1.3.9

AI25BTECH110030 - SARVESH TAMGADE

Question:
The center of a circle is at $(2,0)$. If one end of a diameter is at $(6,0)$, then find the other end.
Solution:
Since the center $\mathbf{C}$ is the midpoint of the diameter endpoints $\mathbf{A}$ and $\mathbf{B}$,

$$\mathbf{C} = \frac{\mathbf{A}+\mathbf{B}}{2}$$

Multiply both sides by 2:

$$2\mathbf{C} = \mathbf{A}+\mathbf{B}$$

Rearranged for $\mathbf{B}$:

$$\mathbf{B} = 2\mathbf{C} - \mathbf{A} = 2\begin{bmatrix}2\\0\end{bmatrix} - \begin{bmatrix}6\\0\end{bmatrix} = \begin{bmatrix}4\\0\end{bmatrix} - \begin{bmatrix}6\\0\end{bmatrix} = \begin{bmatrix}-2\\0\end{bmatrix}$$

Answer: The other end of the diameter is at

$$\mathbf{B} = \begin{bmatrix}-2\\0\end{bmatrix}$$

Graph:

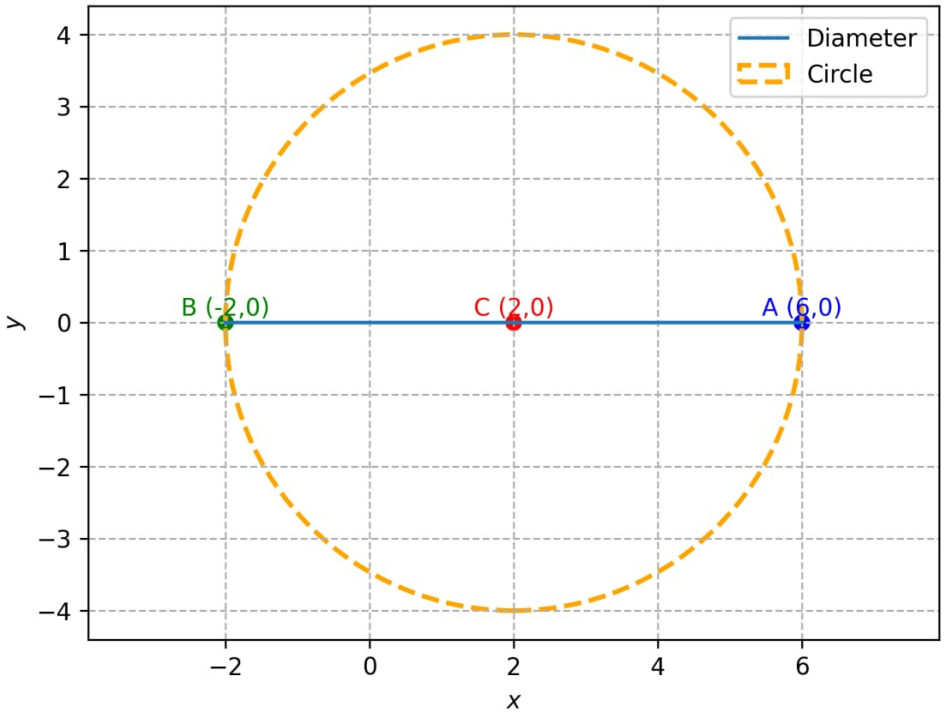

Fig. 1: Stem plot of y(n)