CBSE TEST PAPER-01

CLASS -I X Mathematics (Heron's formula)

General Instruction: All questions are compulsory. Question No. 1 to 4 carry one mark each. No. 5 to 8 carry two marks each. Question No. 9 to 12 carry 3 marks each. Question number 13 carry 5 marks.

1.The measure of each side of an equilateral triangle whose area is $\sqrt{3}$ cm^2 is

(A) 8 cm (B) 2 cm (C) 4 cm (D) 16 cm

2. Measure of each side of an equilateral triangle is 12cm. Its area is given by

(A) $9\sqrt{3}$ sq cm (B) $18\sqrt{3}$ sq cm (C) $27\sqrt{3}$ sq cm (D) $36\sqrt{3}$ sq cm

3.Two adjacent side of a parallelogram are 74cm and 40cm one of Its diagonals is 102cm. area of the ||gram is

(A) 612 sq m (B) 1224 sq m (C) 2448 sq cm (D) 4896 sq m

4. The area of rhombus is 96 sq cm. If one of its diagonals is 16cm, then length of Its side is

(A) 10 cm (B) 8 cm (C) 6 cm (D) 5 cm

5.An umbrella is made by stitching 10 triangles pieces of cloth of two different colour, each piece measuring 20 cm 50 cm and 50 cm. How much cloth of each colour is required for the umbrella?

6.The perimeter of a rhombus ABCD is 40cm. find the area of rhombus of Its diagonals BD measures 12cm

7.Find area of triangle with two sides as 18cm & 10cm and the perimeter is 42cm.

8.Find the area of in isosceles triangle, the measure of one of Its equals side being 'b' and the third side 'a'.

9.From a point in the interior of an equilateral triangle perpendiculars drawn to the three sides are 8 cm, 10 cm and 11 cm respectively. Find the area of the triangle to the nearest cm. (use $\sqrt{3} = 1.73$)

10.A parallelogram, the length of whose side is 60 m and 25 m has one diagonal 65 m long. Find the area of the parallelogram.

11.A parallelogram, the measures of whose adjacent sides are 28 cm and 42 cm, has one diagonals 38cm. Find Its altitude on the side 42cm.

12.Find the area of a quadrilateral ABCD in which AB=3 cm, BC=4 cm, CD= 4 cm, DA=5 cm and AC= 5 cm.

13.A field in the shape of a trapezium whose parallel side are 25m and 10m. The non-parallel side are 14 m and 13 m. Find the area of the field.

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CLASS - IX Mathematics (Heron's formula)

[ANSWERS]

1. (B)

2. (D)

3. (D)

4. (A)

5. a=20cm, b=50cm

$\therefore$ cloth required for each colour

$= 5 \times Area$ of one triangle piece

$= 5 \times \frac{a}{4}\sqrt{4b^2 - a^2}$

$= 5 \times \frac{20}{4}\sqrt{4(50)^2 - (20)^2}\ sq\ cm$

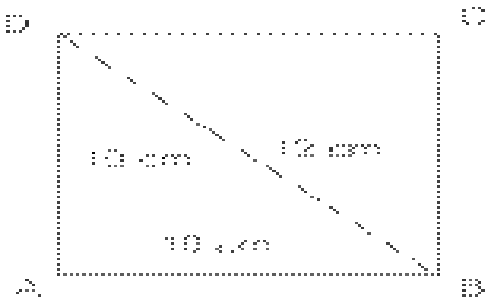
$= 25 \times 40\sqrt{6}$ sq cm

$= 1000 \times \sqrt{6}$ sq cm

thus, $(1000\sqrt{6})$ sq cm cloth of each colour is required

6. $\therefore AB = BC = CD = DA = \frac{40}{4} cm$ 10cm

now in $\triangle ABD$,



AB=10cm, BD=12cm and DA=10cm

$\therefore$ S$=\frac{10+12+10}{2}cm=16$cm

By Heron's Formula,

area of $\triangle$ABD $=\sqrt{16(16-10)\,(16-12)\,(16-10)}$

$=\sqrt{16\times6\times4\times6}=48$sq cm

$\therefore$ area of rhombus ABCD $=2\times$ area of $\triangle$ABD

$=2\times48$sq cm

$=96$sq cm

7. Let a=18cm, b=10cm

Perimeter =42cm

$\therefore a+b+c=42cm$

so, C=14cm

$\therefore$ S$=\frac{a+b+c}{2}=\frac{18+10+14}{2}=21cm$

new area of triangles

$=\sqrt{21(21-18)\,(21-10)\,(21-14)}$

$=\sqrt{21\times3\times11\times7}=21\sqrt{11}\ sq$ cm

Hence required area is $21\sqrt{11}\,sq.cm$

8. Here

$S=\frac{a+b+b}{2}units$

$=\frac{a+2b}{2}units$

$\therefore\ area\ of\triangle$

$=\sqrt{(\frac{a+2b}{2})\times(\frac{a+2b}{2}-a)\times(\frac{a+2b}{2}-b)\times(\frac{a+2b}{2}-b)}$

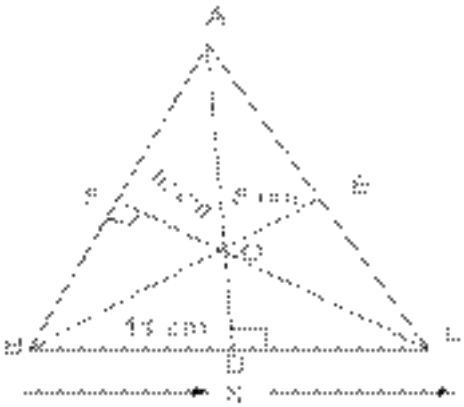
$$=\sqrt{\left(\frac{a+2b}{2}\right)\left(\frac{2b-a}{2}\right)\frac{a}{2}\times\frac{a}{2}}\ sq\ units$$

$$=\frac{a}{4}\sqrt{4b^2-a^2}\ sq\ \text{units}$$

9. Let each side of the equilateral Δ ABC measure be x cm.

Let OD= 11cm, OE =8cm and OF=10cm

Join OA, OB and OC



$$Now\ ar(\triangle ABC)=ar(\triangle OBC)+ar(\triangle OCA)+ar(\triangle OAB)$$

$$=\left(\frac{1}{2}x\times 11+\frac{1}{2}x\times 8+\frac{1}{2}x\times 10\right)sq\ \text{cm}$$

$$=\frac{29}{2}x\ \text{sq cm}\rightarrow(1)$$

But area of equilateral Δ, the measure of whose each side of x

$$=\frac{\sqrt{3}}{4}\ x^2\ \text{sq cm}\ \rightarrow\ (ii)$$

from (i) and (ii)

$$\frac{\sqrt{3}}{4}x^2=\frac{29}{2}x$$

$$\therefore x=\frac{4\times 29}{\sqrt{3}\times 2}=\frac{58}{\sqrt{3}}$$

$$\therefore\ \text{area of}\ \Delta ABC=\frac{29}{2}\times\frac{58}{\sqrt{3}}$$

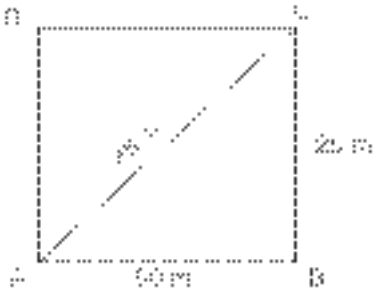
$$= \frac{841\sqrt{3}}{3} \text{ sq cm}$$

$$= \frac{841 \times 1.73}{3} = 485 \text{ sq cm}.$$

Ans10. AB=DC=60cm, BC=AD= 25m and AC=65m

Area of parallelogram ABCD= Area of Δ ABC + area of Δ ACD

= 2 Area of Δ ABC [$\because$ ar Δ ABC =ar Δ ADC]



now

$$S = \frac{60 + 65 + 25}{2} m = 75m$$

$$\therefore \text{ area of } \Delta ABC = \sqrt{S(s-a)(s-b)(s-c)}$$

$$= \sqrt{75(75-60)(75-65)(75-25)} \text{ sq m}$$

$$= (5 \times 3 \times 5 \times 2 \times 5) \text{ sq m}$$

$$= 750 \text{ sqm} \rightarrow (II)$$

from (i) and (ii), we get

area of 11^{gm} ABCD

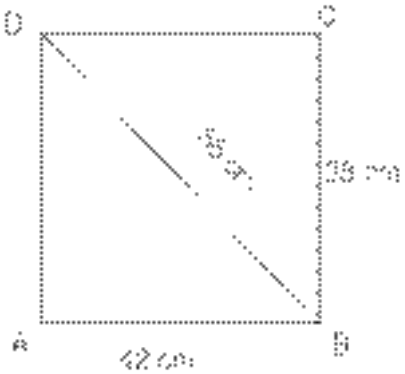
$$= 2 \times 750 = 1500 \text{sq m}.$$

Ans11. AB=DC=42cm=C

BC=AD= 28cm =b

And BD=38cm=a

Let A be the area of Δ ABD



$now,\ S=\frac{38+28+42}{2}=54cm$

$A=\sqrt{54(54-38)(58-28)(54-42)}$

$=\sqrt{54\times16\times26\times12}$ sq cm.

$=144\sqrt{13}$ sq cm

$\therefore$ area of $\Delta ABD=144\sqrt{13}$ sq cm

again area of $\Delta ABD=\frac{1}{2}base\times altitude$

$=\frac{1}{2}\times42\times h\ sq\ cm,$ where h cm is altitude

$=21h$ sq cm

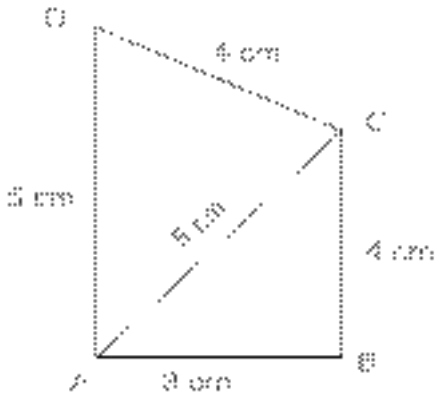
$\therefore$ from (i) and (ii),we get

$21h=144\sqrt{13}$

$h=\frac{144\sqrt{13}}{21}=\frac{48\sqrt{13}}{7}cm$

thus, required altitude $=\frac{48\sqrt{13}}{7}cm$

Ans12. $\because$ Area of quadrilateral ABC=area of Δ ABC + area of Δ ACD (i)



For ΔABC, $S = \frac{3+4+5}{2} = 6cm$

$\therefore$ Area of $\Delta ABC = \sqrt{6(6-3)(6-4)(6-5)}$

$= \sqrt{6 \times 3 \times 2 \times 1}$ sq cm $= 6$sq cm $\rightarrow$ (ii)

For ΔACD, S= $\frac{5+4+5}{2} = 7$cm

$\therefore$ area of $\Delta ACD = \sqrt{7(7-5)(7-4)(7-5)}$

$= \sqrt{7 \times 2 \times 3 \times 2} = 9.2$ sq cm $\rightarrow$ (iii)

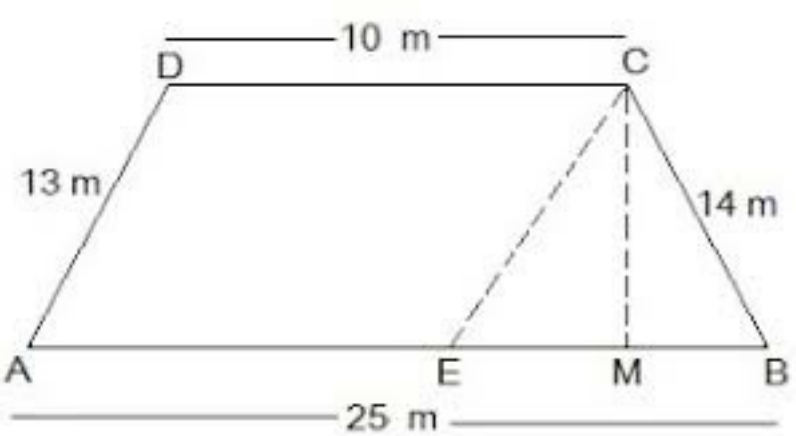
$\therefore$ from (i), (ii) and (iii), we get

area of quadrilateral ABCD $= (6+9.2) = 15.2$ sq cm

Ans13. AB=25m, CD =10m

AD=13m and BC=14

Draw EC $\parallel$ AD and CM $\perp$ EB



Now CE =AD=13m and

EB=AB-AE= (25-10) m= 15m

In Δ BCE, a=15m, b=14m and C=13 m

$$\therefore S = \frac{a+b+c}{2} = \frac{15+14+13}{2}$$

$=21\text{m}$

$\therefore$ area of $\Delta BCE =$

$\sqrt{21(21-15)(21-14)(21-13)}$

$=\sqrt{21\times 6\times 7\times 8}$ sq m

$=84$ sq m $\rightarrow$ (i)

$Also, area\ of\ \triangle BCE = \frac{1}{2} \times BE \times CM$

$\Longrightarrow CM = \frac{2\times Area\ of\ \triangle BCE}{BE}$

$\Longrightarrow \frac{2\times 84}{15}$

$\Longrightarrow \frac{56}{5}m$

Now, area of *parallelogram* AECD =Base $\times$ height

$=10\times\frac{56}{5}$ m=112 sq m $\rightarrow$ (ii)

thus area of trapezium ABCD =area of *parallelogram* + *area* ofΔ BCE

=112 sq m+84 sq m [using(i) and (ii)]

=196 sq m