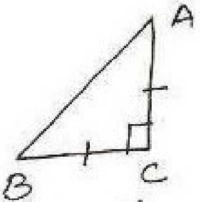
Ex 6.5

math.com

(4)



given – In fig. $\angle C = 90°$,
$AC = BC$

To Prove $AB^2 = 2AC^2$

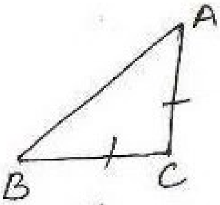
Proof In rt $\triangle BCA$

$AB^2 = AC^2 + BC^2$ **[Pythagoras Theorem]**

$= AC^2 + AC^2$ $(\because AC = BC)$

$AB^2 = 2AC^2$

(5)

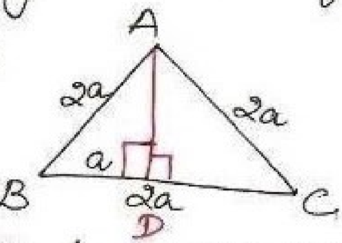


given – In fig. $AC = BC$
$AB^2 = 2AC^2$

to prove – ABC is a right $\triangle$

Proof – $AB^2 = 2AC^2$ (given)
$AB^2 = AC^2 + AC^2$
$\Rightarrow AB^2 = AC^2 + BC^2$ $(\because AC = BC)$
$\Rightarrow \triangle ABC$ is a right $\triangle$
by converse of pyth. th.

(6)



To find AD, BE, CF

Solution In $\triangle ABC$
$AD \perp BC$
$\therefore BD = CD$ **[In an equilateral triangle altitude is also median]**

$BD = CD = \frac{1}{2} BC$
$= \frac{1}{2} \times 2a$
$= a$

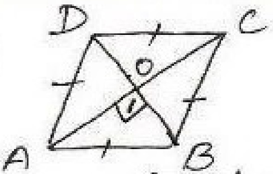
In rt $\triangle BDA$

$AD^2 = AB^2 - BD^2$ **[Pythagoras Theorem]**
$= (2a)^2 - a^2$
$= 4a^2 - a^2$
$= 3a^2$
$\Rightarrow AD = \sqrt{3}a$ units

$\therefore BE = CF = \sqrt{3}a$

[In an equilateral triangle altitudes are equal to each other]

(9)



given – In fig. ABCD is a rhombus

To Show $AB^2 + BC^2 + CD^2 + DA^2 = AC^2 + BD^2$

Proof $\angle 1 = 90°$
$OA = OC$
$OB = OD$

[Diagonals of a rhombus are perpendicular bisectors of each other]

In rt $\triangle AOB$
$AB^2 = OA^2 + OB^2$ (Pyth. th)
$(\times 4)$ $4AB^2 = 4OA^2 + 4OB^2$
$\Rightarrow AB^2 + BC^2 + CD^2 + DA^2 = (2OA)^2 + (2OB)^2$
$= AC^2 + BD^2$ (*)

* $AB = BC = CD = DA$ (sides of rh.)
$OA = OC$, $OB = OD$ (proved)

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