# Assignment-1
## EE:1205 Signals and Systems
## Indian Institute of Technology, Hyderabad

### Kunal Thorawade
### EE23BTECH11035

## I. QUESTION:

Ramkali saved Rs 5 in the first week of a year and then increased her weekly savings by Rs 1.75. If in the $n$th week, her weekly savings become Rs 20.75, find $n$.

## II. SOLUTION:

| Parameter | Value | Description |
|-----------|-------|-------------|
| $x(0)$ | 5 | First term of AP |
| $d$ | 1.75 | Common difference of AP |
| $x(n)$ | 20.75 | $n^{th}$ term of AP |

TABLE 0
PARAMETER LIST

$$x(n) = x(0) + (n)(d) \tag{1}$$

$$20.75 = 5 + (n)(1.75) \tag{2}$$

$$\implies 15.75 = (n)(1.75) \tag{3}$$

$$\implies n = \frac{15.75}{1.75} \tag{4}$$
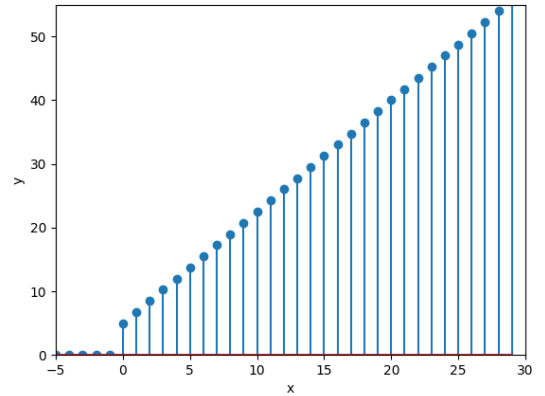
$$\implies n = 9 \tag{5}$$

$$x(n) = 5u(n) + 1.75nu(n) \tag{6}$$

The Z-transform of a sequence $x(n)$ is given by:

$$X(z) = \frac{5z^{-1}}{1 - z^{-1}} + \frac{1.75z^{-1}}{(1 - z^{-1})^2}; |z| > 1 \tag{7}$$



Fig. 0. Plot of $x(n) = 5 + 1.75n$