0) respectively, find the coordinates of vertex A which lies on positive y axis.

12. Plot (-3,0) (5, 0) & (0, 4) on Cartesian plane, name the figure formed by joining these points and find its area.

D.A.V.INTERNATIONAL SCHOOL
ASSIGNMENT SHEET –7

SUBJECT : MATHEMATICS   CLASS – IX

TOPIC : HERON'S FORMULA

1. If the sides of triangle are doubled, then find its new area.

2. If the area of an equilateral triangle is $81\sqrt{3}$ cm^2. Find its perimeter.

3. The perimeter of an isosceles triangle is 32 cm. The ratio of the equal side to its base is 3 : 2. Find the area of the triangle.

4. While selling cloths for making flags a shopkeeper claims to sell each piece of cloth in the shape of an equilateral triangle of each side 10 cm while actually he was selling the same in the shape of isosceles triangle with sides 10 cm, 10 cm & 8 cm :-
   (a) How much area of cloth he was saving in selling each flag.
   (b) What values are lacking on the shopkeeper part.

5. Kiran has a piece of land which is in the shape of rhombus she decided to donate her land equally to an orphanage and an old age home, if the perimeter of land is 400 m and one of the diagonal is 160 m :-
   (a) How much area will each get.
   (b) What are the values exhibited by kiran through this donation.

6. From a point in the interior of an equilateral triangle perpendiculars are drawn on three sides, the lengths of the perpendicular are 14 cm, 10 cm & 6 cm. Find the area of the triangle.

7. The perimeter of a rhombus is 20 cm and one of its diagonals is 6 cm long, then find the length of other diagonal.

8. Find the area of quadrilateral ABCD in which AB= 9 cm, BC = 40 cm, CD = 28 cm, DA = 15 cm & angle ABC = 90°.

9. The difference between the sides at right angles in a right angle triangle is 14 cm, the area of triangle is 120 cm^2. Calculate the perimeter of the triangle.

10. The sides of a triangular field are 51 m, 37 m & 20 m, find the number of flower beds that can be prepared if each bed is to occupy 9 m^2 of space.

11. The height of an equilateral triangle is 6 cm, find the area of triangle.

12. The lengths of the sides of a triangle are in the ratio 3 : 4 : 5 and its perimeter is 144 cm, find the area of the triangle and the height corresponding to the longest side.

13. The perimeter of a triangle is 50 cm, one side of a triangle is 4 cm longer than the smaller side and the third side is 6 cm less than twice the smaller side. Find the area of the triangle.