

**RD SHARMA**  
**Solutions**  
**Class 10 Maths**  
**Chapter 9**  
**Ex 9.2**

1. For the following arithmetic progressions write the first term  $a$  and the common difference

$d$ :

(i)  $-5, -1, 3, 7, \dots$

(ii)  $\frac{1}{5}, \frac{3}{5}, \frac{5}{5}, \frac{7}{5}, \dots$

(iii)  $0.3, 0.55, 0.80, 1.05, \dots$

(iv)  $-1.1, -3.1, -5.1, -7.1, \dots$

**Sol:**

We know that if  $a$  is the first term and  $d$  is the common difference, the arithmetic progression is  $a, a + d, a + 2d, a + 3d, \dots$

(i)  $-5, -1, 3, 7, \dots$

Given arithmetic series is

$-5, -1, 3, 7, \dots$

This is in the form of  $a, a+d, a+2d, a+3d, \dots$  by comparing these two  
 $a = -5, a+d = 1, a+2d = 3, a+3d = 7, \dots$

First term ( $a$ ) = -5

By subtracting second and first term, we get

$$(a+d) - (a) = d$$

$$-1 - (-5) = d$$

$$4 = d$$

Common difference ( $d$ ) = 4.

(ii)  $\frac{1}{5}, \frac{3}{5}, \frac{5}{5}, \frac{7}{5}, \dots$

Given arithmetic series is,

$$\frac{1}{5}, \frac{3}{5}, \frac{5}{5}, \frac{7}{5}, \dots$$

This is in the form of  $\frac{1}{5}, \frac{2}{5}, \frac{5}{5}, \frac{7}{5}, \dots$

$a, a+d, a+2d, a+3d, \dots$

By comparing this two, we get

$$a = \frac{1}{5}, a+d = \frac{3}{5}, a+2d = \frac{5}{5}, a+3d = \frac{7}{5}$$

First term $a = \frac{1}{5}$
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By subtracting first term from second term, we get

$$d = (a+d) - (a)$$

$$d = \frac{3}{5} - \frac{1}{5}$$

$$d = \frac{2}{5}$$

common difference ( $d$ ) = $\frac{2}{5}$
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(iii) 0.3, 0.55, 0.80, 1.05, .....

Given arithmetic series,

$$0.3, 0.55, 0.80, 1.05, \dots$$

General arithmetic series

$$a, a+d, a+2d, a+3d, \dots$$

By comparing,

$$a = 0.3, a+d = 0.55, a+2d = 0.80, a+3d = 1.05$$

First term ( $a$ ) = 0.3.

By subtracting first term from second term. We get

$$d = (a + d) - (a)$$

$$d = 0.55 - 0.3$$

$$d = 0.25$$

Common difference ( $d$ ) = 0.25

(iv) -1.1, -3.1, -5.1, -7.1, .....

General series is

$$a, a + d, a + 2d, a + 3d, \dots$$

By comparing this two, we get

$$a = -1.1, a + d = -3.1, a + 2d = -5.1, a + 3d = -7.1$$

First term ( $a$ ) = -1.1

$$\text{Common difference } (d) = (a + d) - (a)$$

$$= -3.1 - (-1.1)$$

$$\text{Common difference } (d) = -2$$

2. Write the arithmetic progressions write first term  $a$  and common difference  $d$  are as follows:

(i)  $a = 4, d = -3$

(ii)  $a = -1, d = \frac{1}{2}$

(iii)  $a = -1.5, d = -0.5$

**Sol:**

We know that, if first term ( $a$ ) =  $a$  and common difference =  $d$ , then the arithmetic series is,  $a, a + d, a + 2d, a + 3d, \dots$

(i)  $a = 4, d = -3$

Given first term ( $a$ ) = 4

Common difference ( $d$ ) = -3

Then arithmetic progression is,

$$a, a + d, a + 2d, a + 3d, \dots$$

$$\Rightarrow 4, 4 - 3, a + 2(-3), 4 + 3(-3), \dots$$

$$\Rightarrow 4, 1, -2, -5, -8, \dots$$

(ii)  $a = -1, d = \frac{1}{2}$

Given,

First term ( $a$ ) = -1

Common difference ( $d$ ) =  $\frac{1}{2}$

Then arithmetic progression is,

$\Rightarrow a, a + d, a + 2d, a + 3d, \dots$

$\Rightarrow -1, -1 + \frac{1}{2}, -1 + 2\frac{1}{2}, -1 + 3\frac{1}{2}, \dots$

$\Rightarrow -1, \frac{-1}{2}, 0, \frac{1}{2}, \dots$

(iii)  $a = -1.5, d = -0.5$

Given

First term ( $a$ ) = -1.5

Common difference ( $d$ ) = -0.5

Then arithmetic progression is

$\Rightarrow a, a + d, a + 2d, a + 3d, \dots$

$\Rightarrow -1.5, -1.5 - 0.5, -1.5 + 2(-0.5), -1.5 + 3(-0.5)$

$\Rightarrow -1.5, -2, -2.5, -3, \dots$

Then required progression is

$-1.5, -2, -2.5, -3, \dots$

3. In which of the following situations, the sequence of numbers formed will form an A.P.?

(i) The cost of digging a well for the first metre is Rs 150 and rises by Rs 20 for each succeeding metre.

(ii) The amount of air present in the cylinder when a vacuum pump removes each time  $\frac{1}{4}$  of their remaining in the cylinder.

**Sol:**

(i) Given,

Cost of digging a well for the first meter ( $c_1$ ) = Rs.150.

Cost rises by Rs.20 for each succeeding meter

Then,

Cost of digging for the second meter ( $c_2$ ) = Rs.150 + Rs 20

= Rs 170

Cost of digging for the third meter ( $c_3$ ) = Rs.170 + Rs 20

= Rs 210

Thus, costs of digging a well for different lengths are

150,170,190,210,.....

Clearly, this series is in  $A \cdot p$ .

With first term  $(a) = 150$ , common difference  $(d) = 20$

(ii) Given

Let the initial volume of air in a cylinder be  $V$  liters each time  $\frac{3}{4}$  of air in a remaining i.e.,

$$1 - \frac{1}{4}$$

First time, the air in cylinder is  $\frac{3}{4}V$ .

Second time, the air in cylinder is  $\frac{3}{4}V$ .

Third time, the air in cylinder is  $\left(\frac{3}{4}\right)^2 V$ .

Therefore, series is  $V, \frac{3}{4}V, \left(\frac{3}{4}\right)^2 V, \left(\frac{3}{4}\right)^3 V, \dots$

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

**Sol:**

Given sequence is

$$a_n = 5n - 7$$

$$n^{\text{th}} \text{ term of given sequence } (a_n) = 5n - 7$$

$$(n+1)^{\text{th}} \text{ term of given sequence } (a_{n+1}) - a_n$$

$$= (5n - 2) - (5n - 7)$$

$$= 5$$

$$\therefore d = 5$$

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

**Sol:**

Given sequence is,

$$a_n = 3n^2 - 5.$$

$$n^{\text{th}} \text{ term of given sequence } (a_n) = 3n^2 - 5.$$

$$(n+1)^{\text{th}} \text{ term of given sequence } (a_{n+1}) = 3(n+1)^2 - 5$$

$$= 3(n^2 + 1^2 + 2n \cdot 1) - 5$$

$$= 3n^2 + 6n - 2$$

$$\therefore \text{The common difference } (d) = a_{n+1} - a_n$$

$$d = (3n^2 + 6n - 2) - (3n^2 - 5)$$

$$= 3n^2 + 6n - 2 - 3n^2 + 5$$

$$= 6n + 3$$

Common difference (d) depends on 'n' value

$\therefore$  given sequence is not in A.P