

# Assignment

## 11.9.1 - 9

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### QUESTION

Find  $a_9$  in the sequence  $a_n = (-1)^{n-1} n^3$

### SOLUTION

Given,

Symbol	Description
$x(0)$	first term of the sequence
$x(n)$	nth term of the sequence
$x(z)$	$\mathcal{Z}$ - transform of $x(n)$

TABLE 0  
TABLE OF PARAMETERS

$$x(n) = (-1)^{n-1} \cdot n^3 \cdot u(n) \quad (1)$$

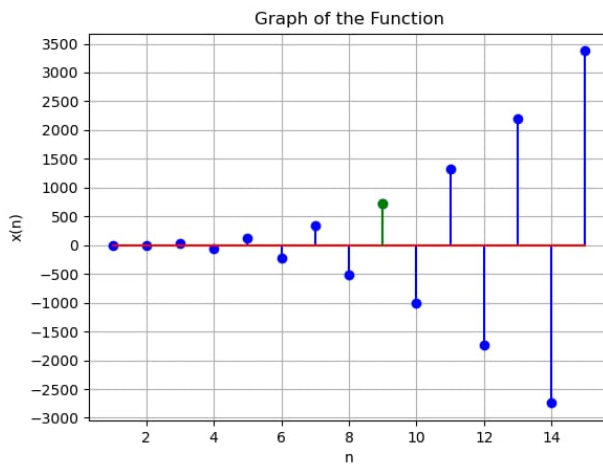
Substitute  $n=9$ ,

$$x(9) = 729 \quad (2)$$

Using  $z$  transform,

$$x(z) = \sum_{n=-\infty}^{n=\infty} (-1)^{n-1} \cdot n^3 \cdot u(n) \cdot z^{-n} \quad (3)$$

$$x(z) = \frac{z^{-1} (1 + 4z^{-1} + z^{-2})}{(1 - z^{-1})^4} \quad \{z : |z| > 1\} \quad (4)$$



Graph of  $x(n)$