Assignment No.

Your Name

Download all python codes from

https://github.com/ka−raja−babu/Matrix−Theory/tree/main/Assignment1/Codes

and latex-tikz codes from

https://github.com/ka−raja−babu/Matrix−Theory/tree/main/Assignment1

1 Question No. 9

In Figure 1, $\angle BAC = 90^0$, $AD \perp BC$. Prove that $AB^2 + CD^2 = BD^2 + AC^2$.

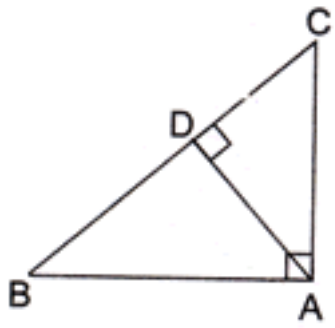

Fig. 1

2 Solution

In fig $\triangle ABC$ *where* $AD \perp BC, \angle BAC = 90°$

To prove : − $AB^2 + CD^2 = BD^2 + AC^2$

Proof : − *Since* $AC \perp BD$

$\angle ADC = \angle ADB = 90°$

In $\triangle ADB, \angle ADB = 90°$

So, ADB is a right Triangle

$\Rightarrow AD^2 = AB^2 - BD^2$ − − − − − − − (1)

Also in $\triangle ADC, \angle ADC = 90°$

So $\triangle ADC$ *is also right Triangle*

$\Rightarrow AD^2 = AC^2 - CD^2$ − − − − − − − (2)

From Both (1) *and* (2), *we get*

$AB^2 - BD^2 = AC^2 - CD^2$

$\Rightarrow AB^2 + CD^2 = BD^2 + AC^2$ (*Hence proved*)