



# MATHS

## BOOKS - V PUBLICATION

### AREA

#### Question Bank

1. Draw a circle and a triangle with one vertex at the center of the circle and the other two

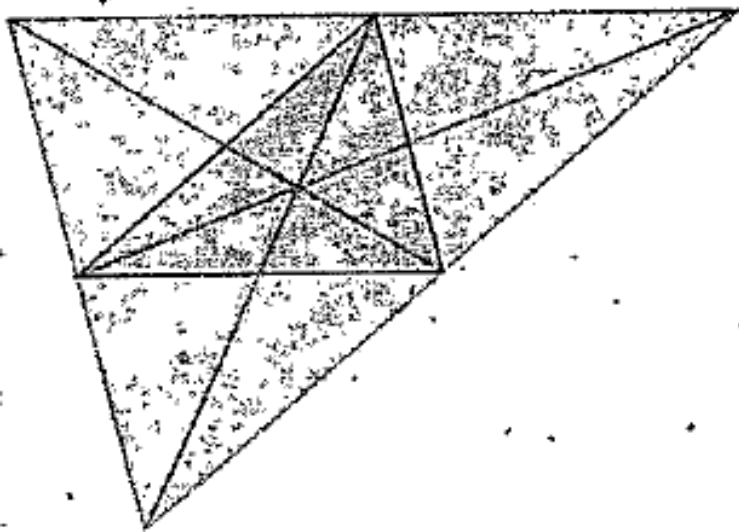
on the circle. Draw another triangle of the same area with all three vertices on the circle.



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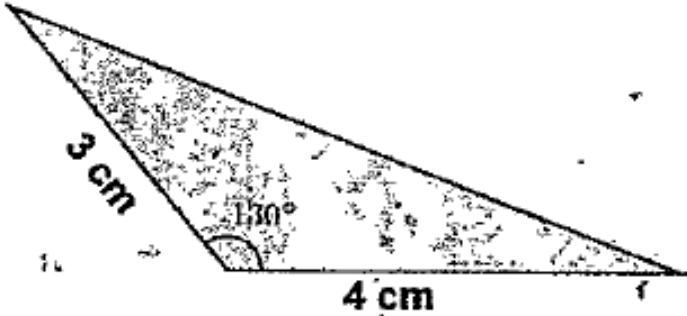
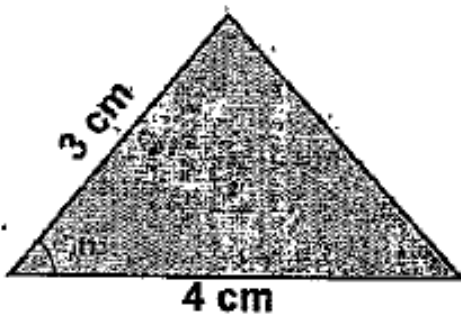
2. In the picture below, the lines parallel to each side of the blue triangle through the opposite vertex are drawn to make the big triangle. How many triangles in the picture have the same area as that of the blue triangle? How many of them have the same

measures of the blue triangle?



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3. Prove that the two triangles shown below have the same area:



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4. How many different triangles of the same area can be drawn without changing the lengths of two sides?





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5. Draw triangle having sides 6cm, 7cm and 8 cm. Draw an isosceles triangle of the same area with one side 8cm.



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6. Draw triangle having sides 4,5,7 centimetres. Draw three different triangles of the same area.



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7. Draw  $\Delta ABC$  having two sides 5cm and 6 cm and angle between these two sides  $60^\circ$ . Draw three triangles of the same area with measurements  $\angle ACR = 30^\circ$ ,  $\angle BCQ = 60^\circ$  and  $\angle BAP = 90^\circ$ .



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8. Draw triangle having one side 7 cm and angle at its ends are  $30^\circ$  and  $40^\circ$ . Draw three

isosceles triangles of the same area.



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9. Draw triangle having two sides 6 centimetres and 5 centimetres and angle between these two sides  $60^{\circ}$ . Draw a triangle of the same area with sides 6 cm and 5 cm but not equal to the first triangle.



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**10.** Draw a circle and a triangle with one vertex at the center of the circle and the other two on the circle. Draw another triangle of the same area with all three vertices on the circle.



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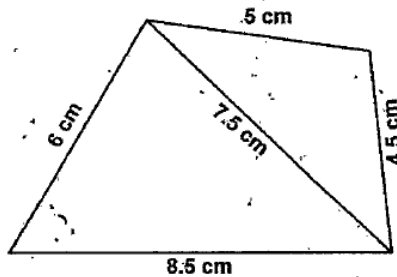
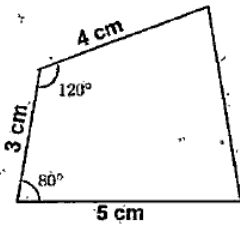
**11.** Draw a quadrilateral, a pentagon and a hexagon In GeoGebra and draw triangles of the same areas.



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12. Draw the two rilaterals shown below, in your note book. Draw triangles of the same area and calculate the areas (The lengths needed may be measured).



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**13.** Draw a rhombus of sides 6 centimetres and one  $\angle 60^\circ$ , then draw a triangle of the same area.



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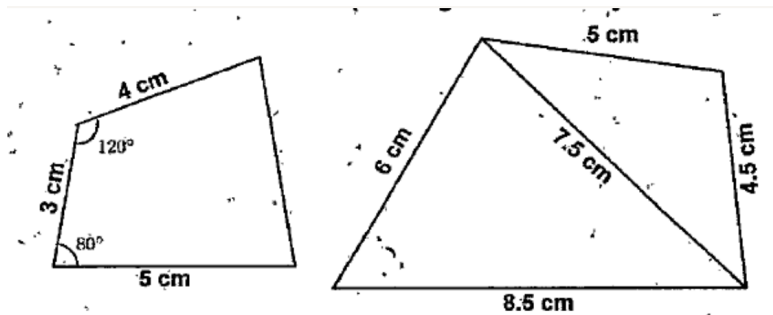
**14.** Draw a regular pentagon and then a triangle of the same area. Calculate the area



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15. The picture shows a rectangle divided into two parts.

Instead of the broken line separating these parts, draw a straight line to divide the rectangle into two other parts of the same area. Calculate the areas of these parts.



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**16.** In the figure ABCD is a trapezium. Diagonal AC and BD intersect at O. Area of triangle ABC is  $24 \text{ cm}^2$  and area of triangle AOB is  $10 \text{ sq.cm}$ .

a) Find the area of triangle BOC.

b) How much is the area of triangle AOD?

Write reason.



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**17.** Draw the trilateral with given measures.

Draw a triangle of the same area as that of the

ilateral.



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**18.** In the picture below, the lines, parallel to side of triangle  $A B C$  through the opposite vertex are drawn to make the triangle  $PQR$ .

a) Draw this picture, Draw the lines  $BQ$ ,  $CP$  and  $AR$ .

b) The triangles.  $ABP$ ,  $AQC$  and  $BRC$  have the same area as that of triangle  $A B C$ . Why?

c) Find another 4 triangles of same area as

that of triangle A B C from the picture which you have drawn and write their names.



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**19.** Draw a regular pentagon having side 4 centimetre and draw a triangle of same area. Find the area of the triangle.



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**20.** In the picture below, two lines are drawn from the top vertex of a triangle to the bottom side:

Prove that the ratio in which these lines divide the length of the bottom side is equal to the ratio of the area of the three smaller triangles in the picture.



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21. In the picture below, the top vertex of a triangle is joined to the midpoint of the bottom side of the triangle and then the midpoint of this line is joined to the other two vertices.

Prove that the areas of all four triangles obtained thus are equal to a fourth of the area of the whole triangle.



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**22.** In the picture below, the top vertex of a triangle is joined to the midpoint of the opposite side and then the point dividing this line in the ratio 2:1 is joined to the other two vertices:

Prove that the areas of all three triangles in the picture are equal to a third of the area of the whole triangle.



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**23.** Prove that the lengths of the perpendiculars from any point on the bisector of an angle to the sides are equal.

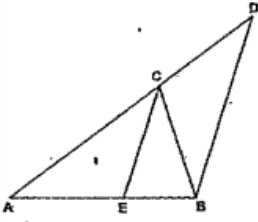
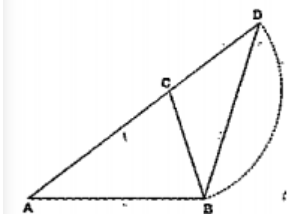


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**24.** In the picture below, the side AC of the triangle ABC is extended by D, by adding the length of the side CB. Then the line through C parallel to DB is drawn to meet AB at E.

Prove that CE bisects

$\angle C$



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25. In the figure, the diagonals of a quadrilateral split it into four triangles. The areas of three of them are shown in the

picture:

Calculate the area of the whole quadrilateral.



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**26.** In this picture the horizontal lines at the top and bottom are parallel. Prove that the yellow and red triangles are of the same area.



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**27.** In the figure, the diagonals of a trapezium split into four triangles.

The area of the yellow triangle is 10 square centimetres and the area of the green triangle is 20 square centimetres. What is the area of the whole trapezium?



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**28.** The picture below shows a trapezium divided into four parts by the diagonals.

The area of the blue triangle is 4 square centimetres and the area of the green triangle is 9 square centimetres. What is the total area of the trapezium?



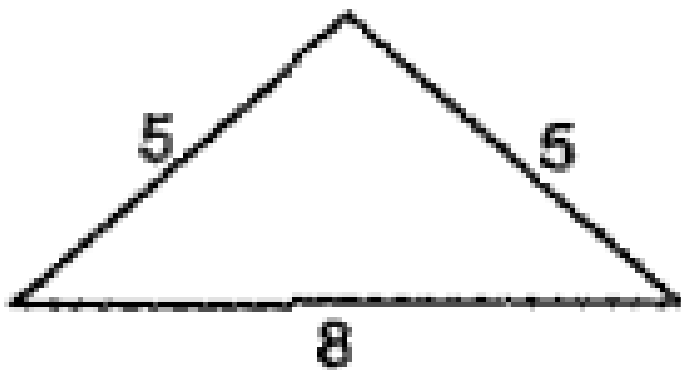
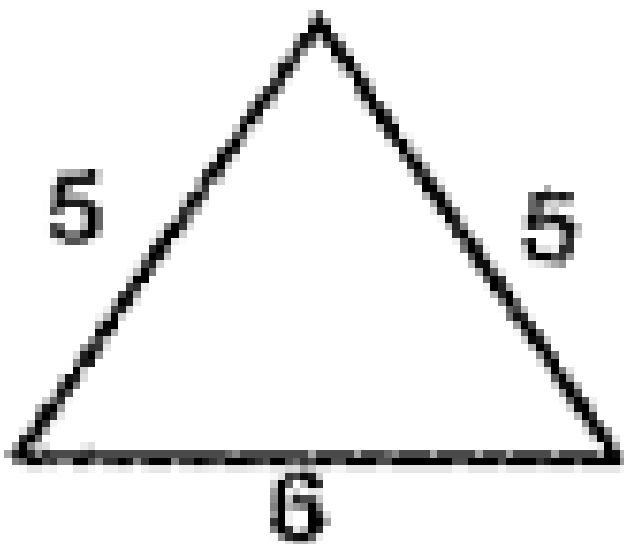
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**29.** Draw a square of sides 5 centimetres. Draw an isosceles triangle of the same area.



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30. Prove that the two triangles shown below have the same area





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**31.** In triangle ABC, D is the midpoint of BC and E is the midpoint of BD. Also O is the midpoint of AE. Prove that area of triangle ABC is 8 X the area of triangle BOE.



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**32.** In the figure ABCD is a rectangle and P is a point on the side CD. Prove that the area of



triangle  $AQB$  is equal to the sum of the areas of triangle  $PQD$  and  $\Delta PCB$ .



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**33.** A rectangular field is divided into 8 plots by drawing two triangles, In eight plots four varieties (ginger, beans, paddy, gingelly) are cultivated. Each is indicated in the following shades.

Prove that the area of ginger is equal to the

area of beans, and also prove that area of the paddy is equal to the area. of gingelly.



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**34.** In parallelogram ABCD, P and Q are the points on the sides AB and CD. Lines AQ and PD intersect in K and if PC and BQ intersect in L. Prove that the area of the quadrilateral PKQL is equal to the sum of the areas of the triangles AKD,  $\Delta$  BLC



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**35.** Construct a right-angled triangle such that its hypotenuse being 12 centimetres and area being 24 square centimetres.



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**36.** Look at these pictures:

The rectangle ABCD is transformed to the triangle ADE of equal area. The side AD of the rectangle is also a side of the triangle. Can you

similarly draw triangles of equal area, sharing the other sides of the rilateral?



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**37.** In the figure ABCD is a rectangle.  $AB = 6$  cm,  $BC = 4$  cm. P is the midpoint of CD.

a) What is the area of triangle APB?

b) What is the area of triangle PAD?

c) If  $AQ : QB = 1 : 2$ , then what is the area of the quadrilateral AQPD?



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**38.** In the figure,  $B P: P Q: Q C=1: 2: 1$ . Area of triangle APQ is 8 sq.cm.

(a) Find the area of triangle A B P.

b) Find the area of triangle ABC.



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**39.** In the figure,  $BC=12$  cm,  $BD=3$  cm. Area of triangle ABC is 80 sq.cm.

a) What is  $BD : DC$ ?

b) Find the area of triangle ADC.



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**40.** In the figure, the line CE is parallel to BD. Area of triangle ABD is 30 sq.cm. and that of triangle BDC is 29 sq . cm.

- a) What is the area of quadrilateral ABCD?
- b) What is the area of triangle BED?
- c) What is the area of quadrilateral ABED?



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**41.** In the figure,  $BD = DC$ ,  $\angle B = \angle C$ . Area of triangle  $ABC$  is  $100 \text{ sq.cm}$ .

What is the area of triangle  $PAB$ ?



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**42.** If  $AB=8 \text{ cm}$ ,  $AC=6 \text{ cm}$   $BC=9 \text{ cm}$ .  $AD$  is the bisector of angle  $A$ .

a)  $BD : DC =$

b) What is the ratio of areas of triangle  $ABD$  and triangle  $ACD$ ?





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**43.** In the figure, Area of rectangle ABGD is 36 sq.cm. What is the area of triangle ABP?



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**44.** In the figure,  $AB=12$  cm  $AD=4$  cm. Then

a)  $BD=$ ---- cm.

b) The ratio of the areas of triangle ADC and triangle BDC is =.....



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**45.** Area of triangle BPC is 10 sq.cm.

a) Find the area of triangle A B C.

b) Find the area of rectangle ABCD.



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**46.** Draw triangle having sides 5 ~cm, 6 ~cm and 7 ~cm. Draw an isosceles triangle of the same area and having one side beginarraylll 7 cm.



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47. In the figure, A B C D is a trapezium. Diagonal A C and B D intersect at M. Area of triangle ABC is  $24 \text{ cm}^2$  and area of triangle AMB is  $10 \text{ cm}^2$ .

a) Find the area of triangle BMC.

b) How much is the area of triangle AMD?

Write reason.



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**48.** Draw a rilateral with given measures. Draw a triangle of the same area as that of the rilateral.



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**49.** Draw a rergular pentagon having side 4 ~cm and draw a triangle of the same area.



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**50.** In triangle  $ABC$ ,  $AM$  is the bisector of angle  $BAC$ .  $MP$  is drawn perpendicular to  $AB$  and  $MQ$  is perpendicular to  $AC$ .

a) Prove that  $MP$ , and  $MQ$  are of the same length.

b) Prove that, in any triangle, the bisector of an angle divides the opposite side in the ratio of the sides of the angle.



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**51.** In the figure, line AB is parallel to CD.  $AB=5$  cm ,  $AC=4$  cm, angle  $CAB=90^\circ$  .

a) Calculate the area of triangle ABC.

b) How much is the area of triangle ABD?

Write reason.



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**52.** In the picture below, the lines, parallel to side of triangle A B C through the opposite vertex are drawn to make the triangle PQR.

a) Draw this picture, Draw the lines BQ, CP and AR.

b) The triangles. ABP, AQC and BRC have the same area as that of triangle ABC. Why?

c) Find another 4 triangles of same area as that of triangle ABC from the picture which you have drawn and write their names.



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**53.** Draw triangle ABC with  $AB=8$  cm,  $BC=6$  cm, and angle  $B=30^\circ$ . Draw a angled

triangle of the same area. Measure its perpendicular sides. Calculate the area of the triangle.



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**54.** In the figure, Area of rectangle ABGD is 36 sq.cm. What is the area of triangle ABP?



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**55.** In the figure,  $AB=12$  cm  $AD=4$  cm. Then

a)  $BD=$ ---- cm.

b) The ratio of the areas of triangle ADC and triangle BDC is =.....



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**56.** In the figure, line AB is parallel to CD.  $AB=5$  cm ,  $AC=4$  cm, angle  $CAB=90^\circ$  .

a) Calculate the area of triangle ABC.



b) How much is the area of triangle ABD?

Write reason.



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57. In the figure A B is parallel to CD. Write the pairs of triangles having the same area.



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58. In the triangle ABC, AB=9 centimetres, B C=12 centimetres. The line B D is the bisector

of angle B. What is the ratio of the areas of triangle A B D and triangle B C D ?



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**59.** AB is the diameter of the circle and C is a point on the circle.

i) Draw a rough figure like this and draw another triangle with all vertices lying on the circle and area equal to the area of triangle, ABC.

ii) Draw an isosceles triangle of same area.



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**60.** In the figure the area of triangle APB is 25 square centimetres. What is the area of triangle ABC ? What is the area of rectangle ABCD?



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**61.** In rectangle PQRS, O is the midpoint of QR. Area of POQ is 16 sq. cm.

a) What is the area of POS?

b) What is the area of OSR?

c) Find the area of the rectangle PQRS?



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