

Chapter 7: Number Patterns

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Q1. Find a formula for the general term for each of the following number sequences:

b) -4, -1, 2, 5, 8, ...

Ans: We have, $T_n = T_1 + (n-1) d$

$$T_1 = -4$$

$$d = \begin{array}{ccccccccc} -4, & -1, & 2, & 5, & 8, & \dots \\ \downarrow & \uparrow & \downarrow & \uparrow & \downarrow & \uparrow \\ & +3 & & +3 & & +3 \\ & & & & & +3 \\ & & & & & = +3 \end{array}$$

Therefore, $T_n = T_1 + (n-1) d$

$$= -4 + (n-1) 3$$

$$= -4 + 3n - 3$$

$$= 3n - 7$$

c) 60, 67, 74, 81, 88, ...

Ans: We have, $T_n = T_1 + (n-1) d$

$$T_1 = 60$$

$$d = \begin{array}{ccccccccc} & 60, & 67, & 74, & 81, & 88, & \dots & & \\ & \downarrow & \uparrow & \downarrow & \uparrow & \downarrow & \uparrow & \downarrow & \uparrow \\ & +7 & & +7 & & +7 & & +7 & \end{array}$$

$= +7$

Therefore, $T_n = T_1 + (n-1) d$

$$= 60 + (n - 1) 7$$

$$= 60 + 7n - 7$$

$$= 7n + 53$$

Q3. Consider the sequence 3, 6, 9, 12, 15, ...

i) Write down the next two terms of the sequence.

Ans: $3, 6, 9, 12, 15, \dots$

$$\begin{array}{ccccccccc} & 3, & 6, & 9, & 12, & 15, & \dots & & \\ & \downarrow & \uparrow & \downarrow & \uparrow & \downarrow & \uparrow & \downarrow & \uparrow \\ & +3 & & +3 & & +3 & & +3 & \end{array}$$

Next two terms are 18 and 21.

ii) Find, in terms of n, a formula for the nth term of the sequence.

Ans: We have, $T_n = T_1 + (n-1) d$

$$T_1 = 3$$

$$\begin{array}{ccccccccc} d = & 3, & 6, & 9, & 12, & 15, & \dots & & \\ & \downarrow & \uparrow & \downarrow & \uparrow & \downarrow & \uparrow & & \\ & +3 & +3 & +3 & +3 & & & & \\ & = +3 & & & & & & & \end{array}$$

$$\begin{aligned} \text{Therefore, } T_n &= T_1 + (n-1) d \\ &= 3 + (n - 1) 3 \\ &= 3 + 3n - 3 \\ &= 3n \end{aligned}$$

iii) Hence, find the 105th term.

Ans: We have, $T_n = 3n$
Therefore, $T_{105} = 3 \times 105$
 $= 315$