



(vi) $p, p+90, p+180, p+270, \dots$ Where, $p = (999)^{999}$

Here,

First term (a) = p

$$a_1 = p + 90$$

$$a_2 = p + 180$$

Now, for the given to sequence to be an A.P,

$$\text{Common difference } (d) = a_1 - a = a_2 - a_1$$

Here,

$$\begin{aligned} a_1 - a &= p + 90 - p \\ &= 90 \end{aligned}$$

Also,

$$\begin{aligned} a_2 - a_1 &= p + 180 - p - 90 \\ &= 90 \end{aligned}$$

Since $a_1 - a = a_2 - a_1$

Hence, the given sequence is an A.P and its common difference is $d = 90$

(vii) $1.0, 1.7, 2.4, 3.1, \dots$

Here,

First term (a) = 1.0

$$a_1 = 1.7$$

$$a_2 = 2.4$$

Now, for the given to sequence to be an A.P,

$$\text{Common difference } (d) = a_1 - a = a_2 - a_1$$

Here,

$$\begin{aligned} a_1 - a &= 1.7 - 1.0 \\ &= 0.7 \end{aligned}$$

Also,

$$\begin{aligned} a_2 - a_1 &= 2.4 - 1.7 \\ &= 0.7 \end{aligned}$$

Since $a_1 - a = a_2 - a_1$

Hence, the given sequence is an A.P and its common difference is $d = 0.7$

(viii) $-225, -425, -625, -825, \dots$

Here,

First term (a) = -225

$$a_1 = -425$$

$$a_2 = -625$$

Now, for the given to sequence to be an A.P,

$$\text{Common difference } (d) = a_1 - a = a_2 - a_1$$

Here,

$$\begin{aligned} a_1 - a &= -425 - (-225) \\ &= -200 \end{aligned}$$

Also,

$$\begin{aligned} a_2 - a_1 &= -625 - (-425) \\ &= -200 \end{aligned}$$

Since $a_1 - a = a_2 - a_1$

Hence, the given sequence is an A.P and its common difference is $d = -200$

(ix) $10, 10+2^5, 10+2^6, 10+2^7, \dots$

Here,

First term (a) = 10

$$a_1 = 10 + 2^5$$

$$a_2 = 10 + 2^6$$

$$a_3 = 10 + 2^7$$

Now, for the given sequence to be an A.P,

$$\text{Common difference } (d) = a_2 - a_1 = a_3 - a_2$$

Here,

$$\begin{aligned} a_2 - a_1 &= 10 + 2^6 - 10 - 2^5 \\ &= 64 - 32 \\ &= 32 \end{aligned}$$

Also,

$$\begin{aligned} a_3 - a_2 &= 10 + 2^7 - 10 - 2^6 \\ &= 128 - 64 \\ &= 64 \end{aligned}$$

Since $a_1 - a \neq a_2 - a_1$

Hence, the given sequence is not an A.P

(x) $a+b, (a+1)+b, (a+1)+(b+1), (a+2)+(b+1), (a+2)+(b+2), \dots$

Here,

First term (a) = $a+b$

$$a_1 = (a+1)+b$$

$$a_2 = (a+1)+(b+1)$$

Now, for the given sequence to be an A.P,

$$\text{Common difference } (d) = a_1 - a = a_2 - a_1$$

Here,

$$\begin{aligned} a_1 - a &= a+1+b-a-b \\ &= 1 \end{aligned}$$

Also,

$$\begin{aligned} a_2 - a_1 &= a+1+b+1-a-1-b \\ &= 1 \end{aligned}$$

Since $a_1 - a = a_2 - a_1$

Hence, the given sequence is an A.P and its common difference is $\boxed{d=1}$

(xi) $1^2, 3^2, 5^2, 7^2, \dots$

Here,

First term (a) = 1^2

$$a_1 = 3^2$$

$$a_2 = 5^2$$

Now, for the given sequence to be an A.P,

$$\text{Common difference } (d) = a_1 - a = a_2 - a_1$$

Here,

$$\begin{aligned} a_1 - a &= 3^2 - 1^2 \\ &= 9 - 1 \\ &= 8 \end{aligned}$$

Also,

$$\begin{aligned}a_2 - a_1 &= 5^2 - 3^2 \\&= 25 - 9 \\&= 16\end{aligned}$$

Since $a_1 - a \neq a_2 - a_1$

Hence, the given sequence is not an A.P

(xii) $1^2, 5^2, 7^2, 73, \dots$

Here,

First term (a) = 1^2

$$a_1 = 5^2$$

$$a_2 = 7^2$$

Now, for the given sequence to be an A.P,

Common difference (d) = $a_1 - a = a_2 - a_1$

Here,

$$\begin{aligned}a_2 - a_1 &= 5^2 - 1^2 \\&= 25 - 1 \\&= 24\end{aligned}$$

Also,

$$\begin{aligned}a_3 - a_2 &= 7^2 - 5^2 \\&= 49 - 25 \\&= 24\end{aligned}$$

Since $a_1 - a = a_2 - a_1$

Hence, the given sequence is an A.P with the common difference $d = 24$.

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