NCERT Discrete 11.5.9.2

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Question: The sum of three numbers in an arithmetic progression (AP) is 24 and the product of those three numbers is 440, find the values of the three numbers.

Solution: The following information is provided in the question:

Parameter	Value	Description
a	8	Second term
d	3	common difference
xi(0)	5	First term

TABLE I
PARAMETERS

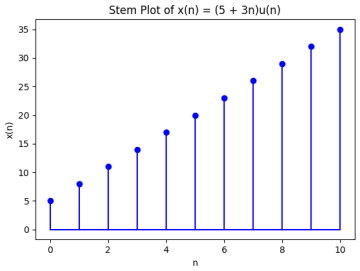

Fig. 1. stem plots of $x(n)$

Let the three numbers in the arithmetic progression be denoted as $a-d$, a, and $a+d$. Then,

$$(a-d)+a+(a+d) = 3a \tag{1}$$
$$3a = 24 \tag{2}$$
$$a = 8 \tag{3}$$
$$(a-d)\cdot a\cdot(a+d) = 440 \tag{4}$$
$$From(4) : (8)\cdot(8-d)\cdot(8+d) = 440 \tag{5}$$
$$(8-d)\cdot(8+d) = 55 \tag{6}$$
$$d = 3 \tag{7}$$
$$x_i(n) = (x_i(0) + n\times d_i)\,u(n) \tag{8}$$
$$x(n) = (2+3n)\,u(n) \tag{9}$$
$$X_1(z) = \frac{5-8z^{-1}}{(1-z^{-1})^2}; |Z| > 1 \tag{10}$$

Therefore, The required three numbers in AP is 5,8 and 11.