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:

$$x(n) = x(0)\, r^n, \text{if} n \geq 0 \quad (1)$$
$$x(4) = x(0)\, r^5 \quad (2)$$
$$x(7) = x(0)\, r^8 \quad (3)$$
$$x(10) = x(0)\, r^{11} \quad (4)$$
$$x(7)\, x(7) = x(0)\, r^8\, x(0)\, r^8 \quad (5)$$
$$= x(0)^2\, r^{16} \quad (6)$$
$$x(4)\, x(10) = x(0)\, r^5\, x(0)\, r^{11} \quad (7)$$
$$= x(0)^2\, r^{16} \quad (8)$$
$$x(7)^2 = x(4)\, x(10) \quad (9)$$
$$q^2 = ps \quad (10)$$

Symbol	Value	Description
$x(4)$	p	5th term of G.P
$x(7)$	q	8th term of G.P
$x(10)$	s	11th term of G.P

TABLE 0
INPUT PARAMETERS

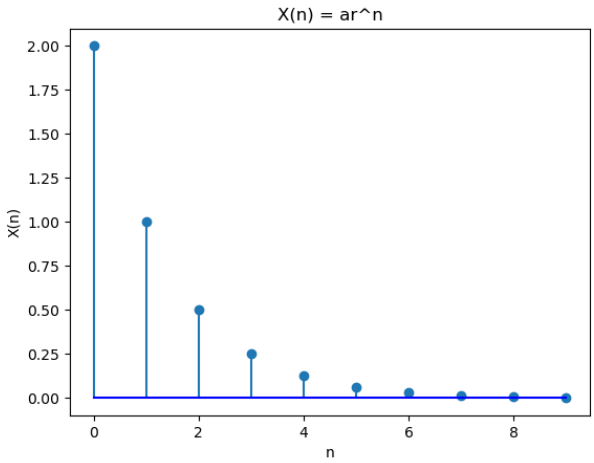

Fig. 0. plot x(n) vs n

$$(11)$$
$$x(n) \overset{Z}{\longleftrightarrow} X(Z) \quad (12)$$
$$x(n) = x(0)\, r^n\, u(n) \quad (13)$$
$$X(Z) = \sum_{n=-\infty}^{\infty} x(n) Z^{-n} \quad (14)$$
$$= \frac{x(0)}{1 - r\, z^{-1}} \;, |z| > |r| \quad (15)$$