Arithmetic Progressions Ex 9.2 Q7

Answer :

In the given problem, we need to find the common difference and the next four terms of the given A.P.

(i) $1,-2,-5,-8,...$

Here, first term (a_1) =1

Common difference (d) $=a_2-a_1$

$=-2-1$

$=-3$

Now, we need to find the next four terms of the given A.P

That is we need to find a_5,a_6,a_7,a_8.

So, using the formula $a_n=a+(n-1)d$

Substituting $n=5,6,7,8$ in the above formula

Substituting n = 5, we get

$a_5=1+(5-1)(-3)$

$a_5=1-12$

$a_5=-11$

Substituting n = 6, we get

$a_6=1+(6-1)(-3)$

$a_6=1-15$

$a_6=-14$

Substituting n = 7, we get

$a_7=1+(7-1)(-3)$

$a_7=1-18$

$a_7=-17$

Substituting n = 8, we get

$a_8=1+(8-1)(-3)$

$a_8=1-21$

$a_8=-20$

Therefore, the common difference is $\boxed{d=-3}$ and the next four terms are $\boxed{-11,-14,-17,-20}$

(ii) $0,-3,-6,-9,...$

Here, first term (a_1) =0

Common difference (d) $=a_2-a_1$

$=-3-0$

$=-3$

Now, we need to find the next four terms of the given A.P

That is we need to find a_5,a_6,a_7,a_8.

So, using the formula $a_n=a+(n-1)d$

Substituting $n=5,6,7,8$ in the above formula

Substituting n = 5, we get

$a_5=0+(5-1)(-3)$

$a_5=0-12$

$a_5=-12$

Substituting n = 6, we get

$a_6=0+(6-1)(-3)$

$a_6 = 0 - 15$

$a_6 = -15$

Substituting $n = 7$, we get

$a_7 = 0 + (7-1)(-3)$

$a_7 = 0 - 18$

$a_7 = -18$

Substituting $n = 8$, we get

$a_8 = 0 + (8-1)(-3)$

$a_8 = 0 - 21$

$a_8 = -21$

Therefore, the common difference is $\boxed{d = -3}$ and the next four terms are $\boxed{-12, -15, -18, -21}$

(iii) $-1, \frac{1}{4}, \frac{3}{2}, \ldots$

Here, first term (a_1) =−1

Common difference (d) $= a_2 - a_1$

$= \frac{1}{4} - (-1)$

$= \frac{1+4}{4}$

$= \frac{5}{4}$

Now, we need to find the next four terms of the given A.P

That is we need to find a_4, a_5, a_6, a_7

So, using the formula $a_n = a + (n-1)d$

Substituting $n = 4, 5, 6, 7$ in the above formula

Substituting $n = 4$, we get

$$a_4 = -1 + (4-1)\left(\frac{5}{4}\right)$$

$$a_4 = -1 + \frac{15}{4}$$

$$a_4 = \frac{-4+15}{4}$$

$$a_4 = \frac{11}{4}$$

Substituting $n = 5$, we get

$$a_5 = -1 + (5-1)\left(\frac{5}{4}\right)$$

$$a_5 = -1 + 5$$

$$a_5 = 4$$

Substituting $n = 6$, we get

$$a_6 = -1 + (6-1)\left(\frac{5}{4}\right)$$

$$a_6 = -1 + \frac{25}{4}$$

$$a_6 = \frac{-4 + 25}{4}$$

$$a_6 = \frac{21}{4}$$

Substituting $n = 7$, we get

$$a_7 = -1 + (7-1)\left(\frac{5}{4}\right)$$

$$a_7 = -1 + \frac{30}{4}$$

$$a_7 = \frac{-4 + 30}{4}$$

$$a_7 = \frac{26}{4}$$

Therefore, the common difference is $\boxed{d = \frac{5}{4}}$ and the next four terms are $\boxed{\frac{11}{4}, 4, \frac{21}{4}, \frac{26}{4}}$

(iv) $-1, -\frac{5}{6}, -\frac{2}{3}, \ldots$

Here, first term (a_1) $= -1$

Common difference (d) $= a_2 - a_1$

$$= -\frac{5}{6} - (-1)$$

$$= \frac{-5 + 6}{6}$$

$$= \frac{1}{6}$$

Now, we need to find the next four terms of the given A.P

That is we need to find a_4, a_5, a_6, a_7

So, using the formula $a_n = a + (n-1)d$

Substituting $n = 4, 5, 6, 7$ in the above formula

Substituting $n = 4$, we get

$$a_4 = -1 + (4-1)(\frac{1}{6})$$

$$a_4 = -1 - \frac{1}{2}$$

$$a_4 = \frac{-2 - 1}{2}$$

$$a_4 = -\frac{1}{2}$$

Substituting $n = 5$, we get

$$a_5 = -1 + (5-1)(\frac{1}{6})$$

$$a_5 = -1 + \frac{2}{3}$$

$$a_5 = \frac{-3 + 2}{3}$$

$a_5 = -\frac{1}{3}$

Substituting $n = 6$, we get

$a_6 = -1 + (6-1)(\frac{1}{6})$

$a_6 = -1 + \frac{5}{6}$

$a_6 = \frac{-6+5}{6}$

$a_6 = -\frac{1}{6}$

Substituting $n = 7$, we get

$a_7 = -1 + (7-1)(\frac{1}{6})$

$a_7 = -1 + 1$

$a_7 = 0$

Therefore, the common difference is $\boxed{d = \frac{1}{6}}$ and the next four terms are $\boxed{-\frac{1}{2}, -\frac{1}{3}, -\frac{1}{6}, 0}$

********** END **********