

# Chapter 4 / Example 13

## Arithmetic sequences

For each of the following arithmetic sequences:

- i State its first term and common difference.
  - ii Find the 10th term of the sequence.
  - iii Determine, giving your reasons, whether 49 is an element of the sequence.
- a**  $u_n = 3n + 1, n \in \mathbb{Z}^+$ . Remember that  $\mathbb{Z}^+$  is the set of positive integers:  $\{1, 2, 3, \dots\}$ .
- b** 206, 199, 192, ...

Press  $[F1]$   $[Y=]$  to display the equation entry screen.

Type  $3x + 1$  in the first equation as  $Y_1$  and press  $[ENTER]$ .

Plot1	Plot2	Plot3
$Y_1 = 3X + 1$		
$Y_2 =$		
$Y_3 =$		
$Y_4 =$		
$Y_5 =$		
$Y_6 =$		
$Y_7 =$		
$Y_8 =$		
$Y_9 =$		

Press  $[2nd]$   $[F5]$  ( $[TABLE]$ )

From the table,  $u_1 = 4$

By subtracting two consecutive terms,  $d = 3$ .

Also from the table,  $u_{10} = 31$ .

X	Y1				
1	4				
2	7				
3	10				
4	13				
5	16				
6	19				
7	22				
8	25				
9	28				
10	31				
11	34				
X=1					

Scroll down the table using  $\downarrow$ .

$u_{16} = 49$

X	Y1				
7	22				
8	25				
9	28				
10	31				
11	34				
12	37				
13	40				
14	43				
15	46				
16	49				
17	52				
X=16					

In the sequence, 206, 199, 192, ...

$u_1 = 206$ .

By subtracting two consecutive terms,  $d = -7$ .

The sequence is  $u_n = 206 + (n-1)(-7)$

Press  $[F1]$   $[Y=]$  to display the equation entry screen.

Type  $206 + (x-1)(-7)$  in the second equation as  $Y_2$ .

Plot1	Plot2	Plot3
$Y_1 = 3X + 1$		
$Y_2 = 206 + (X-1)(-7)$		
$Y_3 =$		
$Y_4 =$		
$Y_5 =$		
$Y_6 =$		
$Y_7 =$		
$Y_8 =$		
$Y_9 =$		

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Press **2nd** **[F5]** (**[TABLE]**)

As stated,  $u_1 = 206$  and  $d = -7$ .

From the table,  $u_{10} = 143$ .

X	Y <sub>1</sub>	Y <sub>2</sub>			
1	4	206			
2	7	199			
3	10	192			
4	13	185			
5	16	178			
6	19	171			
7	22	164			
8	25	157			
9	28	150			
10	31	143			
11	34	136			

X=1

Scroll down the table using **▼**.

$u_{23} = 52$  and  $u_{24} = 45$

49 is not an element of the sequence as it lies between the two values.

X	Y <sub>1</sub>	Y <sub>2</sub>			
19	58	80			
20	61	73			
21	64	66			
22	67	59			
23	70	52			
24	73	45			
25	76	38			
26	79	31			
27	82	24			
28	85	17			
29	88	10			

X=23