11.9.3.25

EE23BTECH11003 - pranav

question: if a, b, c and d are in GP then show that $(a^2 + b^2 + c^2)(b^2 + c^2 + d^2) = (ab + bc + cd)^2$

Solution: let a, b, c and d are a part of GP x(n)

Variable	Description	Value
$x(0)$	First term of the GP	a
r	Common ratio of the GP	r
b	second term of GP	ar
c	third term of GP	ar^2
d	fourth term of the GP	ar^3

TABLE 1: Variables Used

$$(a^2 + b^2 + c^2)(b^2 + c^2 + d^2) \quad (1)$$

$$(a^2 + (ar)^2 + (ar^2)^2)((ar)^2 + (ar^2)^2 + (ar^3)^3) \quad (2)$$

$$\implies a^4 r^2 (1 + r^2 + r^4)^2 \quad (3)$$

$$\implies (ab)^2 (1 + (\frac{c}{a})^2 + (\frac{cd}{ab})^2) \quad (4)$$

$$\implies (ab + bc + cd)^2 \quad (5)$$