

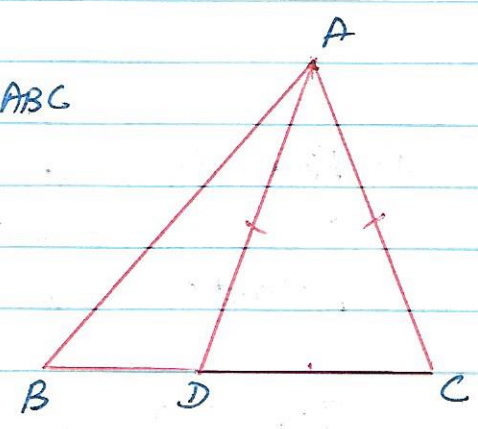
Section D

1) Evaluate  $\frac{15}{\sqrt{10} + \sqrt{20} + \sqrt{40} - \sqrt{5} - \sqrt{80}}$  where it is given that  $\sqrt{5} = 2.236$  and  $\sqrt{10} = 3.162$

2) If  $a^3 + b^3 + c^3 = 3abc$  and  $a + b + c = 0$ , prove that

$$\frac{(b+c)^2}{3bc} + \frac{(c+a)^2}{3ac} + \frac{(a+b)^2}{3ab} = -1$$

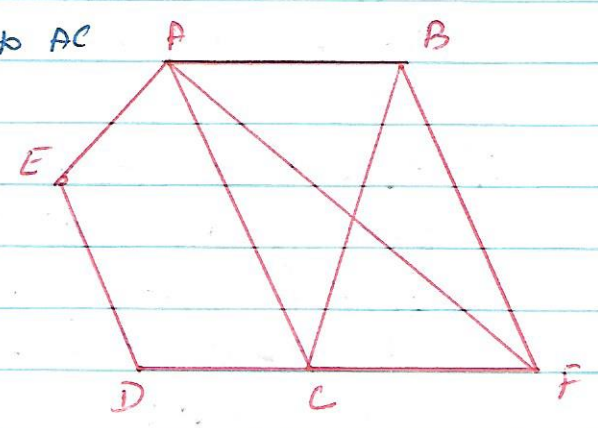
3) D is a point on side BC of  $\triangle ABC$  such that  $AD = AC$ . Show that  $AB > AD$ .



4) In fig, ABCDE is a pentagon. A line through B parallel to AC meets DC produced at F. Show that:

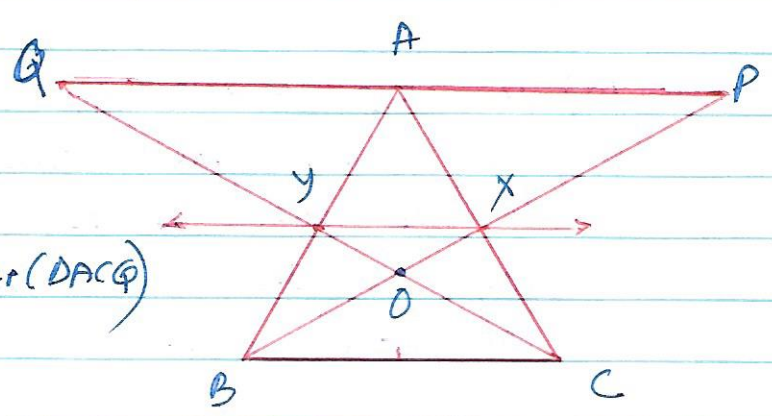
i)  $ar(ACB) = ar(ACF)$

ii)  $ar(AEDF) = ar(ABCDE)$

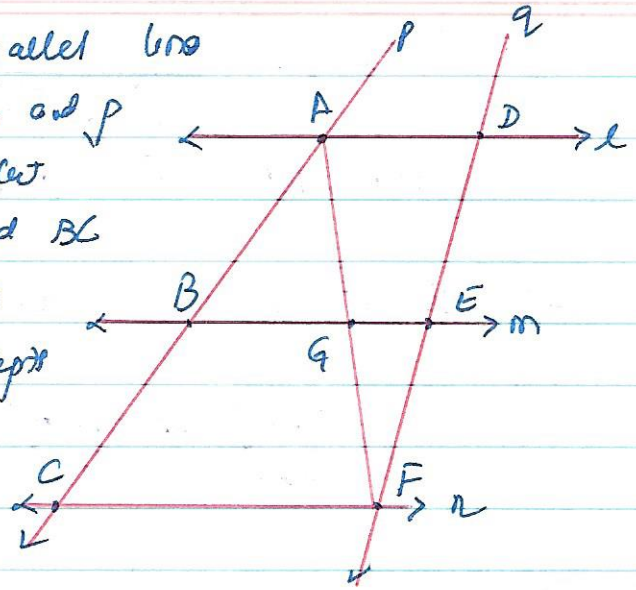


5) In fig, X and Y are the mid-points of AE and AB respectively.  $QP \parallel BC$  and  $CYQ$  and  $BXP$  are straight lines.

Prove that:  $ar(DABP) = ar(DACQ)$



- 6)  $l, m$  &  $n$  are three parallel lines intersected by transversals  $p$  and  $q$  such that  $l, m$  and  $n$  cut off equal intercepts  $AB$  and  $BC$  on  $p$ . Show that  $l, m$  and  $n$  cut off equal intercepts  $DE$  and  $EF$  on  $q$  also.



- 7) Find the area of an isosceles triangle whose one side is 10 cm greater than its each equal side and its perimeter is 100 cm. (Take  $\sqrt{5} = 2.236$ )
- 8) The ratio of total surface area to the curved surface area of a right circular cylinder is 3:2. Find the volume, if its total surface area is  $14784 \text{ cm}^2$ .
- 9) A cloth having an area of  $165 \text{ m}^2$  is shaped into the form of a conical tent of radius 5 cm.
- How many students can sit in the tent if a student on an average, occupies  $\frac{5}{7} \text{ m}^2$  on the ground?
  - Find the volume of the cone.
- 10) A class consists of 50 students out of which 30 are girls. The mean marks scored by girls in a test is 73 (out of 100) and that of boys is 71. Determine the mean score of the whole class.

11) Prepare a continuous grouped frequency distribution from the following data:

Mid-point	5	15	25	35	45
Frequency	4	8	13	12	6

Also find the size of class intervals.

12) If  $x = \frac{\sqrt{2}+1}{\sqrt{2}-1}$  and  $y = \frac{\sqrt{2}-1}{\sqrt{2}+1}$ , find the value of  $x^2 + y^2 + xy$

13) Factorise:  $27a^3 + 8b^3 - 18a^2b - 12ab^2$

14) Show that angles opposite to equal sides of an isosceles triangle are equal.

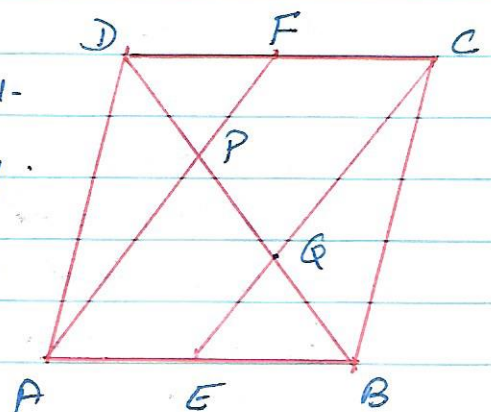
15) D, E and F are respectively the mid-points of the sides BC, CA and AB of a  $\triangle ABC$ . Show that:

(i) BDEF is a parallelogram

(ii)  $\text{ar}(\triangle DEF) = \frac{1}{4} \text{ar}(\triangle ABC)$

(iii)  $\text{ar}(BDEF) = \frac{1}{2} \text{ar}(\triangle ABC)$

16) In parallelogram ABCD, E and F are mid-points of side AB and CD, respectively. Show that the line segments AF and EC trisect the diagonal BD.



17) Show that if the diagonals of a quadrilateral are equal and bisect each other at right angle, then it is a square.

18) The sides of a triangle are in ratio 3:5:7 and its perimeter is 300 m. Find its area.

19) If each side of a triangle is doubled, then find the ratio of area of new triangle thus formed and the given triangle.

20) A cylindrical road roller made of metal is 2 m long. Its inner diameter is 28 cm and the thickness of the metallic sheet rolled into the road roller is 4 cm. Find:

a) outer curved surface area.

b) the weight of the roller, if  $1 \text{ cm}^3$  of metal weighs 15 g. (Use  $\pi = 3.14$ )

21) Thirty children were asked about the number of hours they watched TV programmes in the previous week. The results were found as follows:

1	6	2	3	5	12	5	8	4	8
10	3	4	12	2	8	15	1	17	6
3	2	8	5	9	6	8	7	14	12

(i) Make a grouped frequency distribution table for this data, taking class width 5 and one of the class intervals a 5-10.

(ii) How many children watched television for 15 or more hours a week?

Section-D

22) The marks obtained (out of 100) by a class of 80 students are given below:

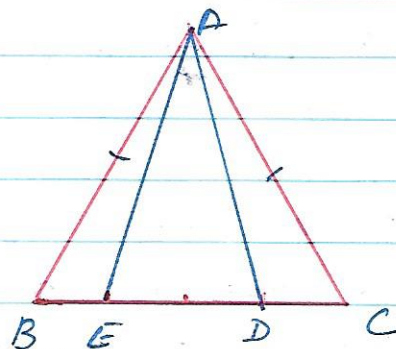
Marks	10-20	20-30	30-50	50-70	70-100
No. of Students	52	60	65	75	80

Construct a histogram to represent the data above.

23) Evaluate  $\frac{25}{\sqrt{40}-\sqrt{80}}$ . Given  $\sqrt{5} = 2.236$  and  $\sqrt{10} = 3.162$ .

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

25. In an isosceles triangle ABC with  $AB = AC$ , D and E are points on BC such that  $BE = CD$ . Show that  $AD = AE$



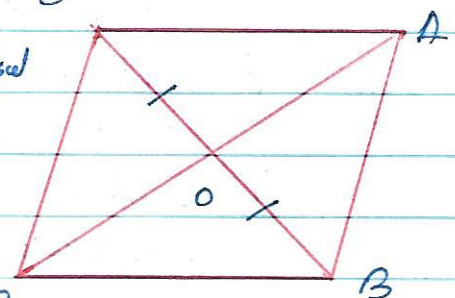
26.  $\triangle ABC$  is a right triangle such that  $AB = AC$  and bisector of angle C intersects the side AB at D. Prove that  $AC + AD = BC$

27. In fig, diagonals AC and BD of quadrilateral ABCD intersect at O such that  $OB = OD$ .

If  $AB = CD$ , then show that:

(i)  $\angle DOC = \angle BOA$  (ii)  $\angle DCB = \angle CAB$

(iii)  $DA \parallel CB$  or ABCD is a parallelogram.



28) ABCD is a rhombus P, Q, R and S are mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rectangle.

29. Prove that the bisectors of the angles of a parallelogram enclose a rectangle.

30. Suman had a triangular field of sides 220 m, 180 m and 300 m. She purchased adjacent triangular field with sides 300 m, 350 m and 400 m. Find the total area of the two fields.

31.) A cylindrical milk steel storage tank has 4.2 m as diameter and is 4.5 m high.

a) Find quantity of milk it can contain

b) How much steel sheet was actually used to make this closed tank, if  $\frac{1}{4}$  of steel sheet was wasted in making the tank?

32) A solid cylinder has total surface area of  $462 \text{ cm}^2$ . Its curved surface area is one third of its total surface area. Find the volume of the cylinder.

33) The length of 40 leaves of a plant are measured correct to one millimeter, and the data obtained is represented in following table:

Length (mm)	No. of leaves
118-126	3
127-135	5
136-144	9
145-153	12
154-162	5
163-171	4
172-180	2

(i) Draw a histogram to represent the given data.

(ii) Is there any other suitable graphical representation for same data?

(iii) Is it correct to conclude that the maximum number of leaves are 153 mm long? -6-

34) Evaluate any suitable identities: (a)  $(102)^3$  (b)  $104 \times 96$

35) Prove that "The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining circle".

36) If the non parallel sides of a trapezium are equal, prove that it is a cyclic.

37)  $\triangle ABC$  is an isosceles triangle in which  $AB = AC$ . Side  $BA$  is produced to  $D$  such that  $AD = AB$ . Show that  $\angle BCD$  is a right angle.

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

- $D$  is the midpoint of  $AC$
- $MD \perp AC$
- $CM = MA = \frac{1}{2} AB$

39) Prove that the line segment joining the mid-points of two sides of a triangle is parallel to the third side and is half of it.

40) Curved surface area of right circular cylinder is  $4.4 \text{ sq. m}$ . If the radius of the base of the cylinder is  $0.7 \text{ m}$ . Find the height. Also find its volume.

41). The points scored by a basketball team in a series of 16 matches are as follows: 17, 2, 7, 27, 25, 5, 14, 18, 10, 24, 48, 10, 8, 7, 10, 28.  
Find the median and mode for the data.

42)

Find the mean salary of 60 workers of a factory from the following table.

Salary (₹)	No of workers
3000	16
4000	12
5000	10
6000	8
7000	6
8000	4
9000	3
10000	1
Total	60

43) The table given below shows the age of 80 teachers in a school :

Age (years)	18-29	30-39	40-49	50-59
No. of teachers	11	32	30	7

The teacher from this school is chosen at random.

What is the probability that the age of the selected teacher is:

- (a) 18 years or more (b) Between 30-39 years (including both)  
 (c) Above 60 years (d) 40 or more than 40 years.

44) Factorise :  $6a^2 - 5a^2 - 13a + 12$

45) If each diagonal of a quadrilateral divides it into two triangles of equal area, then prove the quadrilateral is a parallelogram.