

## Exercise 9.2

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1. Show that the sequence defined by  $a_n = 5n - 7$  is an A.P., find its common difference.

**Solution:**

Given,  $a_n = 5n - 7$

Now putting  $n = 1, 2, 3, 4$  we get,

$$a_1 = 5(1) - 7 = 5 - 7 = -2$$

$$a_2 = 5(2) - 7 = 10 - 7 = 3$$

$$a_3 = 5(3) - 7 = 15 - 7 = 8$$

$$a_4 = 5(4) - 7 = 20 - 7 = 13$$

We can see that,

$$a_2 - a_1 = 3 - (-2) = 5$$

$$a_3 - a_2 = 8 - (3) = 5$$

$$a_4 - a_3 = 13 - (8) = 5$$

Since the difference between the terms is common, we can conclude that the given sequence defined by  $a_n = 5n - 7$  is an A.P with common difference 5.

2. Show that the sequence defined by  $a_n = 3n^2 - 5$  is not an A.P.

**Solution:**

Given,  $a_n = 3n^2 - 5$

Now putting  $n = 1, 2, 3, 4$  we get,

$$a_1 = 3(1)^2 - 5 = 3 - 5 = -2$$

$$a_2 = 3(2)^2 - 5 = 12 - 5 = 7$$

$$a_3 = 3(3)^2 - 5 = 27 - 5 = 22$$

$$a_4 = 3(4)^2 - 5 = 48 - 5 = 43$$

We can see that,

$$a_2 - a_1 = 7 - (-2) = 9$$

$$a_3 - a_2 = 22 - 7 = 15$$

$$a_4 - a_3 = 43 - 22 = 21$$

Since the difference between the terms is not common and varying, we can conclude that the given sequence defined by  $a_n = 3n^2 - 5$  is not an A.P.

3. The general term of a sequence is given by  $a_n = -4n + 15$ . Is the sequence an A.P.? If so, find its 15<sup>th</sup> term and the common difference.

**Solution:**

Given,  $a_n = -4n + 15$

Now putting  $n = 1, 2, 3, 4$  we get,

$$a_1 = -4(1) + 15 = -4 + 15 = 11$$

$$a_2 = -4(2) + 15 = -8 + 15 = 7$$

$$a_3 = -4(3) + 15 = -12 + 15 = 3$$

$$a_4 = -4(4) + 15 = -16 + 15 = -1$$

We can see that,

$$a_2 - a_1 = 7 - (11) = -4$$

$$a_3 - a_2 = 3 - 7 = -4$$

$$a_4 - a_3 = -1 - 3 = -4$$

Since the difference between the terms is common, we can conclude that the given sequence defined by  $a_n = -4n + 15$  is an A.P with common difference of  $-4$ .

Hence, the 15<sup>th</sup> term will be

$$a_{15} = -4(15) + 15 = -60 + 15 = -45$$

