

# 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:

Symbol	Value	Description
$x(5)$	$p = x(0)r^5$	5th term of G.P
$x(8)$	$q = x(0)r^8$	8th term of G.P
$x(11)$	$s = x(0)r^{11}$	11th term of G.P
$x(n)$	$x(0)r^n$	nth term of G.P

TABLE 1  
INPUT PARAMETERS

From Table 1:

$$\begin{aligned}
 x(8) &= x(0) r^8 \\
 x(5) &= x(0) r^5 \\
 x(11) &= x(0) r^{11} \\
 x(8)^2 &= x(5) x(11) \\
 q^2 &= ps
 \end{aligned}$$

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)

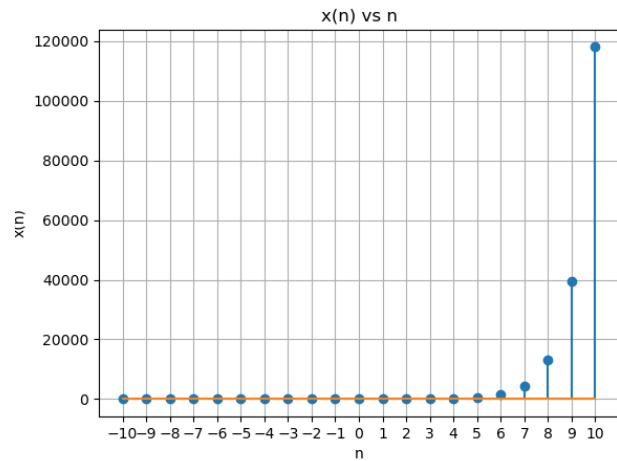


Fig. 1. plot  $x(n)$  vs  $n$   $p=486$ ,  $q=13122$ ,  $s=118098$ ,  $r=3$

$$X(z) = \frac{x(0)}{1 - r z^{-1}}, |z| > |r| \quad (8)$$

$$r = \left(\frac{s}{p}\right)^{\frac{1}{3}} = \left(\frac{q}{p}\right)^{\frac{1}{3}} = \left(\frac{s}{q}\right)^{\frac{1}{2}} \quad (9)$$

$$x(0) = \frac{p^2}{s} = \frac{p^3}{q^2} = \frac{q^4}{s^3} \quad (10)$$

$$X(z) = \frac{p^2 q s}{q s^2 - z^{-1} s^3} \quad (11)$$