

11.9.3.3

EE23BTECH11065 - prem sagar

Question:

The 5th, 8th and 11th terms of a GP are p, q and s respectively. show that

$$q^2 = ps$$

solution:

Given,

$$a_5 = p$$

$$a_8 = q$$

$$a_{11} = s$$

let first term of a GP = a

common ratio of GP = r

we know,

$$\text{nth term of a GP}(a_n) = a \cdot r^{n-1}$$

$$\text{so 5th term of GP}(a_5) = a \cdot r^4 = p$$

$$\text{8th term of GP}(a_8) = a \cdot r^7 = q$$

$$\text{11th term of GP}(a_{11}) = a \cdot r^{10} = s$$

$$a_8 \cdot a_5 = a \cdot r^7 \cdot a \cdot r^4$$

$$= a^2 \cdot r^{11}$$

$$a_5 \cdot a_{11} = a \cdot r^4 \cdot a \cdot r^{10}$$

$$= a^2 \cdot r^{14}$$

$$a_8^2 = a_5 \cdot a_{11}$$

therefore,

$$q^2 = p \cdot s$$

hence proved

$$q^2 = p \cdot s$$

term	value
a_5	p
a_8	q
a_{11}	s

so,

$$p = a \cdot r^4$$

$$q = a \cdot r^7$$

$$s = a \cdot r^{10}$$

hence proved

$$q^2 = p \cdot s$$

n	value
1	a
2	$a \cdot r$
3	$a \cdot r^2$
4	$a \cdot r^3$
5	$a \cdot r^4$
6	$a \cdot r^5$
7	$a \cdot r^6$
8	$a \cdot r^7$
9	$a \cdot r^8$
10	$a \cdot r^9$
11	$a \cdot r^{10}$