Question 21766

The parallel lines of a trapezium are 25 cm and 11cm ,while its non-parallel sides are 15 cm and 13 cm .Find the area of trapezium.

Solution.

Let $ABCD$ be a trapezium and let BH and CK be the heights. We lose no generality assuming that $AB = 15cm, CD = 13cm$. It is clear that
$AH + KD = AD - BC = 25 - 11 = 14$cm and $BH = CK$.
Since the triangles ABH and CKD are right triangles, it follows from the Pythagorean Theorem that
$AB^2 - AH^2 = CD^2 - KD^2$.

Taking into account that $AH = 14 - KD$, we get $225 - (14 - KD)^2 = 169 - KD^2$
Thus
$225 - 196 + 28KD - KD^2 = 169 - KD^2$

and so $KD = 5$. Hence $BH = \sqrt{CD^2 - KD^2} = \sqrt{169 - 25} = 12$.
Then the area of the trapezium

$S = \frac{AD+BC}{2}BH = \frac{25+11}{2}12 = 216cm^2$.
Answer. the area of the trapezium $216cm^2$.