WORKSHEET (SA-I)

CLASS - IX

Q1. Simplify: (i) $\left[5\left(8^{\frac{1}{3}}+27^{\frac{1}{3}}\right)^3\right]^{\frac{1}{4}}$ (ii) $3\sqrt{3}+2\sqrt{27}+\frac{7}{\sqrt{3}}$

(iii) $\sqrt[4]{81}-8\sqrt[3]{216}+15\sqrt[5]{32}+\sqrt{225}$ (iv) $\left(\frac{3}{5}\right)^4\left(\frac{8}{5}\right)^{-12}\left(\frac{32}{5}\right)^6$

(v) $\frac{9^{1/3}\times 27^{-1/2}}{3^{1/6}\times 3^{-2/3}}$ (vi) $64^{-1/3}\left[64^{1/3}-64^{2/3}\right]$ (vii) $(256)^{-\left(4^{-\frac{3}{2}}\right)}$

Q2. Locate $\sqrt{5}, \sqrt{10}, \sqrt{17}, \sqrt{5.6}, \sqrt{8.1}$ on the number line

Q3. Find values of a and b if $\frac{7+\sqrt{5}}{7-\sqrt{5}}-\frac{7-\sqrt{5}}{7+\sqrt{5}}=a+\frac{7}{11}\sqrt{5}b$

Q4. Rationalise (i) $\frac{\sqrt{2}}{2+\sqrt{2}}$ (ii) $\frac{\sqrt{10}-\sqrt{5}}{2}$ (iii) $\frac{4\sqrt{3}+5\sqrt{2}}{\sqrt{48}+\sqrt{18}}$

Q5. If $a=\frac{3+\sqrt{5}}{2}$, then find the value of $a^2+\frac{1}{a^2}$.

Q6. Find value of $\frac{4}{(216)^{-2/3}}+\frac{1}{(256)^{-3/4}}+\frac{2}{(243)^{-1/5}}$.

Q7. Show that $p-1$ is a factor of $p^{10}-1$ and $p^{11}-1$.

Q8. Factorise: (i) $2x^2-7x-15$ (ii) $2x^3-3x^2-17x+30$

(iii) $\left(2x+\frac{1}{3}\right)^2-\left(x-\frac{1}{2}\right)^2$ (iv) $16x^2+4y^2+9z^2-16xy-12yz+24xz$

Q9. Expand: (i) $(4a-b+2c)^2$ (ii) $\left(\frac{1}{x}+\frac{y}{3}\right)^3$ (iii) $\left(\frac{x}{2}+2y\right)\left(\frac{x^2}{4}-xy+4y^2\right)$

Q10. Find the value of $x^3+y^3-12xy+64$, when $x+y=-4$

Q11. If polynomials az^3+4z^2+3z-4 and z^3-4z+a leave the same remainder when divided by $z-3$, then find the value of a.

Q12. If both $x-2$ and $x-\frac{1}{2}$ are factors of px^2+5x+r, show that $p=r$.

Q13. If $a+b+c=5$ and $ab+bc+ca=10$, then prove that $a^3+b^3+c^3-3abc=-25$.

Q14. Without plotting the points indicate the quadrant in which they lie (i) Ordinate >5, Abscissa $\to -3$

(ii) Abscissa $\to -5$, Ordinate $\to -3$

Q15. Find the coordinates of the point

(i) which lies on x and y axes both

(ii) whose ordinate is -4 and which lies on y-axis.

Q16. Which of the following points lie on y-axis?
A(1,1) ; B(1,0) ; C(0,1) ; D(0,0) ; E(0,-1) ; F(-1,0) ;
G(0,5) ; H(-7,0) ; I(3,3)

Q17. Points A(5,3), B(-2,3) and D(5,-4) are three vertices of a square ABCD. Plot these points on a graph paper and hence find the coordinates of C.

Q18. In fig 1, X and Y are the mid points of AC and BC and AX = CY. Show that AC = BC.

Q19. In fig 2, $\angle ABC = \angle ACB$, $\angle 3 = \angle 4$. Show that $\angle 1 = \angle 2$.

Q20. In fig 3, $\angle 1 = \angle 3$ and $\angle 2 = \angle 4$. Show that AB = CD

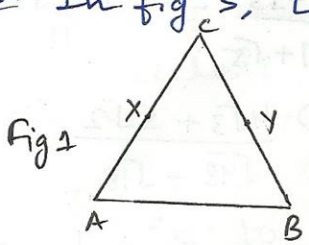


Fig 1

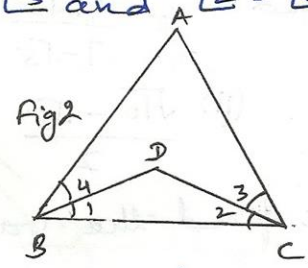


Fig 2

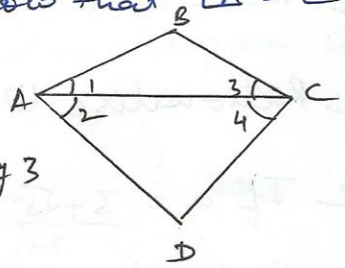
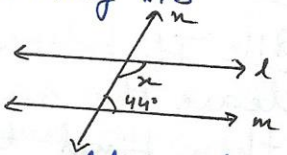


Fig 3

Q21. Read the following two statements which are taken as axioms:
(i) If two lines intersect each other, then vertically opposite angles are not equal
(ii) If a ray stand on a line, then the sum of two adjacent angles so formed is equal to 180°.
Is this system of axioms consistent? Justify.

Q22. How many triangles can be drawn having its angles as 45°, 64° and 72°? Give reason.

Q23. Find value of x for which $l \parallel m$.



Q24. AP and BQ are the bisectors of the two alternate interior angles formed by the intersection of a transversal t with parallel lines l and m. Show $AP \parallel BQ$. (Fig 4)

Q25. $BA \parallel ED$ and $BC \parallel EF$. Show that $\angle ABC = \angle DEF$ (Fig 5)

Q26. $DE \parallel QR$ and AP and BP are bisectors of $\angle EAB$ and $\angle RBA$ resp. Find $\angle APB$. (Fig 6)

Q27. A triangle ABC is right angled at A. L is a point on BC such that $AL \perp BC$. Prove that $\angle BAL = \angle ACB$.

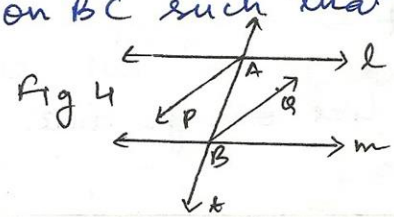


Fig 4

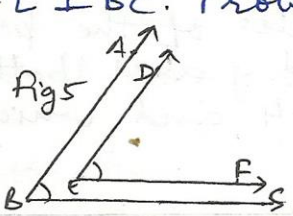


Fig 5

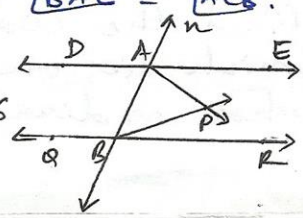


Fig 6

Q28. Bisectors of interior $\angle B$ and exterior $\angle ACD$ of $\triangle ABC$ intersect at point T. Prove that $\angle BTC = \frac{1}{2} \angle BAC$.

Q29. In fig 7, $\angle Q > \angle R$, PA is the bisector of $\angle QPR$ and $PM \perp QR$. Prove that $\angle APM = \frac{1}{2}(\angle Q - \angle R)$.

Q30. If fig 8, $BA \perp AC$, $DE \perp DF$ such that $BA = DE$ and $BF = EC$. Show that $\triangle ABC \cong \triangle DEF$

Q31. S is any point on side QR of $\triangle PQR$. Show that
$PQ + QR + RP > 2PS$

Q32. Bisectors of $\angle B$ and $\angle C$ of $\triangle ABC$ intersect each other at O. Prove that $\angle BOC = 90^\circ + \frac{1}{2} \angle A$.

Q33. Bisectors of $\angle B$ and $\angle C$ of an isosceles $\triangle ABC$ with $AB = AC$ intersect at O. Show that external angle adjacent to $\angle ABC = \angle BOC$.

Q34. P is a point on the bisector of $\angle ABC$. If the line through P, parallel to BA meet BC at Q, prove that BPQ is an isosceles triangle.

Q35. Show that in a quad ABCD, $AB + BC + CD + DA > AC + BD$.

Q36. In $\triangle ABC$, D is the mid pt. of AC such that $BD = \frac{1}{2} AC$. Show that $\angle ABC$ is a right angle.

Q37. ABCD is a quad s.t. $AB = AD$ and $CB = CD$. Prove that AC is the perpendicular bisector of BD.

Q38. In $\triangle ABC$ and $\triangle PQR$, $\angle A = \angle Q$, $\angle B = \angle R$. Which side of $\triangle PQR$ should be equal to side BC of $\triangle ABC$ so that the two triangles are congruent? Give reason.

Q39. Is it possible to construct a triangle with lengths of its sides as 4cm, 3cm and 7cm? Give reason.

Q40. In $\triangle PQR$, $\angle P = 70^\circ$, $\angle R = 30^\circ$. Which side is longest?

Fig 7

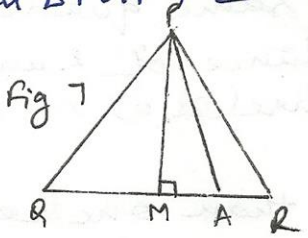
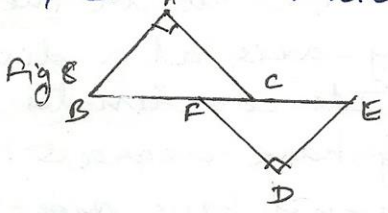


Fig 8



Q41. A design is made on a rectangular tile 50 cm × 70 cm. The design shows 8 triangles each of sides 26 cm, 17 cm and 25 cm. Find area of design and remaining area of tile.

Q42. ΔABC has sides AB = 7.5 cm, AC = 6.5 cm and BC = 7 cm. On base BC a ||gm DBCE of same area as that of ΔABC is constructed. Find height (DF) of ||gm. (Fig 9)

Q43. The area of trapezium is 475 cm^2 and height is 19 cm. Find the length of two parallel sides if one side is 4 cm greater than the other.

Q44. If each side of a Δ is doubled, then find the ratio of the new Δ formed and the given Δ.

Q45. The perimeter of an isosceles Δ is 32 cm. The ratio of the equal side to its base is 3:2. Find the area of the triangle.

Q46. Calculate the area of the shaded region in Fig 10.

Fig 9

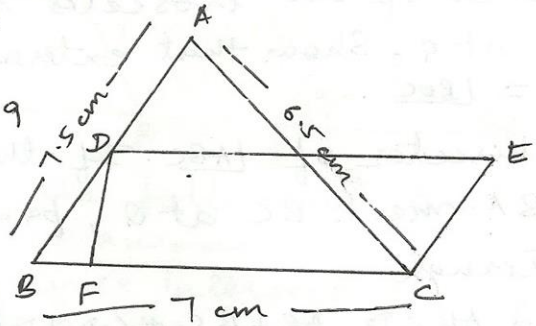
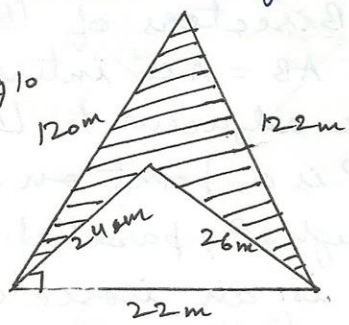


Fig 10



Q47. Write True or False and justify your answer

(a) If the side of a rhombus is 10 cm and one diagonal is 16 cm, the area of the rhombus is 96 cm^2

(b) In a Δ, the sides are given as 11 cm, 12 cm, 13 cm. The length of the altitude is 10.25 cm corresponding to the side having length 12 cm.

(c) If a quantity B is a part of another quantity A, then A can be written as the sum of B and some third quantity C

(d) Two distinct intersecting lines cannot be parallel to the same line.

(e) Points (1, -1) and (-1, 1) lie in the same quadrant.

(f) A point lies on y-axis at a distance of 2 units from the x-axis. Its coordinates are (2, 0).

(g) A binomial may have degree 5.

(h) A polynomial cannot have more than one zero.

(i) Number of rational numbers between 15 and 18 are finite

(j) The square of an irrational number is always rational.