8th Area of trapezium Test paper Solved
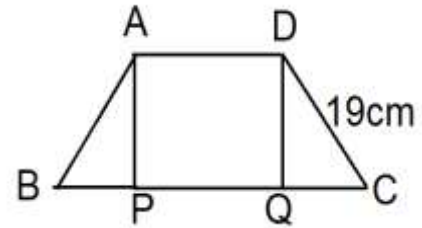
1. Prove that area of trapezium is 1/2(sum of parallel sides) x height

Let ABCD is a trapezium in which AD II BC and

Draw AP$\perp$BC and DQ $\perp$ BC Let, Height(h) = AP = DQ

Area of trapezium ABCD = $\frac{1}{2}(area\ of\ \Delta BAP) +$

$are\ (Rectangle\ APQD) + area(rectangle\ DQC)$

= $\frac{1}{2} BP \times AP + PQ \times h + \frac{1}{2} QC \times h = \frac{1}{2} h\ (BP + 2PQ + QC)$

= $\frac{1}{2} h\ \{(BP + PQ + QC) + AD\}$ [using AD = PQ] = $\frac{1}{2} h\ \{(BC + AD\}$

2. In a trapezium one of the parallel side is 6 cm longer than the others. If its area please 168 cm square. If distance b/w two parallel side is 8cm find the length of parallel sides

Sol: Let one of the parallel side = x , Then other parallel side is = x + 6 , h = 8cm , Area = 168 cm^2

Now, Area of trapezium = 168

$\Rightarrow$ ½ $(x + x + 6) \times 8 = 168$

$\Rightarrow 2x + 6 = \frac{168}{4}$

$\Rightarrow 2x = 42 - 6$

$\Rightarrow x = \frac{36}{2} = 18cm$

One of the parallel side = x = 18 cm , Then other parallel side = x + 6 = 18 + 6 = 24cm

3. In a trapezium one of the parallel side is double the other. If area is 9450 m^2 and height is 84m. Find the length of parallel sides.

Solution: Let one of the parallel side = x , Then other parallel side is = 2x , h = 84 m , Area = 9450m^2

Now, Area of trapezium = 9450

$\Rightarrow$ ½ $(x + 2\ x) \times 84 = 9450$

$\Rightarrow 3x = \frac{9450}{42} = 225$

$\Rightarrow x = \frac{225}{3} = 75\ m \qquad \Rightarrow x = \frac{36}{2} = 18cm$

Hence, one of the parallel side = x = 75m , Then other parallel side = 2x = 2 x 75 = 150cm

4. In a trapezium parallel sides are 20 cm and 10 cm. If non parallel equal sides are each 13 cm. Find its area

Let In trapezium ABCD, AB=20 cm ,CD = 10 cm

We have to find hight h= CP(fig)

Draw CE∥AD and CP⊥AB

So In quadrilateral AECD -> AD∥CE and AE ∥CD

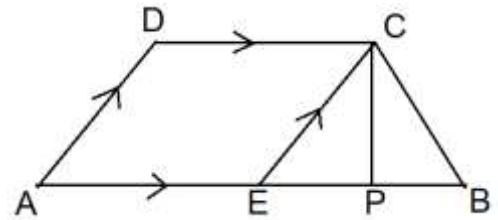So, AECD will be ∥gm. Thus, AE =CD = 10cm and CE =AD =BC = 13cm

⇨ BE = AB - AE = 20-10 = 10 cm

Now, $\triangle$BEC, $s = \frac{a+b+c}{2} = \frac{13+13+10}{2} = 18$
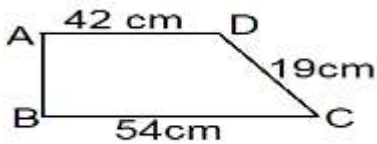
Area of $\triangle$BEC $\sqrt{s(s-a)(s-b)(s-c)} = \sqrt{18(18-13)(18-13)(18-10)} = \sqrt{18 \times 5 \times 5 \times 8} = 60$ cm2

$But\ area\ of\ \triangle\text{BEC} = \frac{1}{2}\ BE \times DP => 60 = \frac{1}{2} \times 10 \times h => h = \frac{60}{5}$

$= 12$ $https://jsuniltutorial.weebly.com/$

$Area\ of\ trapezium\ = \frac{1}{2}\ (sum\ of\ parallel\ sides) \times height\ = \frac{1}{2}(20+10) \times 12 = 180cm^2$

5. In the given figure, perimeter of trapezium 130 cm. Find its area

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Perimeter of trapezium 130 cm = AB+BC +CD +AD => 130 = AB + 54 + 19 + 42 => AB = 15cm

$Area\ of\ trapezium\ = \frac{1}{2}\ (sum\ of\ parallel\ sides) \times height\ = \frac{1}{2}(54+42) \times 15 = 720cm^2$
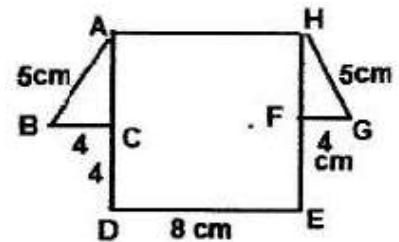
6. Find the area of following figures using given data

(i) In Right triangle ABC, AC = $\sqrt{5^2 - 4^2}$ = $\sqrt{25-16}$ = $\sqrt{9}$ = 3 cm

So, AD = 4 + 3 = 7cm

now area of rectangle ADEH = 7 x 8 = 56cm²

Area of ABC + Rea of HGF = 2 x ½ x 4 x 5 = 20cm²
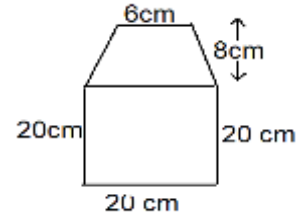
Hence area of ABCDEFGH = 56 + 20 = 76cm²

(ii) Area of fig $= area\ of\ trapezium\ +\ Ara\ of\ square$

$\qquad = \frac{1}{2}\ (sum\ of\ parallel\ sides)x\ height\ \ + (side)^2$

$\qquad = \{\frac{1}{2}(20 + 6)x8\}\ \ \ + \ \ (20x20)$

$\qquad = 104\ +400 = 504cm^2$

(iii) In Right triangle ABC ,

$AC^2 - BC^2\ =\ AB^2\ =>\ AC^2 =\ 41^2 - 40^2$

$=>\ AC =\ \sqrt{1681 - 1600} = \sqrt{81} = 9cm$

$area\ of\ trapezium\ \ = \frac{1}{2}\ (sum\ of\ parallel\ sides)x\ height$

$\qquad\qquad = \frac{1}{2}x\ (40 + 16)x9 = \frac{504}{2} = 252cm^2$
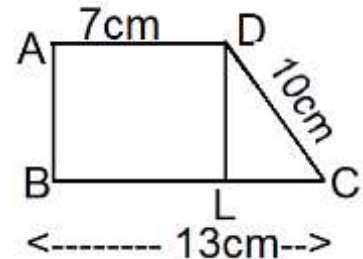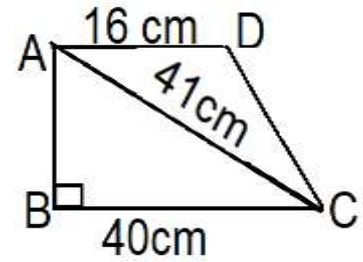

(iv) ABLD is rectangle so, BL= AD = 7 cm then CL = BC – BL = 13 -7 = 6 cm

$DC^2 - LC^2\ =\ DL^2\ =>\ DL^2 =\ 10^2 - 6^2$

$=>\ AC =\ \sqrt{100 - 36}\ =\ \sqrt{64} = 8cm$

$area\ of\ trapezium\ \ = \frac{1}{2}\ (sum\ of\ parallel\ sides)x\ height\ \ =$

$\frac{1}{2}x\ (13 + 7)x\ 8 = 80cm^2$

Question for Practice:

1. Q. Find the area of a trapezium whose parallel sides of lengths 10 cm and 15 cm are at a distance of 6 cm from each other. Calculate this area as: (i) the sum of the areas of two triangles and one rectangle. (ii) the difference of the area of a rectangle and the sum of the areas of two triangles.
        Ans: 75cm2

2. Q. The area of a trapezium is 384 cm2. Its parallel sides are in the ratio 3 : 5 and the perpendicular distance between them is 12 cm. Find the length of each one of the parallel sides.(ans:24cm,40cm)

3. . The parallel sides of a trapezium are 25 cm and 13 cm; its nonparallel sides are equal, each being 10 cm, find the area of the trapezium.(Ans 152 cm2)   https://jsuniltutorial.weebly.com/

4.Find the area of a trapezium whose parallel sides are 25 cm, 13 cm and the other sides are 15 cm each.   (Ans: 57√21 cm2)