NCERT Mathematics 10.5.2 Q10

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Question: The 17th term of an AP exceeds its 10th term by 7.Find the common difference.

Solution:

Parameter	Description	Value
$x(0)$	First term of AP	
d	Common difference of AP	
$x(16) - x(9)$	The difference between 17th and 10th term of AP	7

Using the equation $(x(n) = x(0) + (n)d,$

$$(x(0) + 16d) - (x(0) + 9d) = 7 \qquad (1)$$
$$\implies d = 1 \qquad (2)$$

Now,

$$y(n) = (x(0) + nd)u(n) \qquad (3)$$

The z-transform of $y(n)$ is given by

$$Y(z) = x(0) \cdot \frac{1}{1 - z^{-1}} + 1 \cdot \frac{z^{-1}}{(1 - z^{-1})^2}; \quad |z| > 1 \quad (4)$$