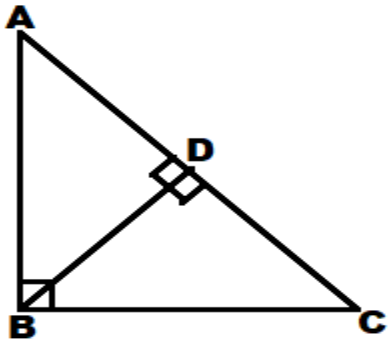
Theorem 6.8.(Pythagoras Theorem)

In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.



Given: - A $\triangle ABC$ in which $\angle ABC = 90°$.

To prove: - $AC^2 = AB^2 + BC^2$.

Construction: - Draw $BD \perp AC$.

Proof: -

In $\triangle ADB$ and $\triangle ABC$, we have

$\angle A = \angle A$ (common) .

$\angle ADB = \angle ABC$ [each equal to 90°] .

$\therefore \triangle ADB \sim \triangle ABC$ [By AA-similarity] .

$\Rightarrow AD/AB = AB/AC$.

$\Rightarrow AB^2 = AD \times AC$ .....(1) .

In $\triangle BDC$ and $\triangle ABC$, we have

$\angle C = \angle C$ (common) .

$\angle BDC = \angle ABC$ [each equal to 90°] .

$\therefore \triangle BDC \sim \triangle ABC$ [By AA-similarity] .

$\Rightarrow DC/BC = BC/AC$.

$\Rightarrow BC^2 = DC \times AC$. .....(2) .

Add in equation (1) and (2) , we get

$\Rightarrow AB^2 + BC^2 = AD \times AC + DC \times AC$.

$\Rightarrow AB^2 + BC^2 = AC(AD + DC)$.

$\Rightarrow AB^2 + BC^2 = AC \times AC$.

$\therefore AB^2 + BC^2 = AC^2$ *Hence Proved*

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