

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
d	3	common difference
x(n)	$(x(0) + n \times d) u(n)$	(n+1)th term
S(n)	24	sum of (n+1) terms
p(n)	440	product of (n+1) terms

TABLE 0
PARAMETERS

Let the three numbers in the arithmetic progression be denoted as $x(1) - d$, $x(1)$, and $x(1) + d$. Then,

$$S(2) = (x(1) - d) + x(1) + (x(1) + d) \quad (1)$$

$$= 3x(1) \quad (2)$$

$$3x(1) = 24 \quad (3)$$

$$x(1) = 8 \quad (4)$$

$$P(2) = (x(1) - d) \times x(1) \times (x(1) + d) \quad (5)$$

$$(8) \times (8 - d) \times (8 + d) = 440 \quad (6)$$

$$(8 - d) \times (8 + d) = 55 \quad (7)$$

$$d = 3 \quad (8)$$

$$x(0) = x(1) - d \quad (9)$$

$$x(n) = (x(0) + n \times d) u(n) \quad (10)$$

$$= (5 + 3n) u(n) \quad (11)$$

$$\text{From } (??) \quad (12)$$

$$X(z) = \frac{5 - 8z^{-1}}{(1 - z^{-1})^2}; \quad |z| > |1| \quad (13)$$

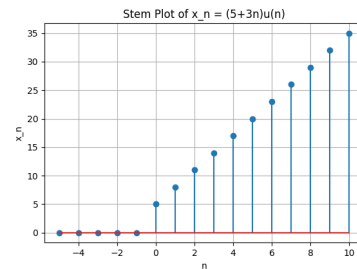


Fig. 0. stem plots of x(n)

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