Assignment 1(ICSE 2018 BOARD)

Deepshikha(CS21BTECH11016)

5.a The 4th term of a G.P. is 16 and the 7th terms is 128. Find the first term and common ratio of the series.

Generalised: Let the first term of the G.P. be a and common ratio r , a_m = p and a_n = q be the m th and n th term of G.P. respectively.

Therefore,

$$a_m = ar^{(m-1)} = p \tag{1}$$

$$a_n = ar^{(n-1)} = q \tag{2}$$

Dividing the equation $(2)\div(1)$,

$$\frac{ar^{(n-1)}}{ar^{(m-1)}} = \frac{q}{p}$$

$$r^{(n-m)} = \frac{q}{p}$$

$$r = \left\{\frac{q}{p}\right\}^{(\frac{1}{n-m})} \tag{3}$$

Equation (3) gives the value of r.

Put equation (3) in equation (1) gives value of a ,

$$a = \left\{\frac{p^{(n-1)}}{q^{(m-1)}}\right\}^{(\frac{1}{n-m})} \tag{4}$$

Thus, equation (3) and (4) gives value of r and a respectively.

Solution: Substituting m=4,n=7,p=16,q=128 in equations(3) and (4), we get,

$$r = 8^{(\frac{1}{3})}$$

$$r = 2$$

and,

$$a = \left\{\frac{16^6}{128^3}\right\}^{(\frac{1}{3})}$$

$$a = 2$$

Therefore,

First term=2 and,

Common difference=2

Variable	Value	Description
a_4	16	Fourth term
a_7	128	Seventh term
a	2	First term
r	2	Common diff.

TABLE I
GP