

Discrete Assignment

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1) **Question 11.9.4.9:** Find the sum to n terms of the series whose n th term is given by $n^2 + 2^n$?
Solution:

TABLE I
INPUT PARAMETERS

Variable	Description	Value
$x(n)$	n -th term of sequence	$(n^2 + 2^n)u(n)$

$$x(n) = (n^2 + 2^n)u(n) \quad (1)$$

$$2^n \cdot u(n) \xleftrightarrow{Z} \frac{1}{1 - 2z^{-1}} \quad (2)$$

$$(3)$$

$$n^2 u(n) \xleftrightarrow{Z} \frac{z^{-1}(1 + z^{-1})}{(1 - z^{-1})^3} \quad |z| > 1 \quad (4)$$

$$X(z) = \frac{z^{-1}(z^{-1} + 1)}{(1 - z^{-1})^3} + \frac{1}{1 - 2z^{-1}} \quad (5)$$

$$Y(z) = X(z)U(z) \quad (6)$$

$$Y(z) = \left(\frac{z^{-1}(z^{-1} + 1)}{(1 - z^{-1})^3} + \frac{1}{1 - 2z^{-1}} \right) \left(\frac{1}{1 - z^{-1}} \right) \quad (7)$$

$$Y(z) = \frac{z^{-1}(1 + z^{-1})}{(1 - z^{-1})^4} + \frac{2}{1 - 2z^{-1}} - \frac{1}{1 - z^{-1}} \quad (8)$$

$$y(n) = \frac{n^2(n^2 - 1)}{3}u(n) + 2 \cdot 2^n u(n) - u(n) \quad (9)$$

$$y(n) = \left(\frac{n^2(n^2 - 1)}{3} + 2^{n+1} - 1 \right) u(n) \quad (10)$$

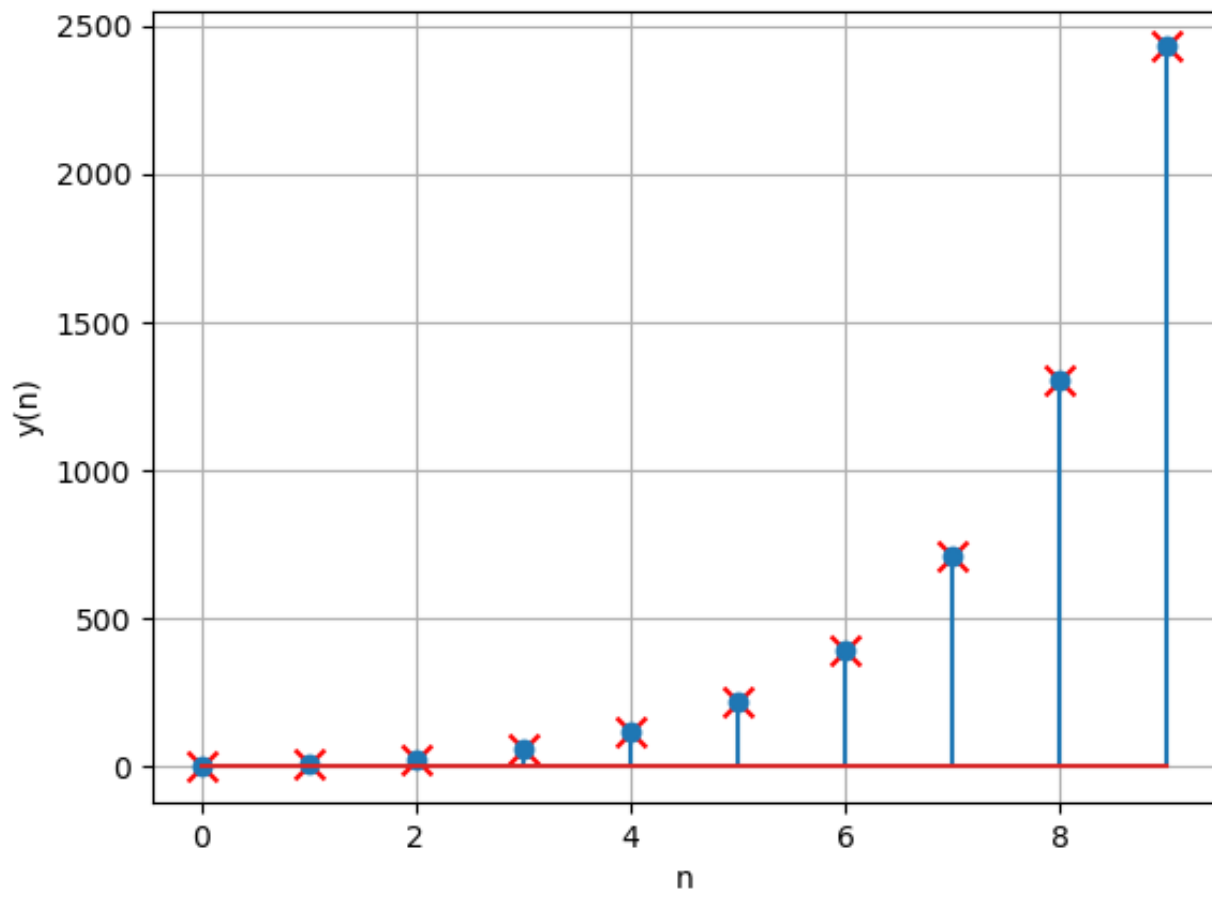


Fig. 1. Graph of $y(n)$