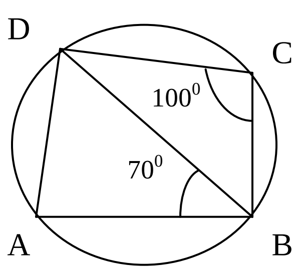
SAMPLE PAPER – 2009
CLASS – IX
SUBJECT – MATHEMATICS
(Geometry)

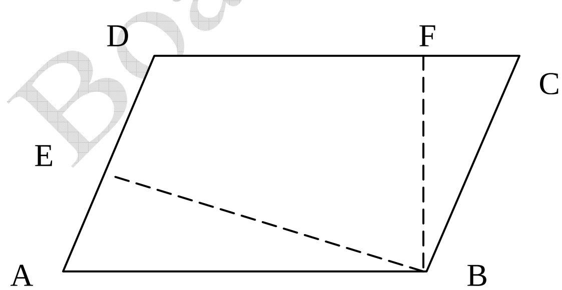
TIME – 3 Hrs M.M: 80

SECTION-A $10\times1=10$

1) Name the point in a triangle that touches all sides of given triangle. Write its symbol of representation.
2) Where is Orthocenter of a right angled triangle ($\triangle ABC$) right angled at B located?
3) In above figure ABCD is a cyclic quadrilateral. If $\angle BCD = 100^0$ and $\angle ABD = 70^0$, find $\angle ADB$.



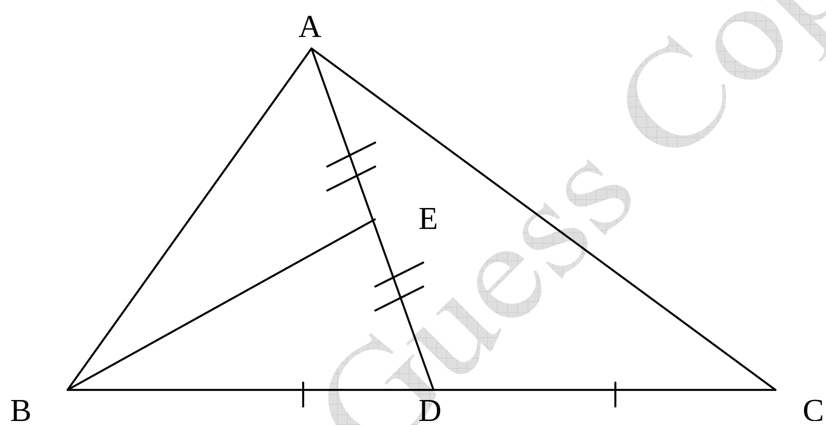
4) Prove that angle subtended by semicircle is 90^o.
5) If $\overline{BE}$ and $\overline{BF}$ are $\perp$ to AD and CD respectively. Then find AD if AB=10cm, BE is 4cm and BF is 5cm.



6) Prove that area of triangle is half area of parallelogram if between two parallel lines and having common base.
7) Find area of a triangle with sides 3cm, 4cm, 5cm using heron's formula.
8) Name the type of triangle where orthocenter, in-center, and circumcenter are collinear.
9) Prove that opposite sides of parallelogram are equal.
10) How many solutions are possible when two lines are parallel?

Section B (2 mark)

11) Derive ABC is a triangle in which D is midpoint of BC and E is the midpoint of AD. Prove that area of $\triangle BED = \frac{1}{4}$ area of $\triangle ABC$.



12) If a triangle and a parallelogram are on the same base and between the same parallels, then prove that the area of the triangle is equal to half the area of the parallelogram.

Or

Show that a median of a triangle divides it into two triangles of equal area.

13) Prove that the opposite angles of cyclic Quadrilateral are supplement of each other.
14) Diagonals AC and BD of a trapezium ABCD with AB || DC intersect each other at O. Prove that ar (AOD) = ar (BOC).

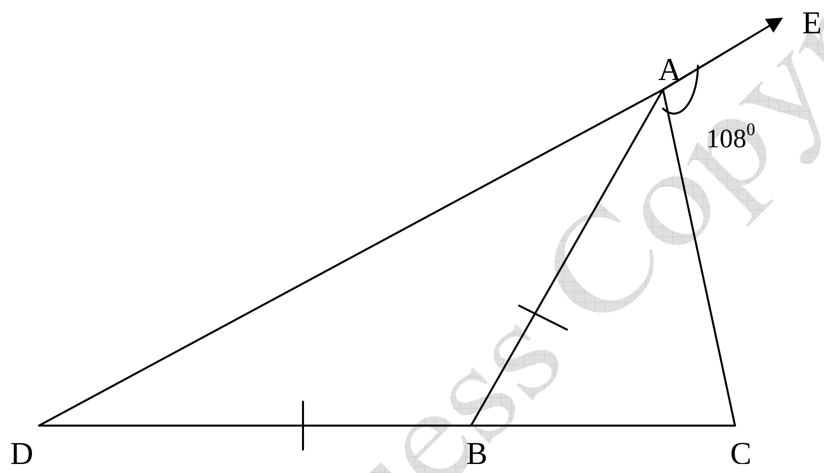
Or

D and E are points on sides AB and AC respectively of triangle ABC such that ar (DBC) = ar (EBC). Prove that DE || BC.

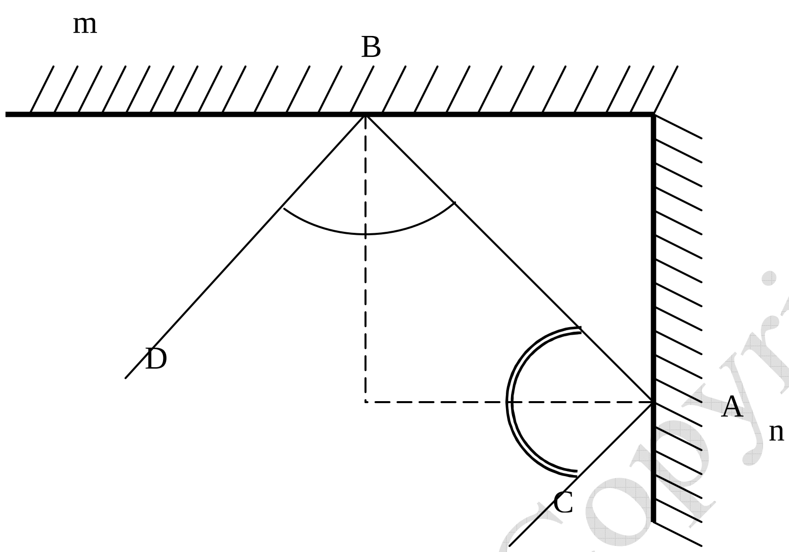
15) Parallelogram ABCD and rectangle ABEF are on the same base AB and have equal areas. Show that the perimeter of the parallelogram is greater than that of the rectangle.

Section C (3 mark)

16) In the bellow figure AB divides $\angle DAC$ in the ratio of 1:3 and AB=DB. Determine the value of x.



17) In figure bellow m and n are two plane mirrors perpendicular to each other. Show that the incident ray CA is parallel to the reflected ray BD.



18) Prove that perimeter of the triangle is greater than the sum of its three medians.

Or

19) Prove that Perimeter of the triangle is greater than the sum of the three altitudes.

20) If two circles intersect in two points, prove that the line joining the centres is the perpendicular bisector of the common chord.

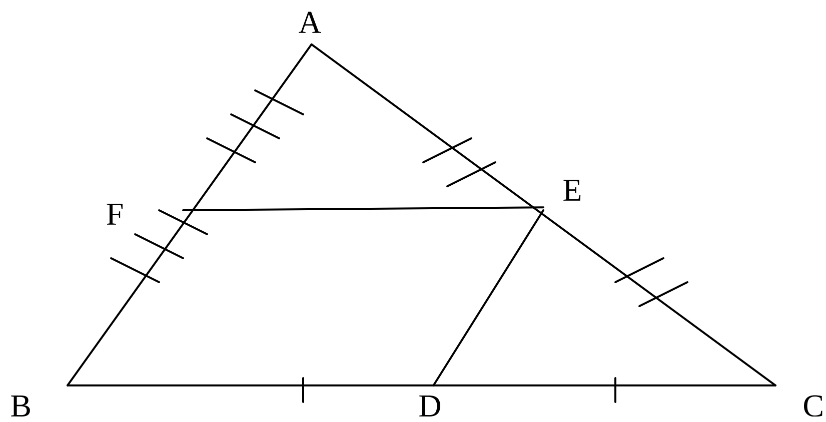
21) Of any two chords of a circle show that the one which is larger, is nearer to the centre.

Or

Of any two chords of a circle show that the one which is nearer to the centre, is larger.

22) If D, E &F are midpoints of sides BC, CA, AB respectively then prove that BDEF is a parallelogram.

23)



Or

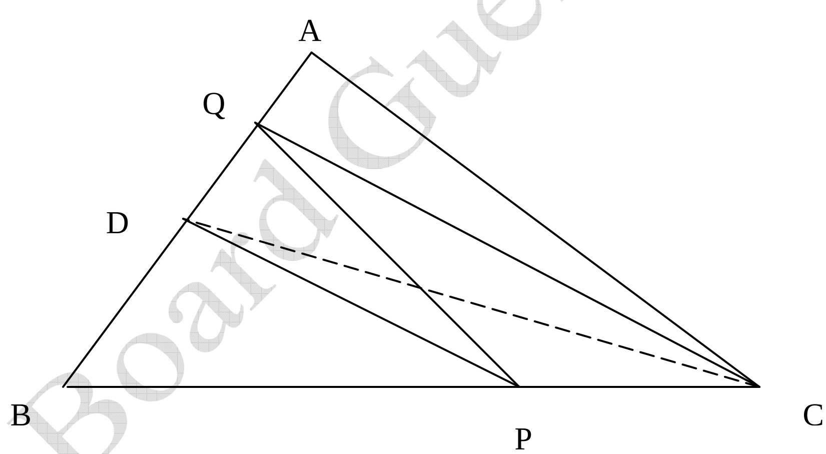
O is the centre of the circle of the circle of radius 5cm, $OP \perp CD$, AB||CD, AB=6cm, CD=8cm and chords on opposite side. Determine PQ.

24) Prove that:

a) Equal chord subtend equal angle at centre.

b) Equal chords are equidistant from centre.

25) In triangle ABC, D is the mid-point of AB.Pis any point of BC. CQ||PD meets AB in Q.Show that $\square MBC \cong \square ABD$.



Section D (6 mark)

26) If E, F, G, H are respectively, the mid-points of sides AB, BC, CD and DA of parallelogram ABCD. Show that the quadrilateral EFGH is

a) a parallelogram

b) its area is half area of ||ABCD.

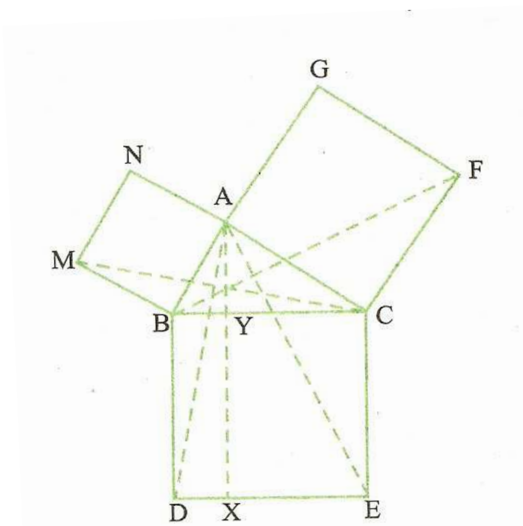
27) ABCD is a parallelogram and O is any point in its interior. Prove that:

a) $ar(\Delta AOB) + ar(\Delta COD) = ar(\Delta BOC) + ar(\Delta AOD)$
b) $ar(\Delta ADF) = ar(\Delta DCE)$

Or

In Fig. 9.34, ABC is a right triangle right angled at A. BCED, ACFG and ABMN are squares on the sides BC, CA and AB respectively. Line segment AX . DE meets BC at Y. Show that:

a) ar (CYXE) = 2 ar (FCB)
b) $\Delta MBC \cong \Delta ABD$
c) ar (BCED) = ar (ABMN) + ar (ACFG)



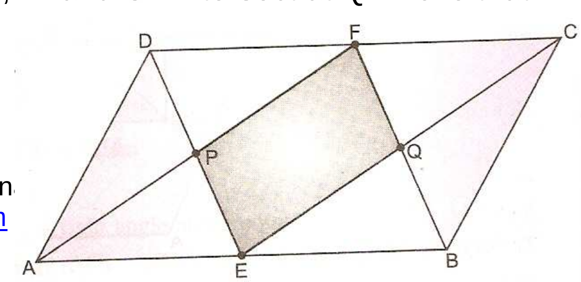
28) Bisectors of angle A, B and C of a triangle ABC intersect its circumcircle at D, E and F respectively. Prove that angles of triangle DEF are $90^0 - \frac{A}{2}, 90^0 - \frac{B}{2}$ and $90^0 - \frac{C}{2}$.

29) Prove that: (2+2+2)

a) If trapezium has two non-parallel sides equal then it is cyclic.
b) For two triangles having same base, their areas are proportional to their heights drawn from the vertex opposite to the common base.()
c) Area of equilateral triangle is $\frac{\sqrt{3}}{4}a^2$ when length of one side is 'a'.

Or (4+2)

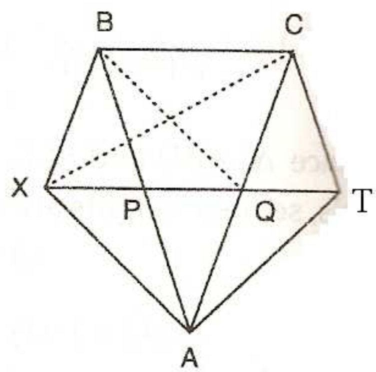
a) ABCD is a parallelogram. E and F are midpoints of sides AB and CD respectively. AF and DE intersect at P;BF and CE intersect at Q. Prove that
   i) AECF is a parallelogram.
   ii) PEQF is a parallelogram.



b) Prove parallelogram has opposite sides and angles equal.

30) (4+2)

a) In Fig bellow, BC||XY, BX||CA and AB||YC. Prove that: $ar(\triangle ABX) = ar(\triangle ACY)$.



b) In parallelogram ABCD, E and F are two points on side AB and BC respectively. Show that $ar(\triangle ADF) = ar(\triangle DCE)$.