Discrete Mathematics

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1 Arithmetic Progression Problem

Which term of the arithmetic progression (AP): $3, 8, 13, 18, \ldots$, is 78?

Parameter	**Value**	**Description**
x(0)	3	Initial term in the AP
d	5	Difference between consecutive terms
x(k) × u(k)	78	Target term in the AP

Table 1: Input Parameters for Arithmetic Progression

To find the term number (k) when the k-th term x(k) is 78 in the arithmetic progression (AP) with the given input parameters, we can use the formula:

$$\mathrm{x}(n) = [\mathrm{x}(0) + (n-1)\mathrm{d}] \times \mathrm{u}(n) \tag{1}$$

$$\tag{2}$$

Substituting the values from Table 1 into Equation (1):

$$\begin{aligned} 78 &= 3 + (k-1) \times 5 \\ 75 &= 5(k-1) \\ 15 &= k-1 \\ k &= 16 \end{aligned}$$

Therefore, the term number (k) when x(k) = 78 in the given arithmetic progression is 16.